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How to Use the Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, city, state or nation. Entries about electric railway companies are under the name of the city in which the main office of the company is located, but in the case of electrified sections of steam railroads, the entries appear under the name of the railroad.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into fourteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index unless, like "employees," they appear also in small type. As an example of how to use the index, if a reader wishes to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only Special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

The list of keywords is revised from time to time to keep the index abreast with developments. In this index, articles relating to motor buses have been grouped under six heads, as shown below.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop practice; shop methods and equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION

Accident claim department
Accidents (including wrecks)
Medical
Safety work
Storm and fire damage

ELECTRIC CARS AND SERVICE CARS

Cars (including car design)
Locomotives
Service and tower trucks
Trackless trolley

CAR EQUIPMENT

Bearings
Brakes and compressors
Current collection
Doors, car
Electrical equipment for cars (except motors)
Gears and pinions
Heaters, electric
Lighting and lighting fixtures
Motors, Electric
Resistors
Seats
Trolley wheels
Trucks
Wheels and axles

EMPLOYEES

Education
Employees
Labor
Medical
Strikes and arbitrations
Tests, Psychological
Wage decreases
Wage increases
Wages and working agreements

FARES

Fare collection (including apparatus)
Fare decreases
Fare increases
Fares
Traffic investigations
Traffic stimulation

FINANCIAL, LEGAL AND STATISTICS

Accounting
Appraisal of railway property
Blanks and forms
Discontinuance of lines
Financial (methods of financing)
Franchises
Insurance, Fire
Insurance and pensions
Legal
Legislation for railways
Market conditions
Operating records and costs
Public service and regulative commissions
Statistics
Taxes

HEAVY ELECTRIC TRACTION

Heavy electric traction (general)
Locomotives

MAINTENANCE OF EQUIPMENT

Car cleaning
Lubrication
Maintenance practice
Motor buses, Practice with
Painting
Repair shop practice; cars and car equipment
Repair shop practice; shop methods and equipment
Repair shops and equipment
Stores
Tests of materials and equipment
Welding

MOTOR BUSES

Motor buses, design
Motor buses, field for
Motor buses, installations
Motor buses, jitney competition
Motor buses, practice with
Motor buses, regulation

POWER

Energy checking devices
Energy consumption
Fuels
Overhead contact system
Power distribution

POWER—Continued

Power generation
Power stations and equipment
Power transmission
Substations and equipment

STRUCTURES

Carhouses and storage yards
Power stations and equipment
Repair shops and equipment
Substations and equipment
Terminals and waiting stations

TRACK

Pavements
Poles
Rail joints and bonds
Rails
Special trackwork
Ties
Track construction
Track maintenance

TRAFFIC AND TRANSPORTATION

Advertising
Customer ownership
Freight and express
Interurban railways
Merchandising transportation
Publicity
Public, Relations with
Rapid transit (elevated and subway)
Schedules and timetables
Signals
Street traffic congestion
Traffic investigations
Traffic regulation
Traffic stimulation
Transportation, Metropolitan (general studies)

MISCELLANEOUS

European practice
Historical
Government ownership
Management
Noise reduction
Railways (general)
Snow and ice removal
Standardization
Wood preservation

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(•Indicates Portrait)

New York, July 5, 1924

Electric Railway Journal

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A Day for Inspection of Exhibits

AT THIS year's convention of the American Electric Railway Association Wednesday is to be set apart on the program exclusively for the inspection and study of exhibits. The American and all affiliated associations are to have no business sessions on this day. The way will be cleared so that no one will have reason to say this year, as many always have had occasion to, that they had had scarcely any time to see the exhibits.

This new plan is frankly an experiment. It ought to be a great success. The exhibits are well worthy of this special recognition. The plan has the enthusiastic indorsement of the manufacturers. It increases the value they may expect to derive from the large sums of money invested in their exhibits. And because of the expense and effort they are put to, they are entitled to this more definite share in the allotment of convention time.

But the plan will fall down miserably if Wednesday is taken by many as a day off to play golf instead of a day off to study the exhibits. Railway executives should make it plain to the men they send that their duty is to be on the pier among the exhibits on Wednesday. And the executives should take some of this to heart themselves. Then as a further inducement, the exhibitors would do well to arrange special attractions at their booths on Wednesday. The Convention Daily of ELECTRIC RAILWAY JOURNAL will do all it possibly can to co-operate in telling the delegates of all the attractions that will invite their presence on the pier on this day off from business sessions.

Is the Service Ready for the Spotlight?

IN A RECENT paper on selling transportation the statement was made that the railways should not turn on the spotlight of publicity until they are ready for it. The thought might be expressed another way by saying we must be sure that we have for sale that which we advertise. Advertising alone will not sell goods. Advertising only creates a demand. Unless that demand is met by good merchandise when the customer calls for it, the advertising is likely to be just an expense rather than a real help.

Nothing hurts the reputation of a merchant more than to make claims for his merchandise that are not fully met when his customers buy the product advertised. Our customers are the car riders. Our salesmen are the platform men, and our product is transportation. We are the merchants, or rather, both the manufacturers and the merchants of this product—transportation.

There may be three varieties of transportation—good, indifferent and bad. Our salesmen in the form of platform men may be good, polite salesmen—or just platform men.

If we are sure that our transportation service is good service, that our platform men are good salesmen, then by all means let us use all the modern methods of publicity to tell the facts to our customers.

But if we are not so sure of our service; if we are rather in doubt about some of our salesmen—then we must get busy and remedy the defects.

It stands to reason that we cannot sell something we do not have—and all the publicity in the world will not make good service out of bad.

Let's Have an Exhibit of *All* Kinds of Rolling Stock

THE bus manufacturers have inspired some new thinking among railway men and car manufacturers. They cannot take credit for it exactly, nor is it to their discredit. It is simply that with 25 per cent of the exhibit space occupied by buses at last year's convention, and with the applications for 35 per cent of the space so far this year coming from bus manufacturers, railway men have sensed the fact that it is not too expensive, nor are new cars too much like the same old thing, to make the exhibition of the latest developments in railway car design worth while.

The bus has the great advantage that it can be run right into the convention hall and that it is so readily mobile anywhere. The facilities are not good at Atlantic City for exhibiting cars, as they must be shown on the near-by streets. But the car builders have much to show that is new, and attention can be directed to their exhibits even if off the pier.

Britton I. Budd, president of the association, has tentatively planned to exhibit a train of the new cars of the Chicago-Milwaukee line, probably including a dining car, a parlor-observation car, a standard coach and a combination baggage and passenger coach. A number of other electric railway companies might with profit to the industry exhibit one or two of their latest designs of cars. For example, the Interstate Public Service Company might exhibit one of its new sleeping cars and a club car. There ought to be exhibited one of the new Detroit type articulated units. The Chicago Surface Lines could well show its latest design of one-man, two-man car recently ordered. The Indiana Service Corporation might show its new 51,700-lb. interurban car. The new double-truck Birmingham car weighing only 564 lb. per seat, with its new race separation arrangement, would interest all the Southern railway men. The Minneapolis company has a car which has been widely referred to in the newspapers as a "noiseless car." Delegates would be interested to see what there is to this popular appeal. It certainly is a great accomplishment, if true.

In general, there is no reason why a railway which has made some progressive development should not show it to the rest of the industry. In other words, the railways themselves should be willing to help push modernization in the industry as well as the manufacturers. No one builder can afford to show more than two or three cars to the convention, but if the railways would take up a little of this burden, we could have a real exhibit of rail cars as well as buses.

Railways Seek Use of Streets in Way to Serve Greatest Number

AMONG automotive industry men there is a common imputation that electric railways want every one else kicked off the streets so that they can have unobstructed right of way.

It is unfortunate if some of the advertising put out by the electric railways in the effort to educate toward relief of traffic congestion has lent itself to that impression, especially in the minds of men sensitive to anything which would tend to limit the use of the streets by other types of vehicles. The tone of some of this advertising has possibly been too sweeping and lacking in evidence of consideration of the other users of the streets. This point should be borne in mind in preparing copy.

Nevertheless, this paper believes that any entirely disinterested person will arrive at the conclusion that whatever is done to relieve congestion ought to give first consideration to the street railway, because in that way the greatest number of people are benefited. From three to five times as many people use the street by the railway as use it by all other vehicles combined. The street railway, with its cars and buses, is the backbone of the transportation facilities of any city. It supplies 250 rides per year for every city inhabitant, averaged over the country for all sizes of cities. In other words, 250 times the population of a city is the index of public benefit to be derived from any regulation making possible a faster operation of street cars. No other means of travel compares with this in the number of annual services performed.

Furthermore, faster operation of street cars resulting from such traffic rules redounds to the public in another way. To speed up a railway produces simultaneously one of the biggest economies and one of the best means of increasing the revenue. But as the railway is permitted under modern utility regulation to earn only a fixed rate of return, the faster operation then means that sooner or later a lower rate of fare will be in effect. The only way that the railway itself profits is that improvement of this sort may in some cases enable it to earn the allowable return, where under slower operation it is unable to do so.

If railway operation were strictly a private enterprise comparable with the business of manufacturing automobiles—in other words, if it were car manufacturers rather than railway operating men who were urging prohibition of parking, then there would be justification for the accusation in the opening sentence of this editorial. But the railway is a public servant. It uses the streets to transport people. It does not use them to store cars that are needed only at certain hours. In fact, it spends considerable money to get the cars to and from private storage yards so that they will not obstruct the streets when not in use.

The electric railways are not trying to hog the streets. They are not interested in any other use of the streets so long as it does not interfere with the service they are trying to perform for the public at large. They are interested in ways and means to speed up all moving traffic, as this would reduce interference with the cars. So long as there was street capacity to spare they did not oppose the parking of automobiles. But with the full street capacity needed there is scant justification for the use of any portion of it as a garage, as this presents a serious interference to the movement of all traffic.

It is unfortunate that the railways have to work toward an end which is unpopular with all regular automobile users and with the manufacturers behind the automobile. But some one has to champion the transportation requirements of the great bulk of the population, and that lot falls to the electric railway.

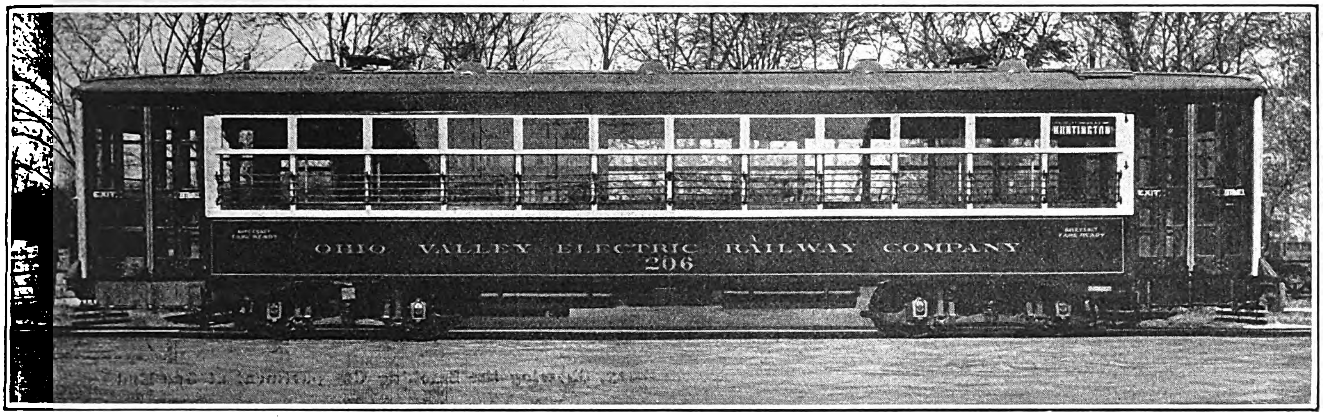
Let's Stop "Talking Poor"

SOMEWHERE there is a place loosely described as being between the devil and the deep sea, and commonly reputed to be one of the most unpleasant localities known to man. It is just about in that position, however, that the electric railways have been during recent years with regard to making public their exact financial status. On the one hand if they adopted a cheerful tone, announced that they were making money and that future prospects appeared rosy, there was the likelihood of public agitation for lower fares. On the other hand if they continually used the plea of poverty in order to get more reasonable fares, preserve existing fares, or get rid of some onerous taxation burden, they were in danger of casting a dark shadow over the entire industry from the financial standpoint.

In this dilemma a good many executives felt that the need for more revenue or relief from certain obligations was immediate and that the harmful effect on the industry of "talking poor" was remote. For that reason we have been hearing for some years past a good deal about the poverty of the electric railways. This has produced an unfortunate impression in the public mind which has been harmful to the industry.

"What is going to become of the electric railway?" the man on the street reasons to himself. "They say they're not earning any money and can't afford to make improvements. An industry that does not go forward, goes backward. If the electric railways are not going forward it must be because their day is about over." Thoughts of that kind tend to undermine public confidence in the railways as a medium of transportation.

As a matter of fact conditions are not nearly so black as they have sometimes been painted. Even in their worst years the electric railways spent enormous sums of money on the maintenance of their rolling stock and track. They are spending a great deal more today. More track is being reconstructed; more new cars are being put in service, and, best of all, more people are riding in the cars than ever before. A more or less satisfactory rate of fare is in vogue in most places. If there was a time when we needed to tell how hard up we were, that time has largely passed, as we have the higher rates of fare and some relief from unfair burdens. So let's stop "talking poor" and sound a note of prosperity. That is what we need now, to bring new money into the industry for capital improvements.



The Railway Lines in Huntington, W. Va., Have Been Completely Re-equipped with Cars of This Type

Modernizing Electric Railway Service in Huntington

Ohio Valley Electric Railway Has Replaced Old Cars with Modern Light-Weight One-Man, Two-Man Cars on All Lines—Schedule Speed Has Been Increased 17 per Cent—Maintenance Costs Have Been Reduced

UNTIL a short time ago the Ohio Valley Electric Railway, Huntington, W. Va., like many other electric railways, was operating a miscellaneous lot of rolling stock. This old equipment was of various ages and various types. There were some small cars and some big cars, some old cars and some comparatively new cars. All of the cars, however, were very heavy and caused rapid wear of the trackwork. In order to give better service and also to prolong the life of the track the railway bought 40 new cars, enough completely to re-equip all its lines on the south side of the Ohio River. These new cars have made it possible to give better and faster service at lower cost.

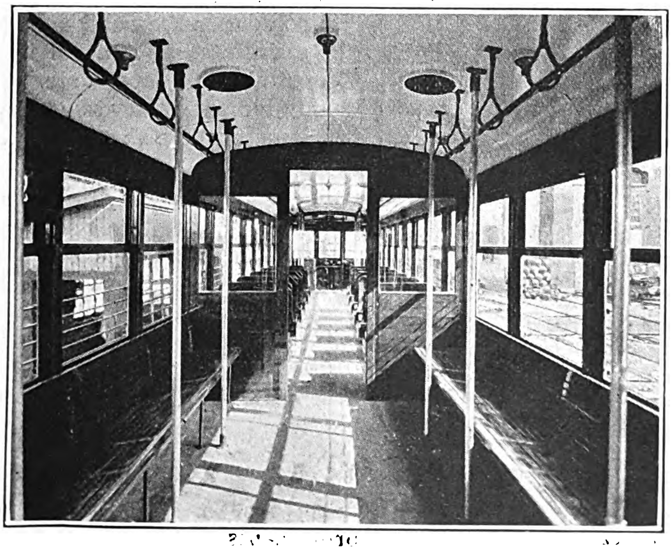
The railway serves a community of about 125,000 people covering a distance of 25 miles on the West Virginia and Kentucky side of the Ohio River. City service is supplied in Huntington, a town of about 75,000 population, and one local line is operated in Ashland, a town of about 15,000 inhabitants. Interurban service is operated between Huntington and Ashland. On the other side of the Ohio River, with no physical connection to the Huntington lines, the same company operates several miles of electric railway through Ironton.

Ashland and Ironton are large steel manufacturing centers. Huntington, on the other hand, is a city of widely diversified industry. The West Virginia industrial plants operate on Eastern time, while the Kentucky and Ohio plants operate on Central time. It thus happens that the hours of the factory workers are so arranged that the manufacturing plants do not all start work at one time. For this reason the railway is able to handle the factory employees with only a few extra cars, the regular all-day service being nearly sufficient for this purpose.

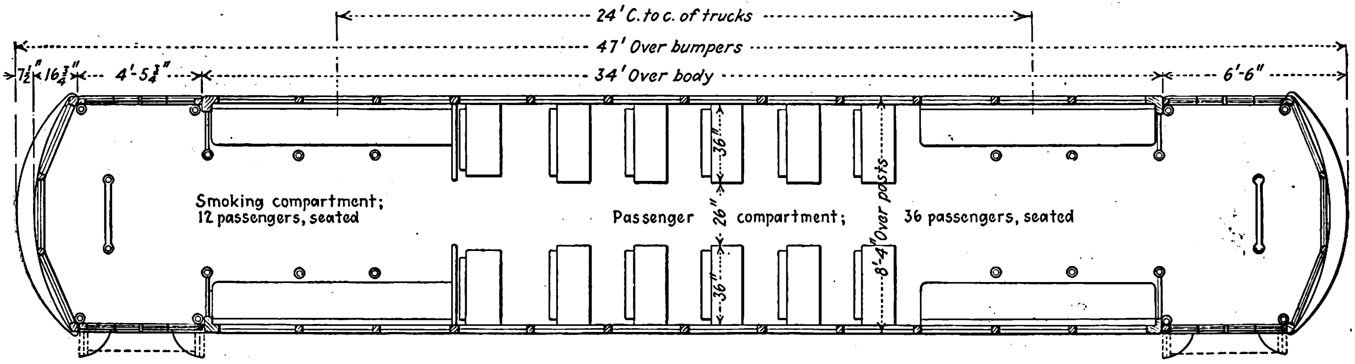
The tracks of the Ohio Valley Electric Railway were in general in very good shape at the time when it was decided to purchase new rolling stock. A great deal of work had been done during the preceding ten years, and this was reflected in the good condition of the roadbed. In some places, however, the track was beginning to show signs of wear on account of the operation of extremely heavy cars. Many of these weighed as much as 58,000 lb. and the lightest weighed over 39,000 lb. The new cars weigh only 34,000 lb.

About the time when the wear on the track was first coming to the attention of the officials of the railway it was thought that faster schedules were needed in Huntington and on the interurban line. Relations between the public and the company had been very friendly throughout this area, and it was felt that it would be a wise move to foster this spirit by improving the railway service. The idea of forestalling possible jitney competition was also an important factor.

It was therefore decided that in order to provide faster service and to reduce the regular maintenance cost and power consumption the railways should be re-equipped with 100 per cent new rolling stock. A car suitable for all the various kinds of service operated by this company was selected and



A Light Bulkhead Separates the Smoking Compartment from the Rest of the Car


24' C. to c. of trucks
47' Over bumpers
7½"
16¾"
4'-5¼"
34' Over body
6'-6"
Smoking compartment; 12 passengers, seated
Passenger compartment; 36 passengers, seated
36"
26"
36"
8'-4" Over posts

Floor Plan of New Cars of the Ohio Valley Electric Railway, Showing the Smoking Compartment at One End

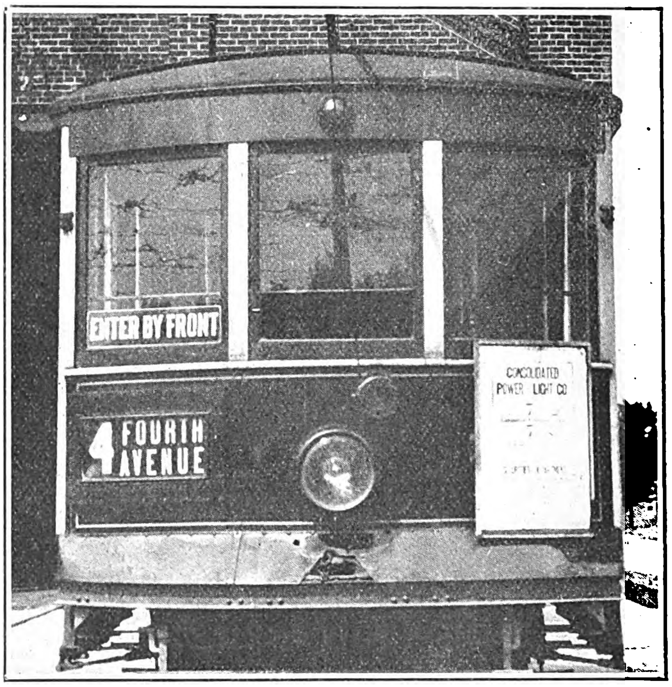
40 new cars of this type were purchased. The old equipment was sold to other railways, except three cars, which were retained for service on the Ohio side of the river, which is not physically connected with the West Virginia and Kentucky side.

The New Cars Have Been Designed for City and Interurban Service

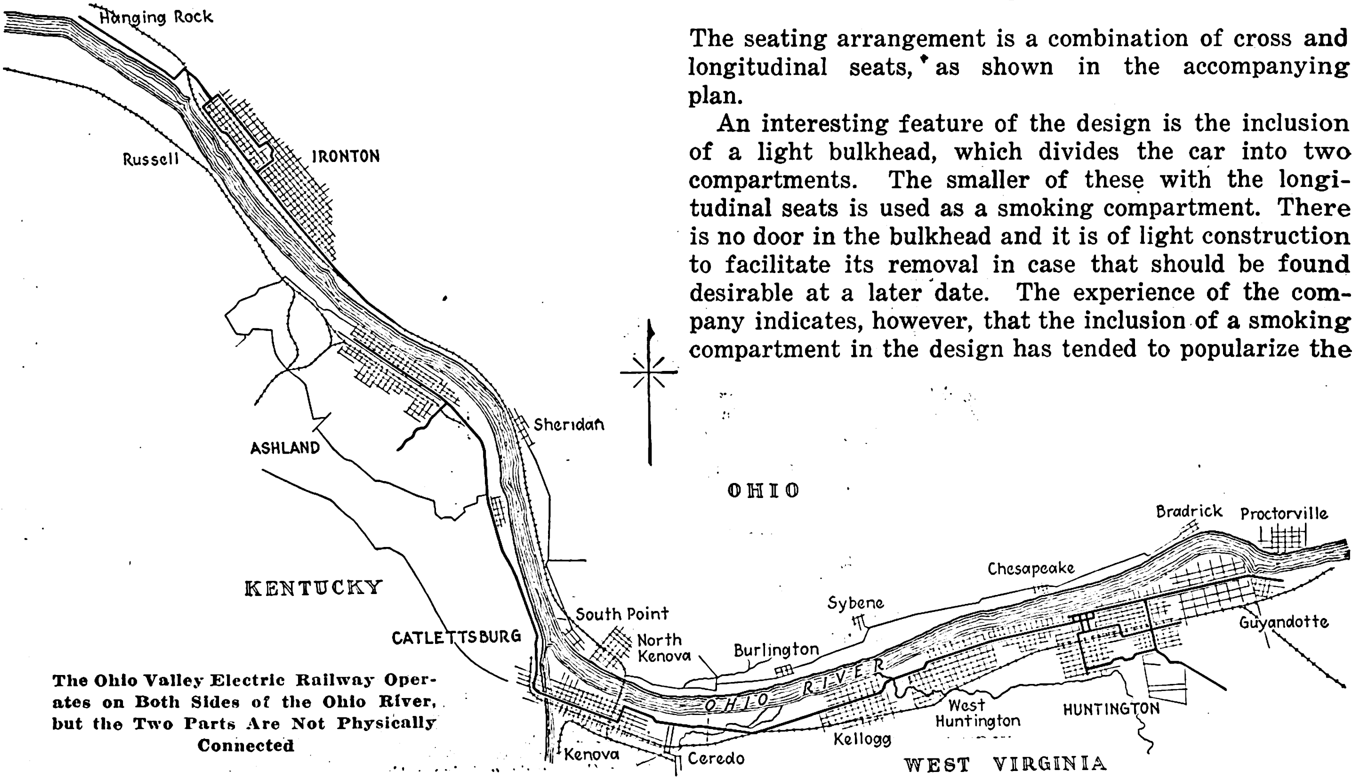
The new car is a typical light-weight one-man, two-man car. It is 47 ft. in length over all and will seat 48 persons. The length is a compromise between that needed for city service and that desired for the interurban route. It was thought more desirable to adopt a single type car, slightly larger than would be needed on the local lines, and possibly a little smaller than would be most advantageous on the Huntington-Ashland route, rather than to divide the purchase into two lots of different lengths. The operating economy of having a standard car in use all over the system was thought to be of greater importance than the excess weight which has to be carried around because the city cars were not of absolutely minimum size.

In interurban service the cars are operated by two men, while in local service they are operated as one-man cars. They are of the double-end type and are equipped with four Westinghouse 510-A, 35-hp. motors per car. The seating arrangement is a combination of cross and longitudinal seats, as shown in the accompanying plan.

An interesting feature of the design is the inclusion of a light bulkhead, which divides the car into two compartments. The smaller of these with the longitudinal seats is used as a smoking compartment. There is no door in the bulkhead and it is of light construction to facilitate its removal in case that should be found desirable at a later date. The experience of the company indicates, however, that the inclusion of a smoking compartment in the design has tended to popularize the


ENTER BY FRONT
4 FOURTH AVENUE
CONSOLIDATED POWER LIGHT CO

In Local Service the New Cars Are Operated by One Man. Passengers Enter at Front


Hanging Rock
Russell
IRONTON
ASHLAND
Sheridan
OHIO
KENTUCKY
CATLETTSBURG
South Point
North Kenova
Burlington
Sybene
Chesapeake
Bradrick
Proctorville
Guyandotte
OHIO RIVER
West Huntington
HUNTINGTON
Kellogg
Kenova
Ceredo
WEST VIRGINIA

The Ohio Valley Electric Railway Operates on Both Sides of the Ohio River, but the Two Parts Are Not Physically Connected service. Huntington is a rather long and narrow city, yet the distances are not so great but that many people could walk if they had any good reason for so doing. The fact that they can smoke as they walk was thought to be influencing many men to neglect the railway service. This was particularly true of men going to work in the morning. Some idea of the strength of this inclination was obtainable from the fact that many men used to let the local cars pass by and take interurban cars for short rides because the latter were provided with smoking compartments.

Another feature intended to appeal strongly to the traveling public and to encourage railway patronage is the ample knee room provided. Window posts are spaced 33 in. apart. This is particularly desirable in the territory through which the Ohio Valley Electric Railway operates because it caters to many travelers. If the seats are sufficiently far apart so that their luggage may be kept out of the aisle inconvenience to the passengers is avoided.

On the Ashland Division, which is almost all interurban lines, where 12 cars were formerly operated, 10 new cars now provide the same service. This means an increase of approximately 17 per cent in schedule speed, due to better acceleration with the modern motors. The use of Nachod signals along this line has also been a factor in speeding up the service. A few minor track changes have also been made to improve the service. For example, in Ashland the former shuttle service now runs all the way down town to the business district.

Maintenance costs have been reduced since the purchase of new equipment and power consumption has decreased. In connection with the latter phase of the question, however, the fact that the new cars are equipped with electric heaters instead of the old-fashioned coal heaters has had a tendency to increase somewhat the total consumption of energy.

Utility Courses Established in Illinois

SPEAKING before the executive committee of the American Electric Railway Association on June 20, President Britton I. Budd, president Chicago Rapid Transit Company, told the committee of the plan that has been worked out with the University of Illinois to establish a four-year public utility course, which will train men to enter the utility field. A public utility fellowship has also been created whereby the university will be able to pay partially or wholly the cost of a one-year post-graduate course in public utility research. A public utility school is also to be established at Northwestern University and a new hall built to house it. The personnel requirements of the public utility field are becoming so great that Mr. Budd thought it quite fitting that the industry should be dignified by a public utility department at the principal schools. It is apparent what a tremendously important thing it is to have the younger generation coming from the colleges versed in the true economics and facts regarding the utilities. Such a plan has been discussed a good deal, but it is actually being carried out now in Illinois. It will require that the utilities co-operate not only by employing graduates of the course but by providing lecturers and otherwise stimulating interest.

Statistics on Twelve Large Properties

FOLLOWING the practice of several years past the ELECTRIC RAILWAY JOURNAL presents herewith statistics showing a comparison between six of the largest surface lines and an equal number of rapid transit properties. Corresponding statistics for 1922 were published in the issue for Nov. 24, 1923, page 891. These comparisons are of special interest when compared with the results of the electric railway industry as a whole, such as the data given in the issue of this paper for May 3, 1924, which included an analysis of operations on 114 city properties. The size of the selected twelve companies may be judged from the fact that they produced gross eearnings of more than $328,000,000 last year, while the 114 properties showed a total of about $370,000,000. These twelve properties also operated one-ninth of the track mileage in the United States. While six of the companies are classed as rapid transit, only three operate elevated or subway lines exclusively, the other three having a combination with surface lines. The average receipts of these companies exceeded $26,000,000, each being above $8,000,000 in annual earnings.

Gross earnings of the six surface companies showed an increase of 4 per cent above the previous year, while operating expenses, including taxes, increased 6.7 per cent. For the rapid transit group the increases were 5.8 and 4.5 per cent respectively. The operating ratio, including taxes, for the surface companies averaged 82.87 per cent, as compared with 83.34 in the previous year, and ranged from 74.76 to 94.72 per cent. For the rapid transit lines, the average operating ratio was 72.40 per cent compared with 71.63 in the previous year, and ranging from 60.05 to 79.13. Selecting the three roads which operate only elevated or subway lines the average was 68 per cent, as against 69.17 previously.

Less service was rendered by each car on the surface lines, the "annual miles operated per car" averaging 31,752 as compared with 34,877 in the preceding year. In the rapid transit group there was an increase, the figures being 41,809 and 39,271 respectively. The "total passengers per mile of single track operated" showed an increase of 10.4 per cent for surface and 8.5 per cent for rapid transit lines. The number of such passengers ranged from 952,045 to 2,489,535 on the surface properties and from 1,349,253 to 1,579,666 on the rapid transit properties. It should be noted, however, that several companies, particularly in the rapid transit group, do not keep account of transfer or free passengers, and for that reason some of the figures are too low. Revenue passengers on surface lines increased 4.8 per cent while the car mileage was increased 3.4 per cent. In the rapid transit group the revenue passengers gained 7.2 per cent, while there was an increase of 8.2 per cent in mileage.

STATISTICS PER CAR-MILE AND PER CAR-HOUR ON TWELVE LARGE ELECTRIC RAILWAYS

	Six Surface Roads					Six Rapid Transit Roads				
	1919	1920	1921	1922	1923	1919	1920	1921	1922	1923
Transportation revenue per car-mile, cents	38.9	44.7	47.8	47.8	48.3	33.1	38.0	38.0	40.8	39.4
Expenses and taxes per car-mile, cents	32.5	37.6	43.2	43.2	43.4	25.9	30.6	33.4	31.1	32.3
Transportation revenue per car-hour, dollars	$3.26	$4.00	$4.03	$3.14	$4.11	$4.21	$4.63	$5.21	$5.14	$4.85
Expenses and taxes per car-hour, dollars	$2.75	$3.37	$3.62	$3.64	$3.59	$3.25	$3.70	$4.13	$3.81	$3.84
Operating ratio, per cent	83.06	87.45	85.08	83.34	82.87	74.00	77.26	77.92	71.63	72.40

Detroit Enlarges Shops

The Paint Shop Finished Last Year and the New Mill Under Way Have Increased the Shop Area 40 per Cent—A Recent Trip Through the Shops Disclosed a Number of Interesting Practices

LAST year the Department of Street Railways, Detroit, added a paint shop, 175 ft. x 235 ft., to its group of shops at Highland Park. This year it is erecting a new mill, which will occupy an area of 175 ft. x 286 ft. The bids are all in on the steel work and the contract will be let shortly. With these two buildings the shops at Highland Park will be increased in area about 40 per cent. When the mill is completed, some shifts will be made in the arrangement. In the meantime, certain additional equipment will be purchased, including bulldozers and oil furnaces. Other improvements contemplated include the speeding up of tools through the installation of forced lubrication on all drill presses and probably on all lathes.

The paint shop, described in the ELECTRIC RAILWAY JOURNAL for June 2, 1923, page 923, is now in full operation. Cars are being repainted in the shop now at the rate of from 75 to 80 a month. Canary yellow has been adopted as a standard color, and the repainted cars carry on the main panel the official seal of the city, put on by the decalcomania process.

A feature of the paint shop, as will be remembered from the previous article, was the method of supporting the scaffolding by brackets swiveled around the supporting posts of the building. The counterweights for these brackets were inside these supporting columns. It has been found that while this plan is very compact, the spacing of the supporting columns, 17 ft., requires rather a long scaffold board. To prevent their bending these boards have to be trussed, and two men are required to shift them.

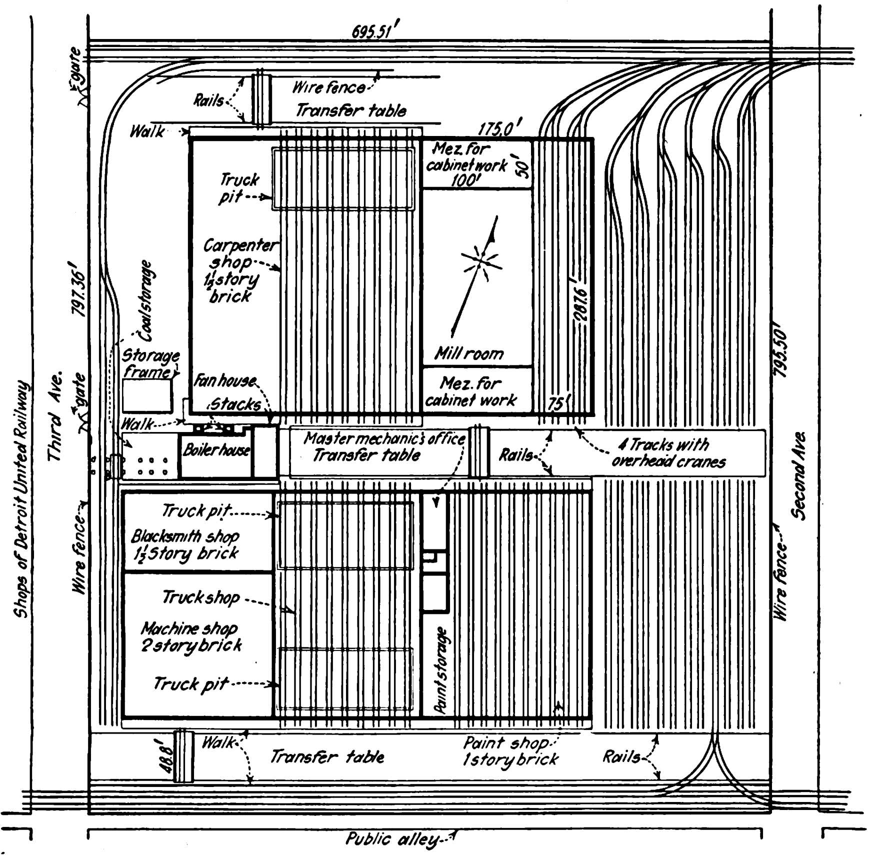
With the added facilities better work is being turned out at the shop. A year ago the average number of cars in the shops for defects was about 110. During the current year the number has been reduced to as low as 43, thus releasing 67 additional cars for passenger service. The record of armature failures is equally satisfactory. During the first year of operation the average number of armature burnouts was 77 a month. Recently the average has been about 37 a month, or less than half the original number. The improvement in this performance is due almost entirely to the practice of dipping and baking armatures, which was adopted two years ago. A recent trip through the shop disclosed the following interesting processes:

PAINT SHOP

Trucks Cleaned by Water Jet. Trucks are cleaned for repainting by the use of a water jet under a pressure of 60 lb. per square inch. This seems to remove the accumulated dirt and grease so thoroughly that the trucks are then ready for repainting. The water is ejected through a ¼-in. water nozzle to which a ⅛-in. air pipe from the shop supply at 60 lb. pressure is connected. The process of cleaning for a pair of trucks takes about 25 minutes.

Spray for Rattan Cushions. The spray method of painting is used extensively in the shop for car body painting. Rattan cushions are also painted by the spray process, but this work is done within a cabinet connected with an exhaust, so that the paint spray which does not stay on the rattan is discharged above the roof.

The cabinet is about 9 ft. long and 4 ft. high. The front is in three parts, the center lifting off and sides sliding back. While the cushions are being sprayed, the cabinet is closed with the exception of the middle opening, through which the spray guns are operated.


695.51'
Gate
Rails
Wire fence
Transfer table
175.0'
Walk
Truck pit
Mez. for cabinet work 100'
50'
Carpenter shop 1½ story brick
Coal storage
797.36'
Mill room
201.6'
793.50'
Storage Frame
Fan house
Stacks
Mez. for cabinet work
75'
Walk
Boiler house
Master mechanic's office
Transfer table
Rails
4 Tracks with overhead cranes
Gate
Third Ave.
Shops of Detroit United Railway
Wire fence
Truck pit
Blacksmith shop 1½ story brick
Truck shop
Machine shop 2 story brick
Truck pit
Paint storage
48.8'
Walk
Transfer table
Paint shop 1 story brick
Rails
Second Ave.
Wire fence
Public alley

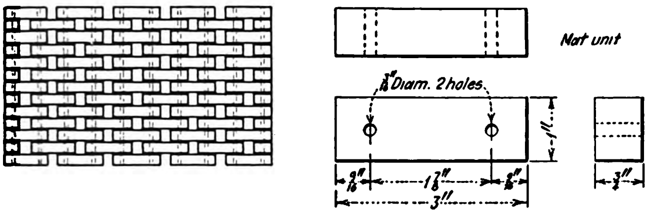
With Additions Under Construction the Shops at Highland Park Are 40 per Cent Larger than Two Years Ago

Sash Frame. A rack for holding freshly painted sash until they dry is another feature of the paint shop. The rack is of channel iron braced and just the size to hold a dozen or fifteen freshly painted sash.

Wooden Mats. Extensive use is made in both the paint shop and in the machine shop of wooden mats on which the men can stand while at work. These mats are made of a series of maple links, 3 in. x 1 in. x ¾ in., as shown in the accompanying drawing. These mats may be made in various widths, but the standard width is 2 ft. There are five standard lengths from 6 ft. to

10 ft. These mats are assembled with No. 9 gage wire and are found much easier for the feet than the concrete floor. At the same time they can be rolled out of the way when the floor is cleaned and they themselves are practically self-cleaning.

Paint Mixing Table. A separate fireproof room adjoining the main paint shop is used for paint storage. A feature of this room is the mixing table, above which are carried, on a frame, 5-gal. cans holding the most commonly used solvents, namely, turpentine, japan, raw oil, turpentine substitute, boiled oil, and enamel oil. Views of this mixing table and of the main row of paint cabinets accompany this article. The 5-gal. cans in the rack over the mixing table are fitted with a special kind of gate valve. This makes it very easy for any painter to draw off as much of any one of the solvents in these cans as he requires while mixing his paint.



This Wooden Mat Is Used Extensively in the Shops. It Is Very Easy on the Feet

When canary yellow was adopted as the standard color for the body of the car, letterboard and roof, dark red was adopted for the sash. Experiments showed, however, that if the side posts were painted yellow for their full height, the contrast with the color of the sash gave a rather divided-up appearance to the side of the car. In consequence, the upper part of the posts, i.e., between the upper sash, are now painted the same color as the sash, giving a streamline effect.

MACHINE SHOP

Building Up Sharp Flanges. The cars in Detroit are single ended, and the steel wheels used tend to develop sharp flanges, two diagonally opposite wheels of the truck usually wearing in this way. These flanges are built up with an automatic arc-welding machine, the whole operation requiring not much more than an hour. The metal from the arc is deposited on the throat and the inside of the flange, no attempt being made to build up treads in this way. The built-up parts are then ground to shape on a Norton emery grinder.

Dirt Guard for Gear Case. To keep dirt out of the gears, the Detroit system is using on the gear case a dirt guard somewhat similar in principle to the dust guard used on car journals. The gear-case guard is stamped out in the form of a disk, which is cut in two to make the two halves. It is then welded to the gear case. An accompanying drawing shows the construction for a gear case of this kind adapted to one-man cars.

Riveting Tips on Control Fingers. A punch press cuts off old studs from controller fingers and rivets on new ones. Both processes are performed with the same die. When turned in one direction, it shears off the old stud, and when turned in the other direction, it forms the die for riveting the stud.

Removable Scrap Receptacles.—A system has been developed for the handling of scrap material about the shops which entails the use of a standard box approximately 6 ft. long by 4 ft. wide by 3 ft. high. These boxes are equipped with lifting loops and with legs of suitable height to accommodate a transveyor truck. In this manner they may be handled by crane or transveyor truck. The boxes are loaded on flat cars, taken to the dump, unloaded by crane and returned to the shop. By this means the handling is reduced to the lowest possible amount.

It is contemplated to use this same system of boxes for the delivery of material to the carhouses and the return of scrap and material for repair. Outgoing supplies will be placed in individual boxes for each carhouse. When the supply car arrives these will be swung aboard and will be unloaded at the carhouses by means of a jib crane on the car. This method will reduce the amount of handling and will speed delivery.

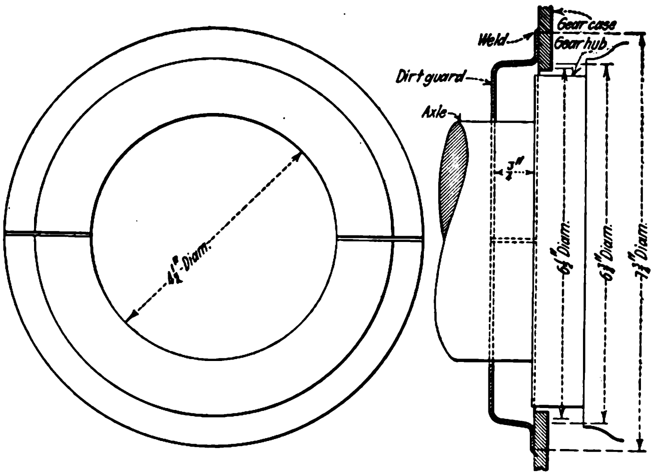
Case-Hardened Pedestal Guides. All car journal boxes which come in for repairs are now being fitted with case-hardened pedestal guides. The old guides are removed and the new guides are welded in place.

Turret Lathes for Bearings and Trolley Wheels. A turret lathe is now being used to machine bearings, so that they can be finished in two operations and much more quickly than with engine lathes. The turret lathe will also be used for shaping up trolley wheels after they have been rebushed.

A new fixture is being designed for holding axle bearings while they are being machined. By its use, it is hoped, the machining on the bearings will be so uniform that it will not be necessary in the future to mate these bearings while they are being made.

Soundproof Room for Testing. In the armature department a soundproof room has been partitioned off, in which field coils are tested with a Century field tester. It has been almost impossible to operate this tester satisfactorily in the open room. Now work can very easily be carried on with it.

High-Voltage Test for Cars. While some light repairs are made in the carhouses, a good many of the cars which need only light repairs go to the shops. It has been the practice for the last few months to put all of these cars through a high-voltage test. The control handle is put on the first notch and a 1,500-volt a.c. circuit is applied to the wiring. This has proved a very rapid way of discovering weak points in the wiring, points which would give trouble probably within the next few weeks, if the car was sent out on the road without this test. In a recent month 30 cars succumbed to this voltage.



Dirt Guards Are Being Welded on Gear Cases in Detroit

Sand Blast for Commutators. In the armature room a sand blast is used for cleaning commutators as well as for cleaning armature cores. A new sand-blast machine to work in a dustless manner is being developed.

Platform for Motor Frames. Motor frames, when brought in for repair, instead of resting on the floor, are set on individual platforms just large enough to hold a motor. These platforms are of wood, with strap-iron legs so that they are 8 or 10 in. from the floor. In this way a lift truck can very easily be run under them, lifting the platform and motor and being then run to any convenient part of the shop. With the motor on the platform it is very easy to work on and around it.

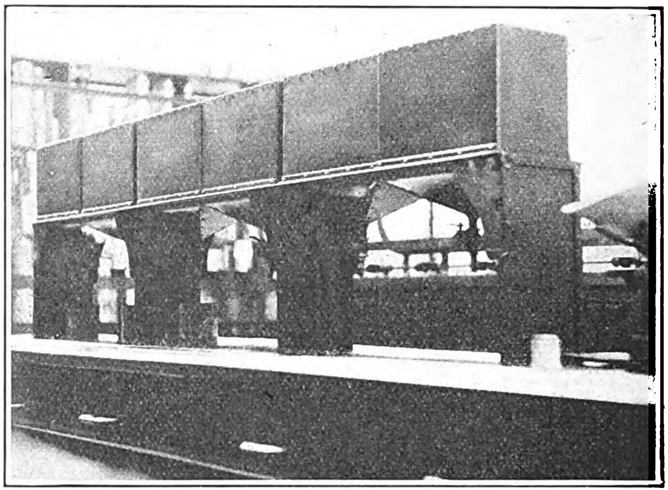
Standardizing Grids. By standardizing motor resistance grids, the number has been cut down from 14 to 3. Only one standard grid frame now is used.

THE WOOD MILL

Outside and Inside Steel Panels for Cars. In the mill a number of interesting practices were observed. The wooden side panels of old cars are being protected as the cars come into the shop by steel plates. These plates are of about No. 15 gage and are screwed on over the old wooden panels. The side molding or belt rail is taken off to simplify the application. End plates are applied to the ends of the car.

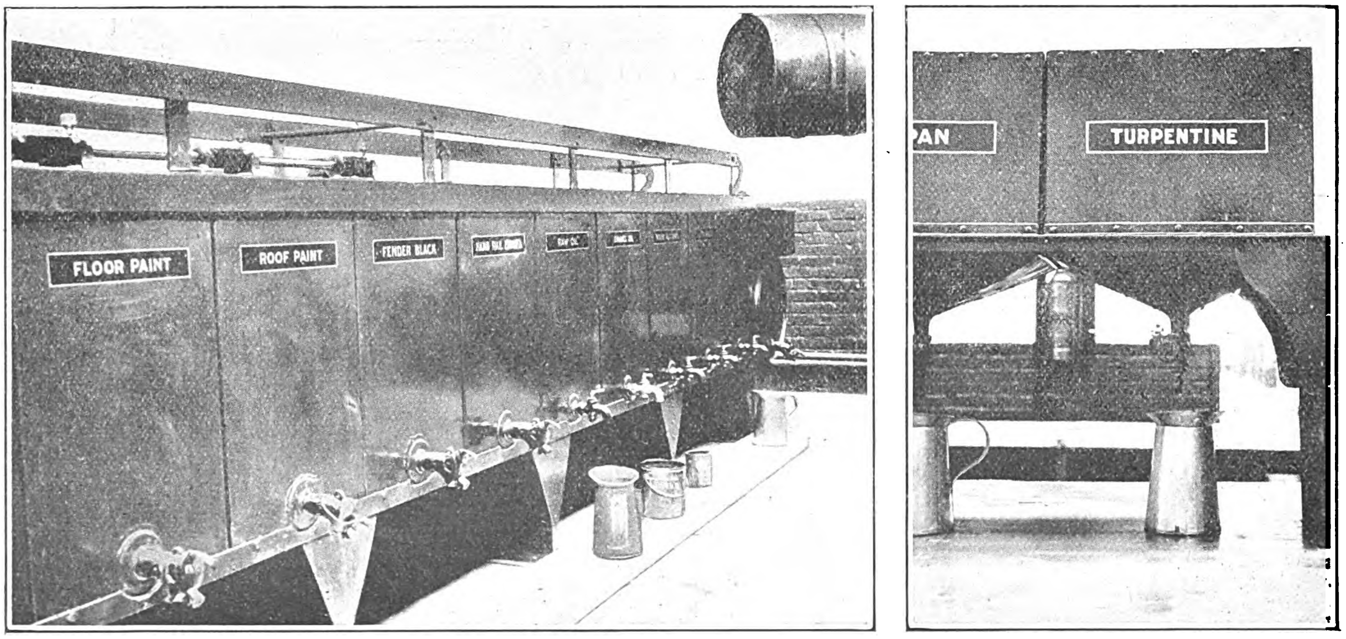
Steel cove panels or heel boards are also being used on the inside of all cars fitted with longitudinal seats. The lower part of this heel board is concave to make a sanitary base and to facilitate sweeping. The panels to fit end circular seats are welded together before being inserted, but the panels for the side seats are put on individually. Of course they contain openings opposite the heaters.

Extra Door Added to Birney Car. When it started operations, the department purchased a large number of standard double-end Birney cars, as these cars at that time were greatly in vogue. It has been found, however, that they are very slow in loading and unloading, and at one time the department was afraid that it might have to give them up. Most of these cars now, however, are being made serviceable by the addition of a second door, which is cut between the posts just back of the original door. This change is being applied only to cars which run on lines with loops, so that they can run as single-ended cars, but most of the lines in Detroit are adapted to single-end equipment. One seat had to be sacrificed by this change, but as the cars are changed to single end, it has been found possible to put seats on the back platform, which increases the seating capacity of the car by eight seats.


This Mixing Table for Paint with Solvents Above Saves the Time of the Painters

Saw Filing and Setting Machine. For filing and setting bandsaws, the department uses an automatic machine manufactured by the Wardwell Manufacturing Company of Cleveland. Each end of the bandsaw is rolled on a large wooden reel, and this machine files and sets the teeth at the same time.

Cabinets for Grease. A number of cabinets for holding grease barrels were also noticed in the shop. They are of steel and hold the grease barrels at the carhouses. At the top of the cabinet is room for placing buckets. These cabinets have the threefold advantage that they keep the dirt out of the grease and buckets; they look better than the exposed barrels and buckets, and there is a distinct benefit in fire protection.



Portion of Main Row of Paint Cabinets at Left; Close View of Row of Solvent Cans and Mixing Table at Right

Trends in Electric Railway Equipment

Smaller Wheel Sizes, Double-End Control, Double Trucks, Four Motors per Car, Lower Weight per Car and Smaller Size Motors Are Trends Shown by Motor Sales

By G. M. Woods
General Engineer Westinghouse Electric & Manufacturing Company,
East Pittsburgh, Pa.

AN ANALYSIS of railway equipments sold by the Westinghouse Electric & Manufacturing Company during the past ten years discloses several tendencies of general interest. In studying the accompanying graphs it must be remembered that the records of only one manufacturer form their basis and that in the case of some orders complete data were not available. Further, several unusually large orders of a certain type of car in one year may cause a peak or depression in the general curve. However, the number of motors involved is large, and it is believed that the tendencies indicated are approximately the true condition.

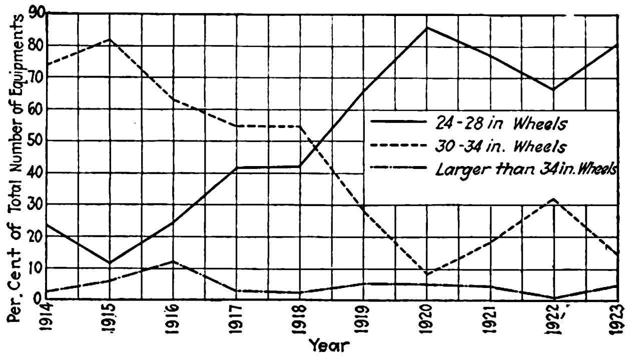


Fig. 1—Trend of Wheel Size as Shown by Motor Orders During the Past Ten Years

Fig. 1 shows the change in wheel size which has taken place during the last ten years. In 1914 23 per cent of the equipments sold were for 24-28 in. wheels and this percentage decreased to 12 per cent in 1915. In 1920 the maximum percentage of 86 was reached. During the last four years the percentage varied between 67 and 85. The main increase in the use of small wheels from 1916 to 1920 may be attributed to the single-truck safety car. The general increase is due partly to the decrease of heavy interurban cars sold during the period considered and to the more general use of low-floor cars in city service.

The trend of 30-34 in. wheels is almost directly opposite to the trend of 24-28 in. wheels because the number of equipments for wheels more than 34 in. in diameter is very small and has been steadily decreasing. The percentage of equipments with 30-34 in. wheels decreased from 73 in 1914 to 15 in 1923.

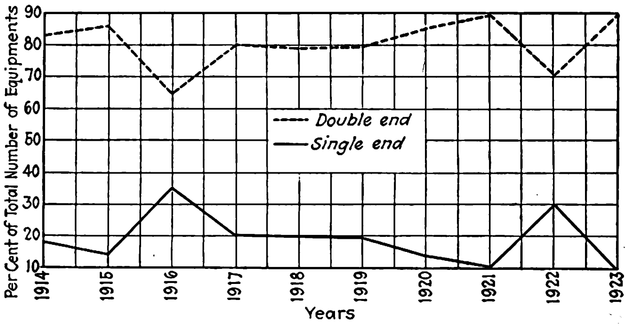


Fig. 2—Proportion of Equipments with Single-End Control and Double-End Control

Present Increasing Tendency Toward Double-Truck Cars

Fig. 2 shows the percentage of equipments with single-end control and the percentage with double-end control. Except for minor variations the percentage of double-end control has kept very close to eighty. The increase in double-end control during 1920 and 1921 was due largely to the large percentage of single-truck, double-end safety cars sold during those two years.

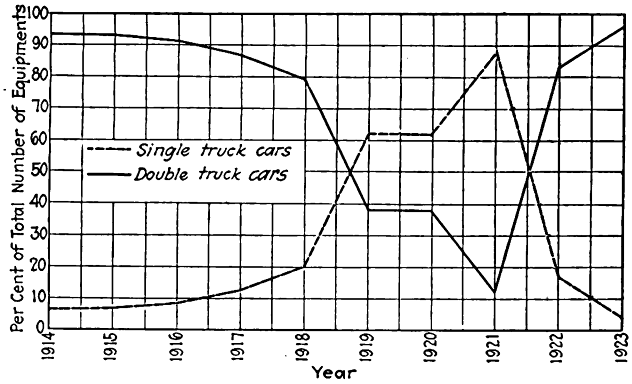


Fig. 3—Percentage of Single and Double Truck Cars, Showing Clearly the Advent and Decline of the Single-Truck One-Man Safety Car

Fig. 3 shows the percentage of double-truck cars and the percentage of single-truck cars for which equipments were sold each year. The percentage of cars which were double truck was between 90 and 95 per cent from 1914 to 1916. The percentage then gradually decreased until in 1921 a minimum of 12 per cent was reached. The sale of double-truck cars then increased, being 83 per cent in 1922 and 95 per cent in 1923. The percentage of equipments for single-truck cars, of course, followed the opposite tendencies. It should be remembered that while comparatively few single-truck safety cars were sold in 1922 and 1923, there were sold a large number of double-truck cars arranged for one-man operation. It is very doubtful if one-man operation would be extensively used in this country today had it not been for the successful operation of the single truck safety car.

The increasing tendency to use quadruple equipments instead of double equipments on double-truck cars is shown by Fig. 4. For the first four years of the period analyzed the numbers were fairly evenly divided. During the last six years the majority of double-truck cars have been equipped with four motors, although minor fluctuations in percentage have taken place. The use

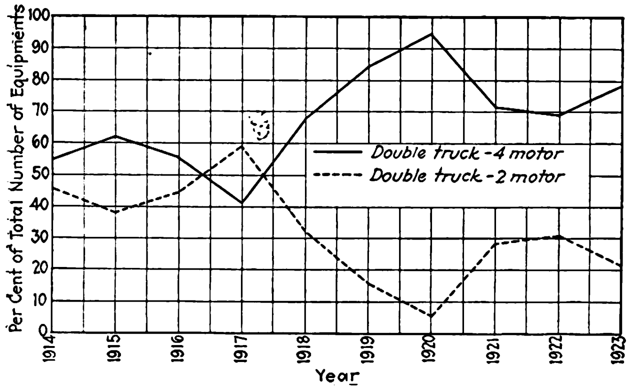


Fig. 4—Trend in Use of Two or Four Motors on Double-Truck Cars

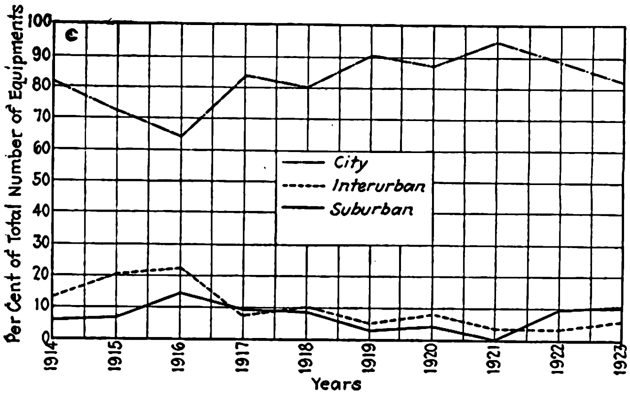


Fig. 5—Division of Motor Sales Between City, Suburban and Interurban Cars

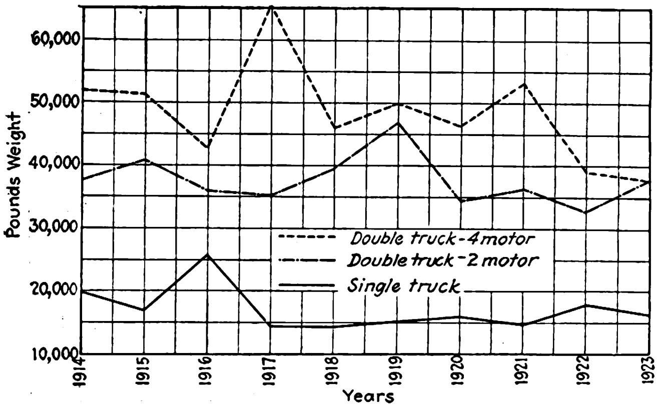


Fig. 6—Average Weight of Double and Single Truck Cars, Showing Four and Two Motor Equipments Separately

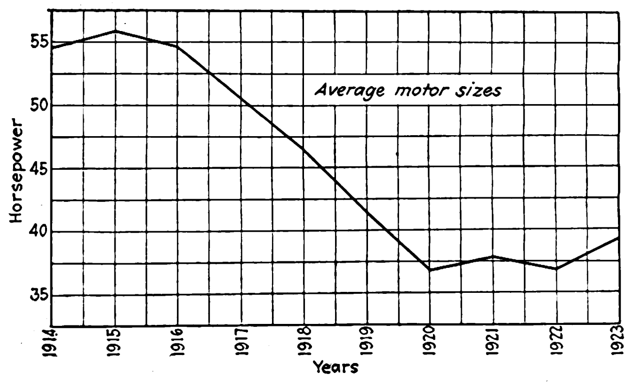


Fig. 7—Average Size of Motors Has Come Down with Weight Reduction and Tendency Toward Smaller Wheels and Four Motors

of quadruple equipments has been brought about by the greater importance of rapid acceleration under modern traffic conditions and the use of low-floor cars with wheels of small diameter.

Double-truck cars in all classes of service are included in the numbers of cars on which Fig. 4 is based. If city cars only were included, a smaller per cent than shown on the curve would have quadruple equipments because practically all interurban cars are equipped with four motors. The number of interurban cars sold in any year is relatively small, and the trend shown by Fig. 4 is not materially affected by their being included.

Fig. 5 shows the percentages of equipments sold for city, interurban and suburban service. The city equipments, of course, form the major portion of the sales. The actual number of interurban cars purchased increased during 1922 and 1923 as compared with 1921. The future of the interurban business seems to depend on two different kinds of passenger service. The first is a high-speed service with heavy cars which can successfully perform the kind of service desired by city-to-city passengers. The second is a frequent, convenient service with light-weight cars which can bring back the passenger traffic lost to the automobile. Most interurban roads can also materially increase their revenues by engaging more actively in freight haulage.

CAR WEIGHTS HAVE BEEN REDUCED

The decrease in weight of all classes of cars is shown by Fig. 6. The greatest saving in weight has been made in the double-truck cars with quadruple equipments. This decrease has been brought about by the general use of low-floor cars with wheels of small diameter. There has been less decrease in the weight of double-truck cars with two-motor equipments. This lower rate of change may be because the cars with two-motor equipments were considerably lighter than those with four-motor equipments and there was less demand for weight reduction, or it may be that the users of two-motor equipments have adhered more closely to existing designs. Curiously, the average weight of double-truck cars equipped with two motors was the same in 1923 as the average weight of the cars equipped with four motors. The trend in weight of single-truck cars is also shown in Fig. 6. The sharp decrease in weight in 1917 was due to the adoption of the safety car. The gradual increase since that time has been caused by modifications of the safety car such as double doors, double floors, heavier body construction and heavier trucks.

The average size of motors sold during the ten-year period is shown in Fig. 7. The size of motor is determined by so many variables that it is difficult to account for any but general trends. The steady decrease from 1915 to 1920 was doubtless caused by the reduction in car weights, the use of four-motor equipment instead of two-motor equipments, the extended use of the light-weight safety car and the general application of ventilated motors with their greater service capacity than non-ventilated motors in proportion to nominal horsepower rating. It is significant of a more liberal tendency in motor applications, both on the part of the electric railways and the manufacturers, that the average motor horsepower has increased slightly during the last three years, although car weights have shown no general increase. Under-motoring is a very expensive form of economy for the operator as well as for the manufacturer.

Rochester Trackless Trolley Construction

The Line Is About 3 Miles Long and Runs Through a Densely Populated District—It Crosses Five Electric Car Lines and One Steam Railroad at Grade—Some of the Overhead Equipment Is of Special Design

THE Rochester trackless trolley line, 2.78 route miles long, operates probably through a more densely populated district than any other trackless trolley line built thus far in this country. It has also more overhead crossings than any other, as it crosses five heavy traffic electric car lines and one steam railroad line at grade. It is operated by the Rochester Railways Co-ordinated Bus Lines, Inc., which is controlled by the New York State Railways, the operator of the electric railway lines in Rochester. This company has done pioneer work in the development of material for the overhead line used by these trackless trolley buses. The experience in Rochester should be of interest to other companies operating or expecting to operate trackless trolleys.

OVERHEAD SPAN SYSTEM ADOPTED

The width of street between curbs on which the trackless trolley line in Rochester is built is from 24 ft. to 32 ft. The span construction is used with tubular steel poles, mostly 7 in., 6 in. and 5 in., set in concrete. The span wire is $\frac{5}{16}$-in. seven-strand Siemens-Martin wire, the same as used for span wire on the rail lines of the New York State Railways, and the trolley wire is No. 00 hard-drawn copper.

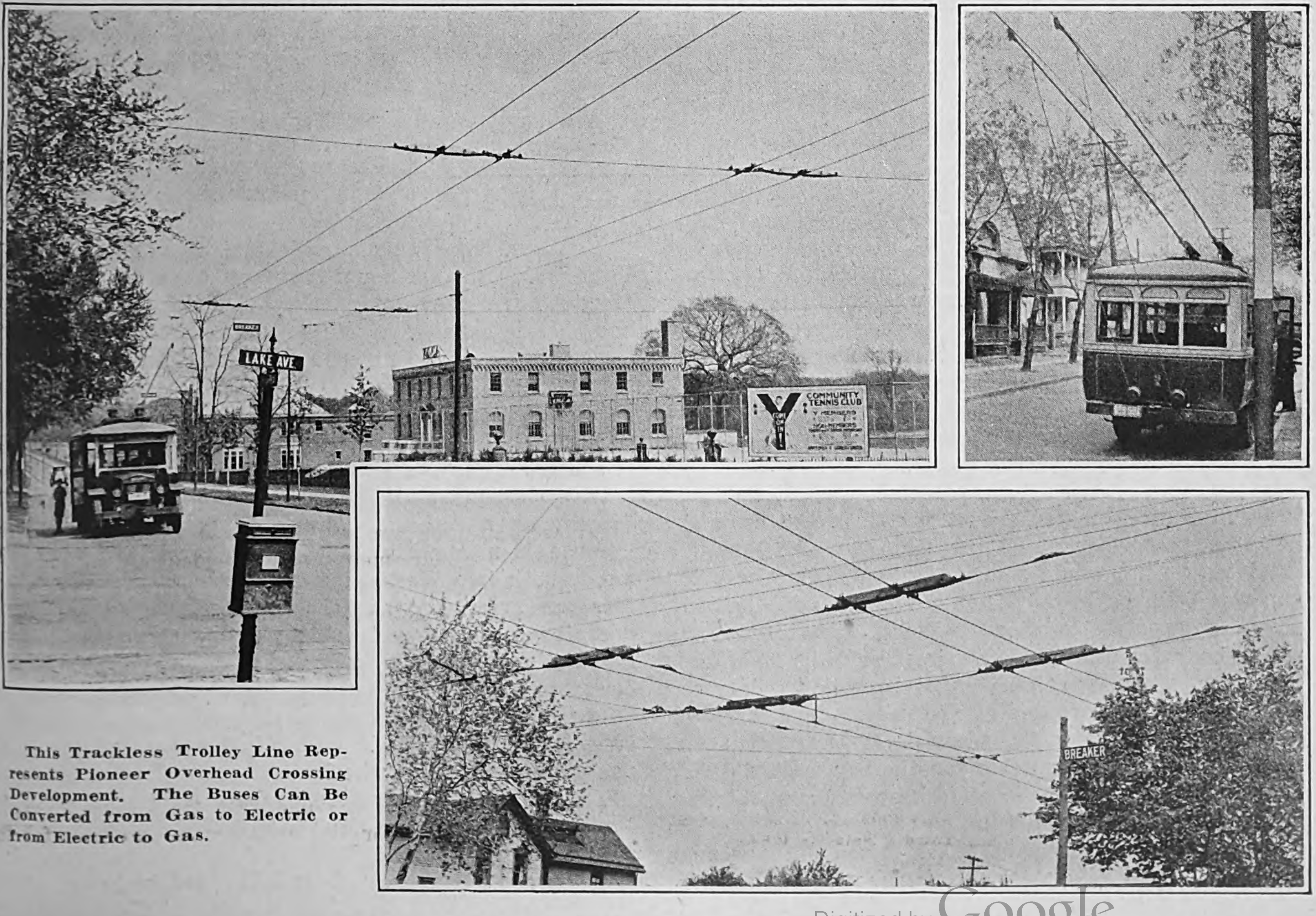
Each span, of course, carries four trolley wires, two positive and two negative.

It was decided that a 24-in. spacing between the positive and the negative wires on the same side of the street was desirable. These wires were located by taking the center of the street and placing the two wires, 24 in. apart, half way between the center line of the street and the curb on one side and the other two wires, the same distance apart, half way between the center line of the street and the curb on the other side. The height of the trolley wire above the surface of the street is the trolley standard of 18 ft. With trolley poles on the trackless trolley buses 18 ft. in length, this gives a swing of about 16 ft. on each side of the wire. This length of trolley pole is about 6 ft. more than on the standard trolley car in Rochester.

USE OF PORCELAIN STRAINS

Four standard porcelain strain insulators are used in each span wire. The arrangement is to put the two positive wires nearest the middle of the street and the two negative wires nearest the curbs. A porcelain strain is then cut into the span wire on each side of each negative trolley wire.

The positive wires are fed at all crossings with each railway line, and at one end, making six feed-in places in the 3 miles of route. Both trolley wires are sectionalized with regular section breakers about half way between the feed-in points, but these breakers are



This Trackless Trolley Line Represents Pioneer Overhead Crossing Development. The Buses Can Be Converted from Gas to Electric or from Electric to Gas.

jumped with four-strand No. 10 copper wire. This tends to equalize the rail line potential but if there is a ground, these jumpers will burn out.

The hangers, ears, etc., are the same type as used on the rail lines.

The negative trolley is grounded at each electric rail intersection by a piece of flexible cable carried down inside the pole, then under the pavement in a piece of creosoted pump log to the rail, to which it is bonded.

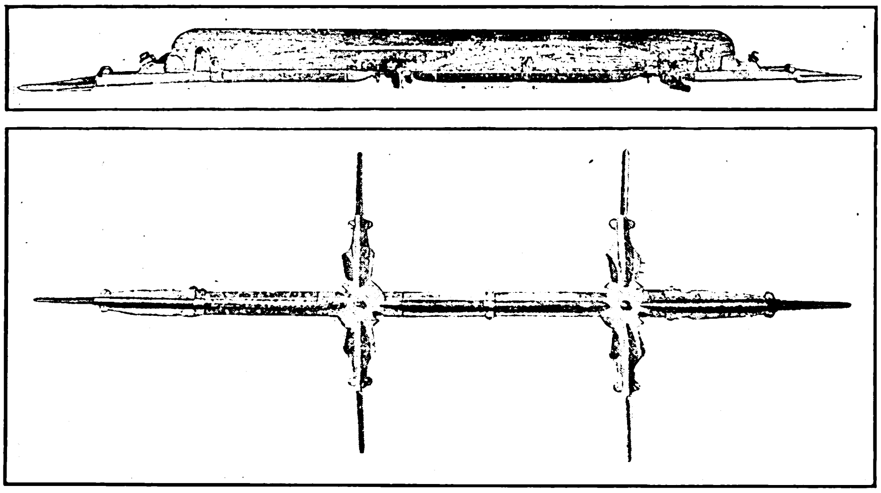
Where the wires cross steam railroad tracks, the trolley wires are carried 22 ft. above the rail, and trolley wire guards of the usual type are carried over them.

The rail lines are fed from different substations, but this does not interfere with the operation of either trackless trolleys or cars.

OVERHEAD CROSSINGS

The chief problem in the operation of the line has come at overhead crossings. These have caused no interference with the operation of the line, but the overhead line department has realized that here might be a weak point if care was not taken.

The first question was to decide whether at a trolley and trackless trolley overhead crossing the trolley or the trackless trolley should have a continuous crossing. At first the continuous crossing was put in for the car line and the trackless trolley motormen were instructed to coast over the crossing. It was thought that as there were fewer of them it would be easier to secure compliance with the regulation, but it was found that no matter which way the crossing was put up the motormen would get careless and occasionally would go over the crossing with the current on.



Side and Bottom Views of Overhead Crossing for Trackless Trolley Line Developed in Rochester

At first stock material was used for the crossing, but it soon developed that no matter which line was insulated an arc would sometimes be drawn where the gap was 6 in. or less. After extended study the company developed the overhead crossing illustrated.

The body frame of this crossing is a piece of hickory 50 in. long by 3½ in. high by 2¼ in. thick. Onto the lower part of this wooden block two standard insulated crossing plates are attached with 24-in. centers and connected by a fiber runner for the car trolley. This fiber runner is in two pieces to keep it from warping, and it is held at the ends in the crossing studs and in the center by a brass clamp. At each end of the wooden block is an end tongue to which the rail trolley wire is attached. This end tongue, at the positive end of the crossing is about 3 in. from the trackless trolley positive crossing, and the end tongue at the negative end is about 11 in. from the negative trackless trolley crossing. Between the negative crossing and the end tongue, to which the car trolley wire is connected, there is another fiber runner to carry the rail trolley wheel, but as this is only 11 in. long a brass clamp is not considered necessary here.

The rail trolley wire is carried over the top of the wooden block, to save cutting the wire, and the groove in which it lies has a cover to keep out the moisture. A slot 12 in. long by ⅜ in. wide is cut horizontally in the wooden block to increase its dielectric strength. The block is then painted thoroughly with black insulating paint or shellac.

At the positive end of the crossing the car trolley wire is electrically connected to the positive trackless trolley wire with a stranded copper bond. Stranded wire is used at this place to prevent breakage of the bond by weaving.

As will be seen, this crossing provides for continuous running of the trackless trolley rather than the car. This is partly because it is believed that a swiveled harp should have smoother running than an unswiveled harp, partly because the rail car is always directly under the wire, whereas the trackless trolley bus may have swung out, and partly because there are two men on the rail car, and if it should be stalled through a dewired trolley a crew of two men can more easily replace the pole than the one trackless operator.

At the eastern end of the line a loop has been built over private property, so that the bus simply runs around the loop. At the western end a wye has been built, as this end may be extended later.

THE BUS EQUIPMENT

The seven trackless trolley buses on this line are "convertible," that is to say, they can be changed, if necessary, to gas buses. When the New York State Railways bought this equipment it purchased from the Brockway Corporation twelve motor bus bodies and chassis capable of being equipped with either gas motor for independent operation or electric motor for trackless trolley operation. Originally seven of these buses were equipped with gas motors and five with electric motors. Since they were purchased last fall, however, two of the gas motor buses have been converted to trackless trolley, and it is the intention of the company to convert two others. The conversion is not difficult because it means simply the replacement of the gas motor with two Westinghouse 258 motors. These motors are arranged with the foot control, so that the operator can manipulate the steering wheel with his hand. The principal other change in the electrical equipment, as compared with the electrical equipment of a trolley car, is in the longer trolley pole used, the swiveled harp, which has four ball bearings, and the use of a 6-in. trolley wheel.

The gas and trackless trolley buses of the Rochester Railways Co-ordinated Bus Lines, Inc., have been in use only since Nov. 1, 1923, so that the management is unwilling yet to express its opinion positively as to the relative merits of the two kinds of motor power. In general, however, the following conclusions have been reached:

Under considerable density of traffic, where stops have to be made every two or three blocks, the trackless trolley is better than the gas bus, because it is more efficient and less noisy in acceleration. Possibly a headway of 20 minutes is the dividing line, trackless trolley being desirable for headways of less than this time and gas buses for more than this time.

The original investment for the trackless trolley is, of course, more, and the overhead system, as constructed in Rochester, costs about $7,000 per route mile. On the other hand, the operating expenses on a frequent stop line are probably less with trackless trolley. The power consumption on the Rochester trackless trolley line is only about 1 kw.-hr. per car-mile without heaters and 2 kw.-hr. with heaters, bringing the power cost considerably below what the gasoline bus would show. The oil consumption on the Rochester trackless trolley line is only 4 gills of oil in ten days. It is believed that the maintenance cost of the trackless trolley will also be considerably less, and the accounting department has been instructed to allow for a physical life of the trackless trolley buses of 18 years and for the gas buses of only 10 years. For both kinds of buses there is depreciation reserve charge for tires of 1 cent a bus-mile.

Track Maintenance Instruction

Eastern Massachusetts Street Railway Conducts Course in Track Methods at Opening of Season —About One Hundred Men Attend

FOR some years the Eastern Massachusetts Street railway has conducted a course on track construction and maintenance prior to the summer's work. Those who have attended are the roadmasters, track foremen and others connected with the way department, as well as the division manager and superintendent. Its purpose was to bring them up to date on the latest methods of the company. This year the plan was changed somewhat by shortening the course and printing an advance syllabus of it for distribution among the participants.

In all there were about 100 men who took the course. This number was divided into three groups, each made up of a certain number of men from each division, so that any one section of the road would not be weakened by having all of its responsible track men away at the same time. The meetings were held in the Chelsea shop, which was fitted up with a screen and stereopticon to show views of standard trackwork and interesting photographs of good and bad work taken during the previous year.

A half day was given up to each class and a class was held each week so that three weeks were required before all those scheduled to take the course could do so. This half day was divided into six periods of 30 min. each, and each period was divided into 20 min. for lecture or instruction and 10 min. for discussion. In the pamphlet describing the course and distributed in advance, blank pages were left between the different topics for notes or memoranda of questions to be asked the lecturer. The six topics considered, with their subdivisions, were:

1. City track construction, namely, track, paving catch basins, general, track oil, tools.
2. Drainage, including open and backfilled track, ditching, culverts and catch basins, also tie renewals and joint repairs.
3. Special work and derailment, including derailments and switches, their causes and means for prevention, inspection of switches, inspection of mates, inspection of frogs, inspection of curves.
4. Bonding, welding and grinding and the care of machines for doing this work.
5. Reports and accounting, including authorization, handling of material, status reports, completed reports, records of employees, contracts.
6. Accident prevention and statistics, including injuries from tools, careless handling of ties, injuries caused from grinding and welding, handling rail and looking out for passing automobiles.

These six talks were given respectively by H. C. Packard, R. M. Hyde and R. A. D'Arcy, division engineers; R. C. Waring, return circuit engineer; C. J. Mahoney, chief clerk, and P. F. Joyce, chief adjuster.

OPEN AND BACKFILLED TRACK

1. Drainage is one of the most important parts of track construction.
2. In overhauling track raise it to at least level with the macadam shoulder
3. Do not full backfill low tee rail track except where it is absolutely necessary. This holds the water and if the ballast is not good your track is bound to work
4. Full open track is what we most desire. Water drains quickly, leaving the ties dry and the roadbed in good shape.
5. Half-open track is the next best type. Leave 1½" or 2" opening under the ditch side rail for the water to pass off, and do not allow this opening to get filled up.
6. Only in the more thickly settled districts is track to be full backfilled. Here you depend on high track, good ballast, and ditches for drainage
7. Broken stone ballast is standard for paved track. Some divisions have laid sub-drains under the ballast in some streets.

DITCHING.

8. Your ditch is supposed to not only drain your track but also your ballast. Get it deep enough to accomplish this.
9. Keep the top shoulder of the ditch at least 6" beyond the end of the tie and a greater distance on grades, otherwise you cannot hold your track to line or grade.
10. Do not make your ditches carry water too long a distance.
11. Cut away the bank on the side if the land beyond is low, and the bank not too wide, otherwise make openings through it.

CULVERTS AND CATCH BASINS.

12. Corrugated iron pipe should be installed under all driveways, and extended far enough so that a person will not have to drive too close to the end.
13. Head up the ends with paving stones to prevent crumpling of the pipe, and to hold back the earth.
14. Catch basins and pipe culverts should be cleaned out at least twice a year, and in some cases much oftener.

TIE RENEWALS.

15. Use chestnut ties for renewals under paved or unpaved track, but with tie-plates at the joints only on unpaved track.
16. Avoid making holes in ties with picks or bars. It lets the water in and starts rot.
17. More attention should be given to spiking. Driving the spike in at an angle and then pulling it over with the last blow or two, not only reduces the holding power, but also leaves an opening for the water to get in.

JOINT REPAIRS.

18. Track should be inspected at frequent intervals by the section foreman.
19. Do not let your repairs go for too long a time. What may be a small job to-day, may develope into being an expensive one in a very short while. This is especially true in permanently paved track or on special work.
20. We have standardized on the welded joint, and your repairs should be made with this in view. Before applying the plates, the plates and rail should be thoroughly cleaned of rust, the rail ends surface bent or cut back, or both if necessary, and the joint seam welded at the first opportunity

SPECIAL WORK AND DERAILMENTS

DERAILMENTS AND SPLIT SWITCHES.

(*a*) **Causes:—**

1. Defective track, bad joints, line, surface, gauge not enough elevation on curves. No guards or improperly placed guards; poor drainage.
2. Defective switches. Worn and loose switch tongues, no springs, broken bolts or springs, dirty boxes, false flanges on mates, battered frogs, bad line, surface and gauge.
   (All above due to insufficient inspection and maintenance)
3. Obstructions in track and special work.
4. Not enough track greasing.
5. Excessive speed and other improper operation.
6. Defective equipment.
   There is a reason for every derailment and most of them can be and must be prevented.

b) **Prevention:—**

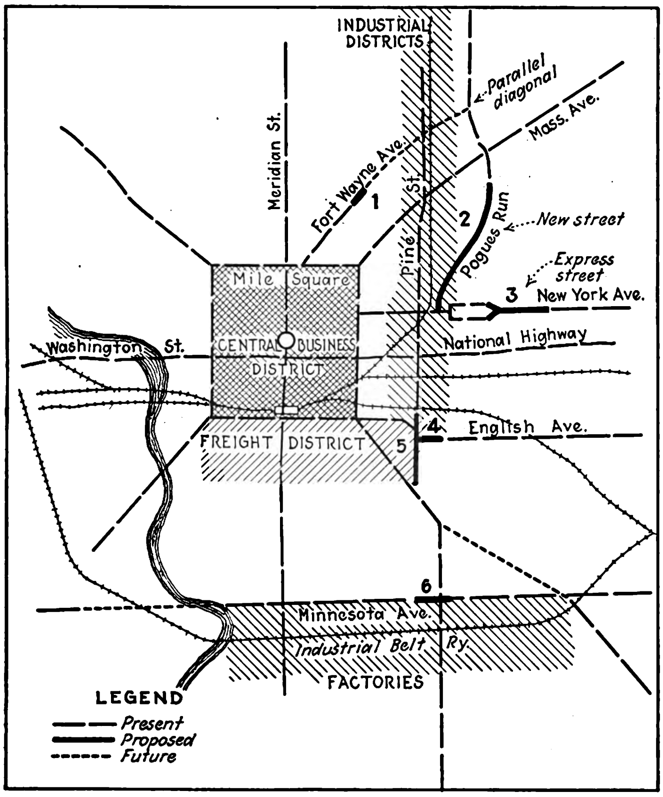
1. Track must be inspected at frequent and regular intervals and defects reported and immediately repaired.
2. All special work must be thoroughly inspected at frequent and regular intervals, defects repaired at once.
   Special work with frequent service every day
   Special work with less frequent service twice a week.
   Special work on country lines once a week.
3. Inspection and repair work must be more thorough than in the past.
   All special work must be under care of some competent man and he will be held responsible for their condition.
   Don't give too many switches to one man.
4. Report to your superior officers all cases where cars run too fast.
5. Keep track groove and special work clean and well greased.
6. All cases of derailments and splits must be thoroughly investigated and where causes doubtful, refer it to Engineering Dept. at once.
7. Discipline given to man at fault.

The Syllabus for the Track Class Is Printed in This Form

Traffic Improvements Proposed for Indianapolis

Engineer's Report Indicates that Efficient Thoroughfare Plan Is First Step in Securing Congestion Relief — Numerous Thoroughfares to Be Opened Up by Construction of Short Connecting Links

SEVERAL immediate improvements that, while comparatively minor in themselves, open the way for much more extensive improvements are recommended in the report of J. Rowland Bibbins, consulting transportation engineer to the Indianapolis City Plan Commission, a preliminary release of which has recently been given. The comprehensive traffic and planning survey made by the engineer with the cooperation of the local forces and the railways company last fall resulted in the discovery of widespread possibilities for fundamental improvements in the city plan, particularly with respect to the system of thoroughfares. These improvements have been laid out for development in the order best calculated to afford immediate as well as future relief.



Six Street Opening Projects Recommended for Immediate Adoption in Indianapolis

In the survey, by means of a carefully laid out schedule the entire traffic movement of the central district was determined as the first and most important step, covering each street throughout the entire day, and for all classes of traffic. The second step covered the examination of some 100 main thoroughfares and their redesign for accommodating and redistributing present and future traffic on practicable standards, with a schedule for reconditioning these streets so as to encourage this redistribution so essential to the relief of the central district. In fact, the volume and complexity of this downtown traffic was found to be so serious a problem that correction of outside defects was clearly needed first to effect any permanent improvement of appreciable value.

Following this a proper traffic control system will be in order, some simplification of car routing in the terminal district, a better system of cartage control of industrial freight and the best plan of railroad development and transit service for the entire district which, under the present city planning law reaches out 5 miles beyond the present city boundaries.

The City Planning Commission has selected six specific improvements for immediate action, all of them recommended in Mr. Bibbins' report. All of these are calculated to perform the function of drawing unnecessary traffic out of the congested district, and especially to create new trucking routes around the center. Another idea is to begin the development of express streets for fast automobile movement entirely clear of the transit streets needed for street car service.

Following are the six projects recommended for immedate action:

(1) The opening of a section on Fort Wayne Avenue. This starts the development of a parallel diagonal street for the relief of the overloaded main diagonal to the center, which virtually will become a new outlet to the rapidly developing northeast section of the city. The street was planned 100 years ago, but was lost through improper land subdivisions.

(2) The Pogues Run extension utilizes an old drainage ditch for a new "get-away" street and to relieve the most congested traffic throat in the city. A direct heavy traffic route will be provided between freight districts, and transit lines along business streets will be cleared of the offending bulk traffic. This ditch is at present an eyesore, but now will be converted into a useful thoroughfare similar to the Fallsway in Baltimore.

(3) The opening of New York Avenue as an express street provides an entirely new type of street for high-speed express traffic, leading directly out of the central district and paralleling the main east-west transit artery to the eastern suburbs. It is designed as a "stop" or restricted speedway. Four other such streets have been laid out in other directions.

(4) The English Avenue project opens an important thoroughfare on the opposite side of Washington Street, the main east-west artery and the National highway. This project is planned to encourage more uniform development of this section of the city and provide a more direct transit entrance. A poorly-laid out subdivision of former days now forces a very crooked and slow entrance.

(5) The improvement of Pine Street gives a new north-south extension through this same area to develop a much-needed trucking route around the central district between railroad and industrial districts located east and south of it.

(6) A short improvement on Minnesota Avenue opens an east-west thoroughfare parallel to the belt line for general crosstown traffic and to encourage industrial trucking to stay in the factory areas until it reaches the most direct route to the freight stations. This route also ties into an important boulevard for expediting faster automobile traffic.

All of these improvements can be developed at relatively little cost and delay. Their importance lies in the fact that they are the bottle-necks of what should be major streets. Moreover, they all have an important relation to the larger city plan which it is the function of the commission to develop. Undoubtedly many other improvements will be undertaken as the theory of these key projects becomes understood by the people. Within the year it is expected that a complete thoroughfare plan will be decided upon for official adoption by the city council, as provided for in the present ordinances.

The beneficial nature of these steps to the basic transit operation throughout the city will be apparent. The traffic survey showed clearly a very large amount of crosstown movement and extraordinary commercial vehicle traffic within the central business district, much of it, without a doubt, due to the defective street system outside. In fact, these conditions were so apparent to the engineer that all efforts were concentrated first outside rather than to attempt now radical measures of relief at the center which would afford no fundamental cure. The seriousness of the problem in Indianapolis is indicated by the fact that there is during the business day no less than one vehicle movement for every 2.5 people of the city, and all of this is concentrated within an area one-half mile from the center.

Some of these general phases of the traffic control problem were discussed by Mr. Bibbins in ELECTRIC RAILWAY JOURNAL for Feb. 23 and March 1, 1924, showing the great value to the industry of adequate fact-data prior to experimental efforts to correct conditions and emphasizing the very important relation of the center to the environs of a large city.

Teaching Firemen About a Subway Car

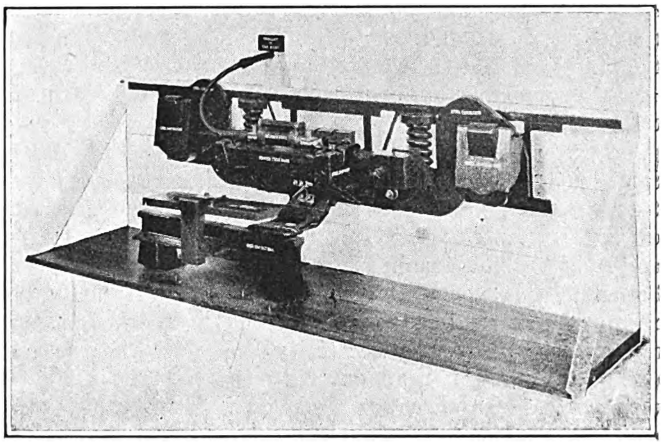
New York Fire Department Gives Instruction at Its Fire College on What to Do at a Subway Fire—Model of Third Rail Construction Used

THE latest addition to the fire college conducted by the New York Fire Department at 153 West 68th Street, New York, is a full-sized model of an electric railway truck side frame, shoe support, collecting shoe and section of third rail, as employed by the Interborough Rapid Transit Company. This model is used to teach firemen what to do in the case of a fire in the subway. The model is of wood and full size. It was built up at the shops of the Interborough Rapid Transit Company in New York and presented to the Fire Department.

Since this model was installed in the fire college, during the first part of May, instruction has been given by a representative of the maintenance department of the Interborough company. Besides this model he uses a blueprint to show the path which the current takes before it reaches the motors and the ground. The point is made that each section of third rail is fed by a separate feeder cable from the substation and is protected by a circuit breaker, that the opening of this breaker automatically cuts the current from the third rail, and that this breaker can be automatically opened at any one of the emergency pull boxes, located on the subway at intervals of about 400 ft. The position of these boxes is indicated by a blue light.

The point is also made that the third rail is protected by an insulated wooden protection board, on which a person can stand with safety; that the contact shoes are of cast iron and can easily be broken with a blow from a hammer, and that all heavy current carrying cables and the motor controlling apparatus are located beneath the floor of the car. The various possible combinations which can form trouble in the subway are also described, and the firemen are taught that about the only occurrence that can cause a flash or smoke in the cars is a short circuit between the third rail and the truck frame. This might possibly start the wooden shoe beams burning or smoldering, or a grounded motor might set fire to the installation of the motor. This can easily be taken care of without inconvenience to passengers, if the routine given below is followed:

1. Pull out the jumpers from both ends of the car that is in trouble.
2. Pull the handle in the emergency box, which cuts power off the third rail. The fact that the power is off is shown by the extinguishing of the main car lights and the lighting of the emergency battery lamps.
3. Get the emergency tools from the emergency tool box and break off the shoes on the third rail side.



Model Used for Instructing Firemen About Third Rail Construction

4. Break off the shoes on the other side of the car where there is no third rail.
5. If there is any flame, extinguish it.
6. Call up the trainmaster's office and order power on the third rail again.
7. Proceed with the train to terminal.

If the short circuit or burning occurs within the motor itself, the firemen are told that it is sufficient to open the main switch.

Shifting from Side to Center Poles in Havana

A CONDITION where side poles were given up for the use of center poles, as described in a recent issue of this paper in connection with Cleveland, developed last year also in Havana. There the double track is in private right-of-way along the center of the street and is not paved except at crossings.

In the reconstruction of the line, the approved plan called for center poles. This required the tracks to be moved about 2 ft. farther apart, but there was not room to do that within the reservation so long as the existing span poles remained on each side. The plan finally decided upon was to build a new track complete in the old position. When this was completed, the track was shifted out 2 ft. from the middle in short sections, without breaking the connections. At the same time that this was done, the center poles were erected and the side poles removed.

The Readers' Forum

Does Not Believe in College Men for Railway Work

SELMA, ALA., June 25, 1924.

To the Editors:

Your article "Using a Technical Man for Technical Work" calls to my mind an attempt made in the same direction on a property I was connected with some time ago. To begin with, the writer did not finish college, but saw enough of the studies used in the electrical course to convince him that a new course was necessary to cover the electric railway field. It is a hard thing to take a man who has studied electrical engineering and put him in the average car shop, working in grease up to his neck, and make him believe he is practicing his chosen work. For it seems as though the grease around a car shop, is the stickiest and hardest to get off your hands.

Another thing to be considered is that the large electrical manufacturing companies have offered the graduating classes good openings before graduation so that you will not get the very best material unless you speak early. Why not teach your own boys in your own shop and then you will have what you want made to order? The average school teaches a lot of useless information calling it electricity, material that is of no use to a young man entering the electric railway business. Why not train your own future heads of departments and teach them the real essentials?

As I said at the beginning, I saw the plan you outlined tried on an average-sized road for two years with little success. It was finally abandoned, owing to the inability of the company to get the young college graduates to take any but a passing interest in the equipment on a street car. They were curious about motors until they saw the inside of one. After that they knew all about it as it had been explained to them by their professor. It was thought early in the experiment that they might be made to do some useful work about the shop, but that idea was soon abandoned, as they came out of the shop at the end of the week with unsoiled overalls and unsullied hands. After two years' trial the management gave up in despair, having in that time tried about eight of these boys in vain. Of the eight young men tried out in this experiment there is only one today whose work is even remotely connected with electricity.

Four other boys used in the same experiment have made a success in the street railway business. All were paid the same wages, worked the same hours and for the same foreman, so it looks as though the college viewpoint had some bearing on the outcome. I think the solution lies in this direction. Let it be known to the men all over the system that you want several boys to learn the electrical and mechanical end of the business. Then instruct your electrical engineer to devote one or two hours a day to them, or have one of his assistants to do so, until they are well versed in the electrical end of the business. Next turn them over to your mechanical department for similar instruction and periodically hold an examination to see if they are learning anything. If not, or if you find any undesirables in the class, weed them out, so that by the time you have taught them for about one year they should begin to return something on your investment.

In two years you should have enough experienced help to fill all the places in your organization, and if you find one or two exceptionally bright boys in a class of average size, then why not give them a real chance and send them to college at your own expense? In other words try the home product in boys before importing any.

W. E. NEES,
Superintendent Selma Electric Railway.

How Speed Affects Wear on Overhead

LEAGUE CITY, TEX., June 19, 1924.

To the Editors:

In a communication I sent you several months ago it will be remembered that attention was called to the fact that while the wear at high speeds was very little, it was excessive at very slow speeds, making it necessary to renew the trolley wire frequently at regular stopping places and to take extra precautions as to anchoring trolley wire to hold it in the event of breaks.

Since sending that communication close observation has been made of wear from sliding contacts on our line, showing that the former conclusions were correct in every detail. It has been demonstrated that with an hourly service each way, with the usual number of extra and special trains, new trolley wire will last not more than two years at the points mentioned.

Accompanying are two sketches showing graphically the excessive wear I have mentioned. This wire had been in use less than two years, the sketches being exact size of two samples cut from the wire at renewal. The piece represented by Fig. 1 was cut from the wire just 65 ft. from that of Fig. 2, which was cut from point of greatest wear. This shows clearly how the wear on the wire rapidly diminishes as the car accelerates in speed. This is representative of what we have at every place where our trains stop or reduce speed very low.

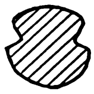


FIG. 1

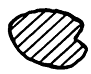


FIG. 2

It has been contended by some that the excessive deterioration is due to the increased current draft from the wire, but the fact that no such condition was encountered during several years of trolley wheel operation clearly refutes that contention, and indicates that the increased wear is almost entirely due to the increased friction at low speed.

This is not to be construed as being in condemnation of the sliding current collector, but only to call attention to a condition that will surely be met with in practice where it is used. For high-speed service it is probable that it is better to use the sliding shoe than the wheel, even though we may have the condition noted, but it is well to anchor thoroughly the trolley wire on each side of such places, as well as on each side of splicing sleeves, section insulators, frogs, etc., as the shoe collector undoubtedly is more severe on such fittings than the wheel. But it stays on the wire better with less wear at other points, if the shoe is not allowed to become badly worn. For slow-speed city service, where stops are frequent, it would seem that the wheel has a decided advantage.

C. L. GREER.

Association News & Discussions

Getting in Better Standing Before the Public

Publicity and Means for Improving Public Relations Are Discussed by Iowa Association in a Joint Convention with the Iowa Section, N. E. L. A.

DEVOTING Thursday, June 26, to the consideration of railway subjects, the joint meeting of Iowa utility men was turned over to F. C. Chambers, president Des Moines City Railway. After telling why he thought the bus would not be able to supplant the electric railway in urban centers, Mr. Chambers discussed public relations. An abstract of this paper appears elsewhere.

Humanized publicity was the subject of a talk by E. P. Harrison, president Iowa Press Association. Securing satisfactory relations with the public was held to be a problem not peculiar to the electric railways and other utilities, but an important factor in the conduct of all business. Successful use of publicity mediums for stimulating favorable public consideration was declared to be a subject requiring careful and intelligent study and direction. Haphazard methods were considered foredoomed to failure.

The public is not interested in dry statistics, according to Mr. Harrison, and will not read them; nor is it interested in the problems of the utilities companies. But once it is inspired with confidence in the utility management, it will act and act quickly for the relief of unfair conditions. The first essential in winning public confidence, is good and faithful service, and without good service to build on, no amount of publicity can be expected to inspire this all-important confidence which is so essential to the establishment of satisfactory public relations.

With these requirements fulfilled, Mr. Harrison held that the task of establishing and maintaining satisfactory public relations is only started. The public is likely to take it all for granted unless attention is intelligently called to the fact. Hit or miss advertising was considered a bar to success. Entire dependence on free publicity through the medium of reading notices furnished to the newspapers was advised against, as it tends to inspire a feeling of resentment and does not help the utility cause in the long run. He advocated telling the story in an interesting and human way and pointed out the importance of using copy written in the language of the people. He also warned the utilities against an attempt to use advertising space only when they need something, without previously building up public good will through this medium by a consistent policy started before the hour of need.

Dwight N. Lewis, member of the Board of Railway Commissioners of Iowa, addressed the convention briefly and suggested a humanized contact between utilities and the communities which they serve, as being an essential to building that mutual co-operation which is so important to good service and satisfactory relations. Above all else, he urged fair dealing in all the relations in which the utility enters.

HOW TRACK RECONSTRUCTION ON ACCOUNT OF PAVING CAN BE AVOIDED

At a luncheon session it was pointed out that a study of the conditions existing in certain cities revealed that the railway in some cases is required to rebuild its track completely on account of repaving regardless of the condition of the old rail.

President Chambers showed that it was possible, in at least one case in Des Moines, to require property owners who petition for an extension of a line into new territory, to sign a contract not to pave the street within a specified number of years, or else to bear the cost of the paving themselves. Although such a contract becomes a lien on the property, Mr. Chambers explained that the potential obligation to pave any street is in very much the same class, even if no car line is put in, and that this point of view can be made the basis of overcoming objection to such contracts as conditions to the extension of car lines in cities. It was also the opinion of some of the members present, that legislation relieving the railways of the paving burden, could be so drawn that the roads would not at the same time be required to rebuild track completely whenever a street is paved or re-paved.

On the recommendation of the nominating committee, the officers and directors who served the association during the past year, were re-elected. These included: President, F. C. Chambers, president and general manager Des Moines City Railway; vice-president, R. A. Leussler, general manager Omaha & Council Bluffs Street Railway; secretary and treasurer, H. E. Weeks, vice-president and treasurer Tri-City Railway & Light Company, Davenport. F. J. Hanlon, president and general manager Mason City & Clear Lake Railroad, was re-elected a member of the board of directors, and W. J. Bertke, vice-president and general manager Sioux City Service Company, was elected to the place made vacant by the retirement of C. D. Cass.

On Wednesday night the members and friends of the two associations staged an unusually lively banquet, which was conspicuous by the absence of speeches. The evening was concluded by an informal dance. Golf for the men and a series of entertainment features for the ladies arranged by Mrs. Sterns and Mrs. Burnquist, furnished diversion during the afternoons and evenings of the other days of the convention.

Five Ways to Improve Public Relations*

By F. C. CHAMBERS

President and General Manager Des Moines City Railway

THE most essential thing in the successful operation of a street railway property is good public relations. The question then immediately arises, how can good public relations be secured and maintained. Primarily, the function of the electric railway is to furnish ample transportation for the community which it serves. In order to give this service we must not only have the facilities, but a great deal of thought and attention must be given to provide adequate service at the time of day when it is required. A careful study of traffic movements must be made frequently, and schedules adjusted so that the correct distribution of cars on the different lines is secured. After the survey has been made and schedules worked out, careful supervision must be given to the operation of cars in order to secure the headways which are called for by the schedules. There is no one thing which will create more dissatisfaction and discontent or cause more complaint than irregularity of headways. Of course, with the congestion in the business districts of our cities and the fact that many of the lines may cross steam railroads where they are frequently held up for several minutes at a time, it is very difficult to keep the cars spaced in accordance with the schedules, but in many cases a careful investigation of the matter will enable routes to be changed and alterations made in operating conditions which will eliminate, to a considerable extent, these delays.

Once the service is established, it must not be assumed that no further attention is necessary to maintain it. If it is found that irregularities in headways continue to occur, a careful investigation should be made to determine whether or not it is the fault of the men operating the cars or whether it is due to the fact that the running time has not been given due consideration in making out the schedules.

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*Abstract of a paper presented at the joint meeting of the Iowa Electric Railway Association and the Iowa Section, N. E. L. A., Fort Dodge, Iowa, June 26.

Very few of the patrons of a railway system have the slightest idea of what is involved in the operation and maintenance of a system operating a comparatively large number of cars, or the investment and operating expenses involved in giving this service. Even when adequate and efficient service is being given, there will be more or less complaints received. Some of these are justified; many are imaginary. Regardless of the nature of the complaint, the company should maintain a department which will take care of and investigate all complaints. If the complaint cannot be taken care of satisfactorily by correspondence, a personal call should be made explaining the situation in detail and at all times taking the attitude that the company stands ready and willing to rectify any injustice done to its patrons.

It must be remembered that the men on the cars are the salesmen for the company and every effort possible should be used to educate these men to give courteous treatment to the company's patrons. In many instances, where these employees are dominated by a labor organization, it is difficult indeed to secure their co-operation along this line, but a great deal can be accomplished in securing this co-operation by creating activities among the employees, which will have a tendency to bring the employee and employer closer together and perhaps to educate the employee in the problems with which the company is confronted.

One of the most prolific sources of discontent and dissatisfaction on the part of the public lies in the fact that it does not know the problems which confront the company. The passenger has no conception of what becomes of his fare. If it is left to some demagogue or perhaps some one who is antagonistic toward the company to disseminate this information, nine chances out of ten the information given will be far from correct and prove detrimental to the company.

From time to time it will be found beneficial to advise the public pertaining to the revenues of the company, its operating expenses, and similar information. In this way the public will become acquainted with the operation of the property and the disposition made of the money which it is paying to support the corporation.

In the past a great many operators have taken the position that the public is not concerned as to the disposition of the company's revenues, but the experience which the companies have had during the past few years has demonstrated that this is the wrong stand for a company serving the public to take. It is a characteristic of the great American people to want to become acquainted with those with whom they do business. Of course, it is very difficult indeed, if not impossible, for the manager of a street railway to know personally any considerable percentage of its patrons, but it is possible to have the heads of the different departments which are responsible for the operation of the system become acquainted in different ways with a large number of people in the community by having them join civic organizations such as the Rotary Club, Kiwanis Club or Lions Club, not forgetting the fact that a substantial membership in the local Chamber of Commerce will unquestionably prove very beneficial.

Motor Bus as an Auxiliary in Baltimore*

By L. H. Palmer

General Manager United Railways & Electric Company, Baltimore, Md.

IN 1915 Baltimore, like many other places, was over-run to a considerable extent with jitneys of the Ford type. A bus body was developed locally, known as the "Baltimore" type, which seated four persons each on two longitudinal seats behind the driver and two additional on the driver's seat. These were crude affairs with a tarpaulin top and sides and open step at rear. I remember one of these machines that went down the street with 23 people clinging to it!

Subsequently a few of the operators invested in larger chassis, but of the 100-odd machines that were in operation at the peak of the mania probably 98 per cent were Fords, with bodies similar to that described.

In 1916 our company, in order to determine the possibilities of the motor bus, and also to combat the indiscriminate competition which was affecting our income, went into the motor bus business. We incorporated two companies—one operated the Ford jitney of the "Baltimore" type, and entered into direct competition with these machines over the three most largely operated routes. The other company bought buses of a better type, equipped with cross seats, and put these on Charles Street in direct competition with a company that had started up to give a better type of service on that high-class thoroughfare.

The operation of the Ford type of jitney began to wane, and after an experience of 15 months we took off our jitneys of this type.

Later, through an amendment to the Public Service Commission law, the power of regulating motor buses and jitneys was vested in the commission, and it became necessary to obtain a certificate of convenience and necessity from it before any new operations could be started. The law provided that any buses in operation at the time this amendment took effect were to be considered *prima facie* to have demonstrated "convenience and necessity." As a result, there is one route with some 30 buses running east from the heart of the city that operates in direct competition with our street cars at about an equal rate of fare. This line of jitneys is now operating 25-seat buses in modern type.

Transportation Monopoly Is Best

As a result of the experience gained, we are firmly of the opinion that all transportation service in a community should be furnished by one company. We believe that the street railway company is at least as capable (and we think more capable) of furnishing proper transportation facilities as any other agency. It certainly has the experience and organization. If you will pardon a personal opinion, I think the one thing that frequently is lacking to complete the combination is a proper attitude of mind on the part of the directing heads of the company. Our own feeling is that if by any stretch of imagination the airplane becomes a common carrier for urbanites, then we want to operate them in the city of Baltimore along with street cars, buses, rapid transit facilities and trackless trolleys!

Our motor buses are operated by a subsidiary entirely owned and controlled by the United Railways & Electric Company. The company is known as the Baltimore Transit Company and operates six routes at the present time. The two main routes are entirely independent of the street cars, charge a 10-cent fare, furnish seats and issue no transfers. The most important one operates on Charles Street, from the financial and shopping districts to and through a high-class residential section on the north side of the city.

Since 1916 the service rendered on Charles Street has gradually extended until at present we are operating 16 to 20 buses on this route, which has a round trip length of 6.5 miles. Four of the buses are of the double-deck type and the balance are 25-seat single deck. We are using the low-level 51-seat double-deck buses manufactured by the Fifth Avenue Coach Company, New York, and have just purchased four more, which will be delivered within the next month. One of these will be equipped with tarpaulin rolled top and side windows, the latter dropping into pockets. This is experimental, to determine its availability for protection of passengers in inclement weather and also on days when a hot sun beats down.

The other route, the Mount Royal Avenue line, diverges from Charles Street about a mile from the business center and taps another residential section, reaching the edge of our largest park.

The first of these routes, under the present fare, is showing a moderate profit; the other route is not yet paying its way. This second route was installed about two years ago, because the Public Service Commission had a bona fide offer from responsible parties to put bus service on this route, and told us that if we did not furnish the service, it would give the other people an opportunity to do so. From our study we felt that the route would not be profitable under the conditions, but decided we should undertake it and do our best to build it up to a point where it would not be a drain. We are hopeful that this result may eventually be obtained.

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*Abstract of a paper presented at the meeting of the New York Electric Railway Association, Long Beach, L. I., June 21, 1924.

In addition to these two main operations, the Baltimore Transit Company is operating two routes of about 1 mile each as direct feeders to the street railway system. These were both put on in lieu of building car tracks and the rate of fare is the same as the street car; that is, 8 cents cash or 7½ cents when metal tokens are purchased, with interchange of transfers to and from intersecting lines. Neither of these is paying its way.

On Monday of this week we put on another route—about 3 miles long—in the eastern section of the city, to afford direct communication between a residential section and a manufacture district which heretofore had no direct connections, passengers being obliged to go around three sides of a rectangle in order to get from one to the other. It is too early yet to say what this now route will do. It was established by order of the Public Service Commission as one of the requirements of getting an increased fare, and preliminary studies do not look hopeful as to its operating at a profit.

EXPERIENCED WITH THE TRACKLESS TROLLEY

The sixth route operated by the transit company is a trackless trolley. In this case owners of real estate along the line insisted that the Public Service Commission help them to obtain some kind of transportation service. Our studies indicated no possibility of the route paying for a number of years, but the commission felt it was a desirable development for the good of the city and its environs, and finally, after negotiations between the commission, the citizens and ourselves, we agreed to install the trackless trolley. Originally our own recommendation was that motor buses should be operated, as we knew more about their possibilities, but the real estate owners wanted something more definite and tangible as an evidence of continued operation to enable them to sell lots, and they felt that if they could not get steel rails laid in the ground, the next best thing would be a network of wires overhead, and for this reason the trackless trolley, which type of service had been recently inaugurated on Staten Island, was determined upon. The people interested raised $32,500 and deposited it in a bank to be used to reimburse us for deficits on the basis of $10,000 the first year, $7,500 the second and $5,000 each for the next three. Results have shown continued deficits more than twice the above guarantees to date. Our primary mistake was in giving too fast service over a mediocre road and that has made our maintenance costs high. We have included depreciation charges of 20 per cent on equipment, 5 per cent on overhead. These plus the seat-mile tax naturally added to our costs.

One of the primary difficulties with the trackless trolley has been the lack of engineering study and experimentation looking toward the development of an economical type of vehicle.

Trackless trolleys so far developed weigh from 25 to 35 per cent more per seat than do the gasoline buses. On the basis that the power plant weighs about the same, it would seem that there is need for considerable additional engineering development to get the weight of the trackless trolley down at least to that of the motor bus before it can be considered successful.

I mentioned the fact that the real estate developers felt that a bus line would not enable them to sell their land. In another section of Baltimore a tract of high grade land of about 500 acres has been sold to the Roland Park Company for development in better type of homes. Members of this highly trained organization, when they came to us to discuss transportation service to this tract, did not want a bus line. They said they could not sell their property as effectively without steel rails laid in the ground.

At the present time there is a committee working to define a policy for extension of our service with either car or bus to outlying districts within the city limits. A representative of the commission, of the Real Estate Board, the city, the Topographical Survey and our company composes the committee, and they are endeavoring to work out a practical plan as to how transportation service can be furnished without being an undue burden on the street railway company, which means, of course, upon the citizens of the community, because our costs, of necessity, have to be borne by the people who ride on the cars.

The organization of our bus business follows very closely that of the street railway. We have a superintendent in general charge who reports to the general manager. The shop foreman, inspectors, dispatchers, etc., report to him. The same general type of supervision, of discipline, of instruction, of schedules, runs, headways and layovers is followed along the well tried out process of the street railway system. The shop foremen, however, do not report to the equipment department of the street railway and the mechanics and laborers working under them are recruited from men who have had experience in automobile repair and operation. Chassis are taken care of at our main garage and minor repairs made, while the painting and body overhauling work are done at the street railway shops on a cost basis, with a proper proportion for labor and supervision added. The care and maintenance of all our automobile trucks, touring cars and emergency wagons are also under the superintendent of automotive equipment.

In addition to the main garage where the buses are all housed and most of the touring cars, we have another garage, about 2 miles distant, which houses the service trucks of the maintenance of way and power departments. A system of regular inspection days for all equipment has been worked out and this has been found of value in reducing costs by preventing a car running too long without proper inspection and repairs. A sub-storeroom is located at the main garage and parts for automotive vehicles are kept at that location.

The safety work and the handling of accidents and damages are taken care of by the railway and wherever possible its organization is used to handle business of the Transit Company, as, for example, our purchasing agent. The handling of the receipts is attended to by the dispatcher, who is under the supervision of our cashier and treasurer. The same applies to payrolls and other operating details.

One of the points on which we are laying great stress is the matter of good housekeeping and attractive appearance of our motor buses. We believe it essential to keep up a high standard; that our employees must not only be efficient operators, and courteous to the public, but must present a cleanly appearance.

We compiled some statistics recently to show the relative measure of service on basis of population served per mile of track in Baltimore and several typical English cities. I am going to quote this as a matter of information, which seems to me to show why there is more opportunity for bus development in some of the communities in Great Britain than in this country.

City	Population	Miles of Track	Population per Mile Track
Baltimore.....	800,000	415	1,937
Glasgow.......	1,300,000	198	6,565
Birmingham...	900,000	130	6,923
Liverpool......	800,000	128	6,250
Edinburgh.....	500,000	100	5,000
Sheffield.......	500,000	79	6,330

These figures are extremely interesting to my mind as showing how much greater service is rendered the community by the street railways in this country than is done by the cities in England, and to an extent indicates that there is less need of bus operation here than abroad.

What possibility exists for so-called de luxe service between centers of population is a matter that has not been fully settled. There is unquestionably a considerable field for this type of transit, and climatic and road conditions and the habits of the people are all important factors. In the State of California, or in Florida, where the weather is warm, where people go for recreation and pleasure, where there are good roads, and, in the case of California at least, wonderful scenery, there is no question but that such operations are very popular; but these factors have much less potency, it seems to me, in a state like New York. Just where they fit in the transportation scheme in a large city is a matter about which we are undecided. We have some dreams about the use of this type of service, but have taken no definite steps as yet in that direction.

The statement has been made that 1,200 motor buses were owned and operated by street railways this year as compared with 300 on Jan. 1, 1923, an increase of more than 300 per cent in a single year. These buses are operated by 143 electric railways, 13 of which have replaced their street railway equipment with buses.

There can be no doubt but that the motor bus as a unit in our transportation system has arrived.

Track Construction*

Substructure Generally Lighter than in America with Emphasis Laid on Need of Flexibility—Practice on Paving, Joints and Curves Described

By M. J. Torres y Estrada
Way Engineer Barcelona Tramways

OPINION differs as to the relative desirability of a flexible and rigid substructure for track. The flexible type is usually constructed of broken stone to a depth of 15 to 25 cm. (6 to 10 in.) on which is placed a layer of gravel or sand, 8 to 10 cm. (3 to 4 in.) deep. This substructure is either carried all the way under the track or else only for a width of 40 to 50 cm. (16 to 20 in.) under each line of rail. The concrete base may also extend all the way under the track or be placed only in the form of a stringer under each rail.

Ties are not always used, as with the stringer form of construction the stringers are depended upon to give support to the rail and tie rods to keep the rails to gage. Wooden ties are usually of oak, cedar or pine, sometimes treated and sometimes not. They are spaced from 80 cm. to 1 m. (32 to 40 in.) apart, except under special work where closer spacing is followed.

Barcelona uses a concrete substructure but in most places it is not carried all the way under the track. Usually it is laid in the form of stringers, 40 to 50 cm. (16 to 20 in.) wide and 16 to 25 cm. (6 to 10 in.) deep, under each rail. If a quickly drying job is required, a special cement is used, such as cement fondu, and in this case the track can be used after 24 hours. In Neuchâtel and Lausanne, the concrete stringers used are made up away from the job in 1 m. lengths, and then laid in the trench. This has the advantage of permitting the immediate passage of cars.

Only four companies, among them Geneva, use wood ties in a concrete sub-base. Glasgow followed that plan for a number of years but abandoned it. Copenhagen uses old rails as ties, partially or fully embedded in a concrete base. A few companies mount their rails on wooden stringers, placed on or buried in concrete. The Hague, Turin and Liége follow this practice. The Hague uses Australian wood stringers, the two other cities employing oak. Several companies report the use of asphalt between the base of the rail and the concrete substructure to produce a cushioning effect. Several others use Australian or teak wood for this purpose, and Marseilles is testing out under its special trackwork a layer of lead.

These and other precautions have been installed to avoid the rigidity of the monolithic concrete construction, whose disadvantages may be summed up briefly as follows:

The vibration of the rails, in spite of all precautions, affects the joint between the rail and the concrete. Water seeps in and disintegrates the concrete particularly at the joints. Renewals and replacements to the track structure are expensive and slow, and a wait is required to allow the concrete to set if any considerable part has been renewed. It is difficult to get at the gas, water, and other utility piping under the street.

Most companies drain the groove of the rail, the drains being at the foot of grades and especially before track switches. Such drainage reduces the cost of maintenance and the quantity of water which gets in under the track.

Types of Paving

Macadam—This type of paving is going out of use and is not a particularly desirable one from the railway point of view, as it is apt to be worn by vehicles into ruts next to the rails. To overcome this, stone toothing is often used adjoining the rails, especially around switches, the space between the toothing and the rail being filled with cement, tar or asphalt. The advantage of macadam is its low cost, but in addition to its rapid deterioration, one company claims that the dirt and mud transferred by vehicles to the rails increases rail wear.

Stone Block—This is undoubtedly the paving most generally used. The blocks are sometimes laid directly against the rail, but sometimes there is a filler of sand and gravel or a special paving brick. While there is a tendency for ruts to form alongside the rail, this pavement is undoubtedly considered the best by railway managers, because of its wearing qualities and its ease of maintenance for both paving and track.

Wood Paving—This is supported on a concrete base. Australian wood is considered desirable because it swells less than softer woods, but is expensive. In consequence, other woods, treated, are being used. One line of wood blocks is laid on each side of the rail longitudinal to it, and the others with their main axes at right angles to that of the street. The chief advantage of this paving is its quietness, and it permits repair about as easily as the stone paving. Its drawback is its cost.

Concrete Paving—This is used very little, so no facts are available.

Asphalt—Like wood, this paving has to be laid on a concrete basis. Best results are secured when the asphalt is laid directly against the rail, but a number of companies separate the rail from the asphalt by a row of wooden or stone headers, the latter being preferable

Superstructure

The general weight of rail used is from 20 to 22 kg. per meter up to 36 kg. for T-rails (72 lb. per yard) and to 60 kg. per meter (120 lb. per yard) for grooved rails. Their length varies on straight track from 10 to 20 m. (33 to 66 ft.) and in Paris rails of 24 m. (78 ft.) have been used. In general, the longer the rail, the better for railway purposes, except for the practical limit of ease of handling in the mills, in transportation, and in city streets.

The joint is still the weak point in the track. The bolted form is the most popular, the connection being made with six, eight and even twelve bolts. Patented mechanical joints are employed to some extent, but are not in as general use as they were. The Haarmann duplex rail is still being used in a few places.

Three companies report they are still using the Falk cast-welded joint, the pioneer of the welded joints. The arc weld has not come into very general use yet, though 50 per cent of the companies replying to the data sheet report they are making some use of it. In the opinion of the author, the aluminum-thermit joint is the best, as it is simple, easy to apply and effective. While higher in cost than some, it is cheaper in the end if the joint holds. Sixty-five per cent of the companies replying to the data sheet are using this joint with satisfaction as regards breakage. Lille-Roubaix-Tourcoing has 13 km. (8 miles) of track which were welded by this system in 1906. During this time not more than thirty joints were broken. The system at Mulhouse figures on a basis of 1 per cent breakage for both alumino-thermit and arc welding.

Practice favors opposite joints, but varies on whether the joint should be suspended or supported. Tie rods are generally used. Bonds are generally attached to the rail by welding or brazing. The use of ordinary solder for bonds has disappeared.

Practice differs as to the layout of curves, some using the parabolic form throughout and others a circular arc in the middle of the curve with spiral entrances. Several companies, including Marseilles, Paris and Lyons, report the use of manganese rail on curves and that its life is three times that of the ordinary rail. The Hague and Glasgow have used the Sandberg system for rails on curves, though in the latter case no great benefit was observed. Lille-Roubaix treated a 6 m. length of rail by heating the head with the torch and then chilling it with water, and after 26 months of use reports a noticeably reduced wear. Paris has also experimented along these same lines.

Opinion is divided as to whether grease, graphite mixed with water, crude oil, a mixture of oil and graphite, or of tar, oil and graphite, is best for curves. Paris has arrangements for putting water in the groove and finds that it reduces the grinding of wheels on curves.

Only four companies use the underground conduit systems, namely, Paris, Bordeaux, Brussels and Lyons. They report in general that maintenance is high, that the system is more subject to interruption than the trolley and that they would prefer the latter.

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*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

A. I. E. E. Discusses 1,500-Volt Automatic Substations

In General the Features Do Not Differ Materially from Standard Practice—Full Automatic Operation Not Favored in All Cases

THE use of 1,500-volt automatic substations for supplying direct current to suburban electrified railways was the subject of a paper before the annual convention of the American Institute of Electrical Engineers held at Chicago June 23-27. This paper, which was presented by C. A. Butcher, general engineer Westinghouse Electric & Manufacturing Compay, gave a complete résumé of the subject. His paper discussed the power requirements, location of substations and their capacity.

Regarding the selection of converting equipment, the author stated that synchronous converters have the advantage of smaller space and weight combined with higher over-all efficiency. Motor-generators are more stable under wide fluctuations in voltage and can carry heavier momentary peak loads.

As to the relative merits of shunt and compound field windings, the author emphasizes the need of a drooping voltage characteristic for automatic service, so that the shunt winding is favored. Where compound-wound converters are used this drooping characteristic has been effected by limiting resistors inserted in the circuit automatically on overload.

For 1,500-volt d.c. service the larger units, whether motor-generators or converters, will be made up of two 750-volt machines connected in series. This is especially true of 50- and 60-cycle converters. The general features of the control equipment are essentially of the same type as in low-voltage automatic stations.

Application of automatic control to substations was discussed by several speakers. V. E. Thelin referred to some simplified substations which have been used by the Chicago Surface Lines for three years without any inspection or maintenance. Trouble has been experienced only with one contact finger and a clock. The speaker favored shunt-wound rotaries and no shunts on the circuit breakers.

G. I. Wright announced that the largest automatic substation now contemplated for railroad electrification consists of two 2,000-kw. units. Suburban lines would involve four or five such units. Full automatic operation was not considered advisable by the speaker, although reclosing and automatic starting and stopping switches were considered desirable.

Precaution will have to be taken to prevent lock-out of motor generators and rotary converters on flashovers, especially with third-rail systems, if continuity of service is to be expected from automatic operation, declared A. M. Garrett. Manually operated substations will be employed on the Chicago terminal electrification of the Illinois Central Railroad, but they have been designed so that they can be converted to automatic operation if this becomes desirable in the future.

A. C. Grayson claimed that Newark, N. J., has the largest combined automatic railway and power substation in the country and that it is noise-proof. Fourteen new automatic substations are under construction by the Public Service Electric Company of New Jersey for commercial, railway and combined commercial and railway service. It is expected that reclosing feeder breakers and supervisory control will be installed in the manually operated substations as they are rehabilitated.

Within thirty days the Detroit Edison Company will have 33,000 kw. in automatic substations, 16,000 kw. of which was installed this year, according to J. W. Bishop.

American Association News

Committee Sails July 9

JAMES W. WELSH, Harley A. Johnson and Harry L. Brown, special committee on foreign operation recently appointed for making a study of advance practices among transportation companies in the principal cities in Europe, will sail on July 9 on the *Aquitania*. Their headquarters in London will be at the Hotel Curzon, where they will remain two or three weeks. The remainder of their time abroad will be spent largely in Paris, with some study of electrification work in Switzerland, if time permits.

Exhibit Committee

THE exhibit committee of the American Association met in New York on July 2 for the purpose of assigning space at the Atlantic City convention, Oct. 6-10. Those present were J. C. McQuiston, chairman; C. E. Morgan, vice-chairman; Edward Dana, C. P. Billings, Cornell S. Hawley, L. W. Shugg, A. L. Price, A. M. Robinson, Executive Secretary J. W. Welsh and Director of Exhibits F. C. J. Dell.

Mr. Dell reported to the committee that to date 141 applications for space had been received, totaling 69,965 sq.ft., which compares with 43,864 sq.ft. in 1923 and 26,420 sq.ft. in 1922 at the corresponding date. Mr. McQuiston commented that the director of exhibits was to be congratulated upon the fine work he has done. The problem this year will be that of finding sufficient space rather than to find exhibitors.

A motion was passed approving the work done thus far by the executive secretary and the director of exhibits.

The rate for exhibit space on the track on Mississippi Avenue was set at $2.40 per linear foot. The committee authorized the executive secretary and the director of exhibits to cancel the assignment of space to any exhibitor if not paid for in a reasonable time.

The committee faces a particularly difficult problem this year in view of the fact that the applications for exhibit space by bus manufacturers total about 24,000 sq.ft., while the total available space with sufficient headroom and having adequate floor carrying capacity is only about 23,000 sq.ft. This is a condition which may require the committee to move some exhibitors from spaces they have occupied heretofore, in order to use all suitable space for exhibitors who require high clearances. A special effort is being made to expand the available exhibit space and a special sub-committee was sent to Atlantic City following the meeting to see what arrangements could be worked out. The committee is going to great length trying to please both old and new exhibitors, and where because of the conditions this year old exhibitors have to be moved to new locations, special plans are on foot to make particularly attractive some of the exhibit space that heretofore has been considered as less desirable.

The committee also decided to recommend to the entertainment committee that the orchestra music on the pier mornings and afternoons be not arranged for this year, as it is considered distracting to the exhibitors.

Sub-committees were appointed as follows:

Membership: New York district, C. E. Morgan and E. P. Waller; Pittsburgh district, J. C. McQuiston and C. P. Billings; Cleveland, Detroit and Toledo district, J. H. Alexander; New England district, Edward Dana; Chicago, E. J. Blair and L. E. Gould; Mid-West, A. L. Price; Southern, E. B. Meissner and B. W. Frauenthal.

Decorations: L. W. Shugg, A. M. Robinson and F. C. J. Dell.

Space, power, car and bus exhibits: E. J. Blair, A. M. Robinson, E. P. Meissner and L. E. Gould.

Meeting rooms and Insurance: J. W. Welsh and F. C. J. Dell.

To co-operate with Entertainment Committee: L. W. Shugg and A. M. Robinson.

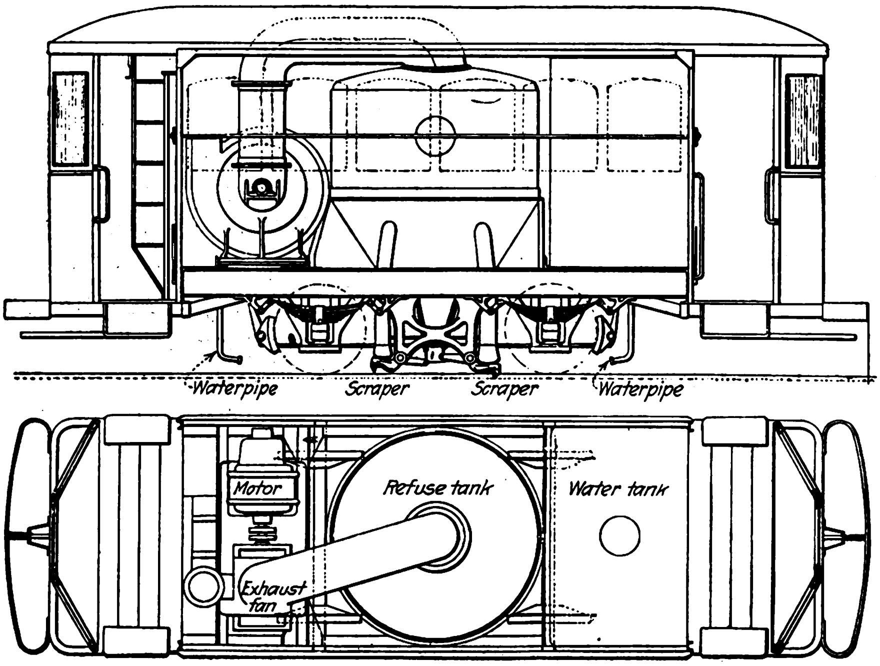
Report on Educational Work Completed

CHAIRMAN EDWARD DANA of the American Association committee on education appointed Myles B. Lambert and H. H. Norris, with himself as chairman, as a sub-committee to draft the report for the Atlantic City convention. This committee met in Boston on June 12 and 13. A number of valuable reports of educational work being done by member companies, which had been prepared for the committee, were digested for use in the report of the committee on education. The sub-committee also approved for immediate publication and distribution in pamphlet form a monograph entitled "Why Educational Work Pays." The sub-committee made an inspection of the educational work being done by the Boston Elevated Railway, particularly the new instructional headquerters at Sullivan Square station.

Maintenance of Equipment

Vacuum Cleaner for Grooved Rails

A CAR equipped to dig out the dirt from the grooves of rails and then pick it up by an exhaust fan on the principle of a vacuum cleaner has been developed in Arnheim, Holland. It is described in an article by P. M. Nieuwenhuis, manager of the Arnheim Tramway System, published in a recent issue of the *Revue Universelle des Transports*.



Plan and Elevation of Vacuum Cleaner Car

The point is made in the article that when the groove in the rail is kept clean, there is not only less danger of derailment, but there is a considerable economy of power. The author also claims that to dig out and remove the dirt at the same time is much better than to remove it first by hand, then have it shoveled up by another gang, because, during the interval, much of it may be worked back into the groove by passing vehicles. While the groove on the average European rail is usually narrower than on rails in this country, from 1 in. to 1½ in. is the common width, a brief account of the car may be of interest.

The apparatus used is mounted on an old single truck car, whose sides have been boarded up to prevent the dirt sucked up from sifting out through the windows. The scrapers used are adjustable from either platform and are pressed down by springs, as shown in the elevation of the car. There is a pair of scrapers for each direction of running, the other pair being raised.

The vacuum tubes terminate directly above the scrapers. The vacuum tank has a capacity of about 4 cu.yd., and the exhaust fan is driven by a series-wound motor of about 15 hp. This motor is protected from overload by a circuit breaker on each platform.

In addition to the scrapers and vacuum cleaners, the car carries a water tank with outlets over each rail at each end of the car. These outlets are controlled by valves operated by the motorman, who soon learns how much moisture is required to facilitate the work of cleaning. In wet weather no water is necessary. In dry weather, the dirt comes out better if sprayed. The water tank is furnished with a gage which can be read from the platform.

The dirt tank is fitted with a signal which notifies the motorman when it is full. It then can easily be discharged over a dump. The sides and roof of the car are removable, so that it is easy to get at the mechanism. There is also a trapdoor on the side, so that the scrapers can be reached in that way.

On straight track the car can make about 15 m.p.h. Hence it can be used between regular cars without delaying traffic. On curves and over special work operation has to be slower.

A single operator can run the car, and it requires hardly more attention than any other type of car.

Relation of Armature Slot to Commutator

SOME suggestions for laying off the armature core in relation to the commutator, when rewinding armatures, were given in an article in the *Electric Journal* for December, 1923, by M. E. Chapman, of the Westinghouse Electric & Manufacturing Company. The proper layout of the coils can be obtained from the winding itself before stripping an old winding. Manufacturers also furnish proper winding data. Sometimes the layout is marked on the end of the bars by the manufacturers, by means of punch marks. When the position of the winding on the armature is originally determined the relation of the commutator throw to the armature throw is prick punched on the end of the commutator. This shows either the center line of the coil throw or the center line of slot 1, and the commutator throw of the first coil. If the center line of the coil throw or the center line of the slot, come on the center line of a bar, the bar is punched. If the center line of the coil throw or the center line of the slot comes on the center line of the mica then the bars on both sides of the mica are punched. When the commutator throw is laid off each bar which is to receive a lead from the first coil is punched. This is true for both top and bottom leads. The varnish covers the end of the commutator and must be scraped off to find these punch marks. A screwdriver or piece of string can be used in determining the center line of the different parts.

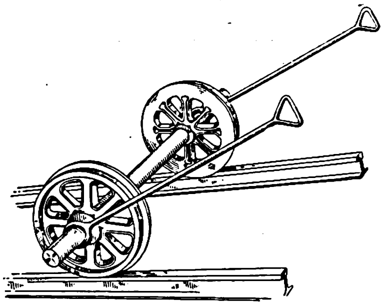
The following rules are given to determine whether there is a dead single coil in the first coil on a four-pole motor:

1. The wave or two-circuit winding always requires an odd number of commutator bars, while the multiple winding may have either an odd or even number.
2. A multiple winding never requires a dead lead.
3. When an even number of coils per slot are used there will always be a dead lead on a two-circuit winding.
4. When an odd number of coils per slot are used, and there are an even number of slots in the armature, there will always be a dead lead on a two-circuit winding.
5. When an odd number of coils per slot are used and there are an odd number of slots in the armature, there will never be a dead lead on a two-circuit winding.

When starting to put the coils in the slots, the bottom part of the first coil should be placed in slot 1, and the top of the coil in the slot that corresponds to the coil throw. When winding coils with both ends closed the top of the throw coils should be placed in the top of the slot, and the coils shaped up. If this is not done the winding will bind. If the coils have open ends, the top of the throw coils need not be put down until finishing the winding, as these coils have only the bottoms shaped and are flexible enough to shape with only the bottom parts in the slots. In shaping the coils they should be hit on the flat part of the diamond only, and care should be taken not to collapse the loops as this will cause short circuits. When lifting the throw coils care should be taken not to injure the insulation on the coils. They should be lifted one at a time starting with the last coil of the first throw and working toward the first coil. In this way the maximum room for putting in the last coil can be obtained.

Handles Used for Rolling Sets of Wheels

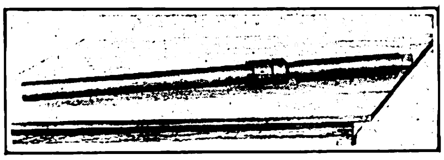
In the railway repair shop of the Savannah Electric & Power Company, Savannah, Ga., the wheel press is located several hundred feet away from the car storage house. It is often necessary to take out wheels and axles from the trucks under a car in the storage house and move them to the wheel press. A convenient method of doing this is to push the wheels along the track by the use of long steel handles made of steel rods. The rod has a hand grip at one end and at the other end is a loop slightly larger in diameter than the axle. One handle is slipped over each end of the axle, as shown in the accompanying sketch. Pressure downward and forward on the handle causes the truck to roll forward along the rails, and it is thus moved from the carhouse along a connecting track and into the repair shop.



Method Used in Savannah for Rolling Sets of Wheels from Carhouse to Shop

Reaming Compressor Bearings

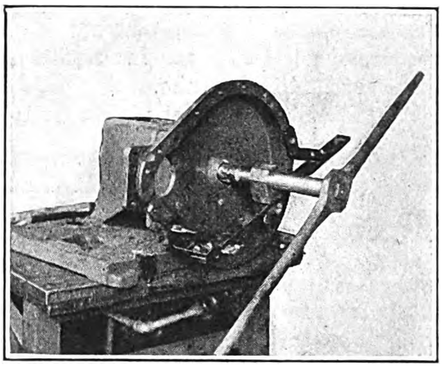
Air compressor main bearings are babbitted in the Decatur shops of the Illinois Traction System and after being placed in the housing are reamed to size by means of an expansion reamer. The device used is a line reamer with a micrometer adjustment of the cutting blades. The accompanying illustration shows the reamer, which was manufactured by the Davis Boring Tool Company of St. Louis. These are made especially for the Illinois Traction System in the following sizes: $2\frac{1}{8}$ in. to $2\frac{3}{16}$ in., $2\frac{3}{16}$ to $2\frac{1}{4}$ in. and $3\frac{1}{8}$ in. to $3\frac{1}{4}$ in. Small sizes are for use on the 25-cu.ft. compressors and the larger size is for the 50-cu.ft. compressors. The reamer is approximately 4 ft. long with a body diameter of $1\frac{1}{2}$ in, and has a square shank at one end. The cutting blades are only a little longer than the bearing and are located about 18 in. from one end.



Expansion Reamer with Micrometer Adjustment Designed and Made for the Illinois Traction System by Davis Boring Tool Company, St. Louis

In operation the reamer is held at the far end in a temporary bronze bearing bolted to the compressor frame. At the gear end it is held by a similar bearing mounted on a framework attached to the housing. This frame is of $1\frac{1}{2}$-in. x $\frac{1}{2}$-in. wrought iron. The two end angles are bolted to the compressor housing, one angle having a slotted hole for the bolt, in order to allow vertical adjustment of the reamer bearing. The bearing is mounted on the cross member between the two angles and is fastened by a winged nut on a bolt set in a slotted hole. This allows adjustment in a horizontal direction.

First a trial cut is made to determine the alignment of the reamer. By turning the adjusting dial, which is marked similar to the graduations on a micrometer caliper, the blades may be extended as little as .001 in. Thus it is possible to ream the bearing to the exact size required.



Set-Up for Reaming Gear End Bearing in Compressor Housing. By Moving the Dial, Minute Adjustment of Reamer Is Possible

About five minutes is required for setting up this reamer and apparatus. The reaming requires about ten minutes, the reamer being turned by hand by means of a cross bar which fits on the square shank. A set-up similar to the one described and illustrated is used when reaming the other bearing of the compressor.

Oxy-acetylene Torch Aids Armature Room Work

In THE armature room of the Kansas City Railways Company, a small-sized oxy-acetylene torch, designed primarily for lead-burning work on storage batteries, has been found to be a very handy utility device.

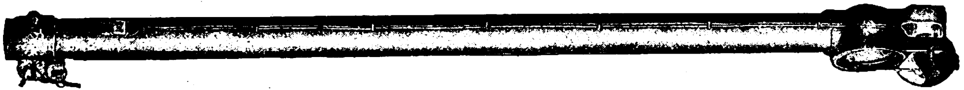
Cleaning solder out of stripped commutators and for sweating terminals in controller repair work, are both very efficiently done by means of this torch. It concentrates a small, hot flame on the work and helps materially in getting a better job of soldering.

As an illustration of the savings produced by this torch, its use has reduced the time for stripping and rebuilding K-14 controllers by as much as two hours per controller. This includes the time taken for stripping the old controllers and soldering the new leads to the terminals.

New Equipment Available

Sight Tube Facilitates Inspection

FOR the purpose of determining the conditions inside the tanks of large oil circuit breakers without the necessity of emptying the oil, the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has perfected a sight tube, built on the principle of the periscope. This sight tube may also be used for inspecting other equipment in inaccessible places. The present design requires a hole 10 in. in diameter for insertion of the tube.



Periscope Used to Examine Contacts of Large Oil Circuit Breakers

At the end of the tube, in a bulb-shaped compartment, a 100-watt, 110-volt lamp is placed so that its rays illuminate the area in front of the lower sighting hole of the tube. A circular mirror, directly above this lamp and opposite a glass-covered opening in the tube, is placed at an angle of 45 deg. to the perpendicular axis of the tube so that it reflects an image of whatever is illuminated by the lamp.

The tube is built in three lengths, 5 ft. 3⅜ in., 6 ft. 2 in., and 6 ft. 7 in.

Improvements Made in Bending Rolls

SEVERAL improvements have been introduced into its series of bending rolls by the Buffalo Forge Company, Buffalo, N. Y. Easier and more even adjustment of the rolls has been secured through the replacement of the springs supporting the top roll and bearings with a balanced lever. Less pressure is also required to regulate the rolls, and the wear on the controlling mechanism is thus reduced. A new spacer arrangement provides an easy and quick adjustment of the space in the rolls necessary to take care of the thickness of the pipe being bent. In addition to the bending of the many forms of structural shapes, these rolls can be used for bending rails, wrought-iron pipe, and odd sections.

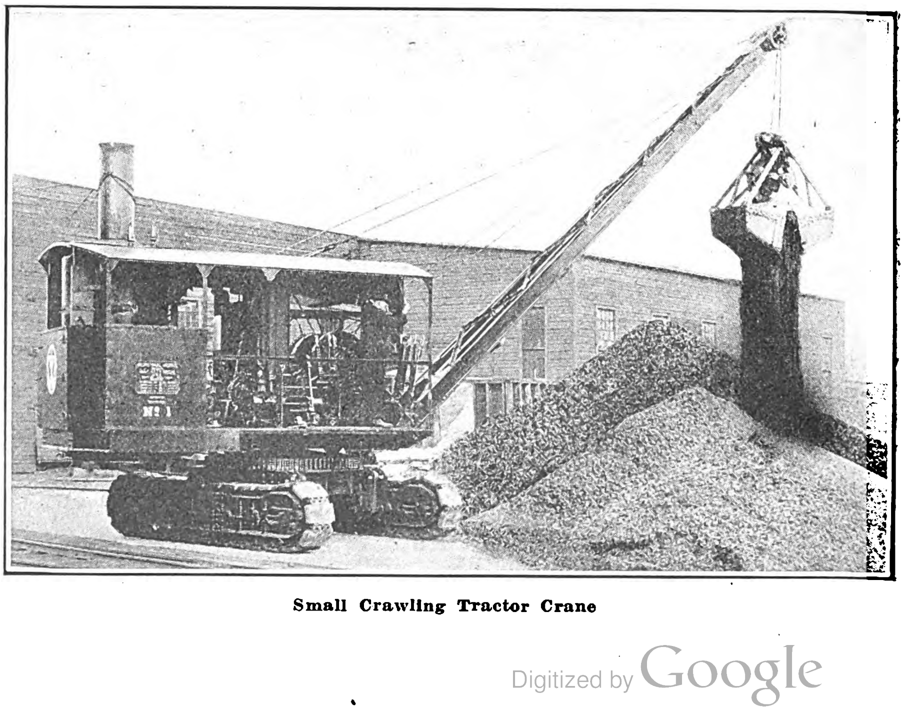
New Crawling Tractor Crane

A 10-TON crawling tractor embodying new features is being offered to the market by the Industrial Works, Bay City, Mich. An important feature is the independent control of the traveling, slewing and hoisting motions. Slewing in either direction is accomplished without reversing the engine by means of a double friction clutch and a train of bevel and spur gears. A slewing brake holds the boom securely with a suspended load in any position. When operating on uneven ground, this brake eliminates any possibility of sudden rotation. The vertical slewing shaft is located accessibly at the front of the crane close to the base of the boom, and since the power is transmitted at this point, there is no great slewing stress carried through the revolving frame.

The entire upper works rests on a rotating steel base. This base rotates on four conical steel rollers which may be taken out without removing any of the parts or jacking up the crane. Heavy steel side frames which carry the shaft bearings are bolted to this rotating bed. The bearings are arranged on the outside of the frames so that any shaft may be easily removed without displacement of other parts. All running bearings are provided with replaceable bronze bushings. Wearing surfaces of all thrust bearings are separated by bronze washers, and bronze collars are placed behind each bevel gear. Gears in the upper works are of cut steel. Oil pipes lead to the operator's platform and the lubrication is accomplished by a pressure system. Clutches controlling the various motions are of a new friction type.

Tractor shoes are close fitting, smooth surface steel and they operate over adjustable idle sprocket bearings which take up the slack in the tractor belt. The crane has two traveling speeds, reversal of direction is accomplished by reversing the engine. Steering while propelling is accomplished from the operator's platform through friction clutches and brakes controlling each tractor belt. Either belt may drive, coast or be held by the brake in any degree desired to negotiate turns.

The new tractor crane is built for either steam, electric or gasoline power, and can be operated with clamshell or dragline bucket, electromagnet, hook and block or grapple. It is readily convertible into a shovel or a pile driver.



Small Crawling Tractor Crane

The News of the Industry

Transfer Plan Changed

Pittsburgh Riders to Have Advantage of Riding from One End of City to Other for 8⅓ Cents

A most important transportation step was taken recently by the Pittsburgh traction conference board when it announced a general transfer system which will mean reaching all points on the system of the Pittsburgh Railways in the downtown business section and in a northside area from any part of the city for a single fare.

The old transfer limitations, which have existed between the systems of the Consolidated, Union Traction companies and the Southern Traction Company, are broken down and the interchange of passengers between the systems permitted. All railroad stations are included within the new transfer zone, making them available from all parts of the city for the single fare. The new zone embraces the entire downtown triangle and one of almost similar size and shape on the Northside. Privileges now available over a limited area on the Crosstown line will be extended over the entire area. The area also embraces West Carson Street between the Point and Smithfield Street bridges.

One of the problems worked out was the identification of holders of the special transfers. This was accomplished by placing the responsibility of getting off before the limit of the zone area is passed. Transfers will be lifted on departure from cars and should passengers delay this beyond the zone boundary, it will be necessary to drop the regular fare.

It also was necessary to solve some of the problems offered by the custom of years to observe a financial segregation plan effecting the various railway units held by the Pittsburgh Railways before the new transfer plan could be developed.

According to the statement of the traction conference board, the new arrangement not only will provide a vast increase to the service given car riders, but also will have a general beneficial effect on all business within the triangle. In addition the tendency will be to relieve traffic congestion by spreading business.

The board also announced the summer high school concession which will be an innovation and enable students to reach the Schenley and Southside High schools for a single fare, not in excess of 10 cents in each direction. At present often two fares and in some cases three fares are required for each trip. No statement was made as to whether this plan would be extended into the regular school year.

A third improvement in the service announced was that of providing a single fare limit to boundary of the Twenty-eighth Ward.

The board, in announcing the improvements to the service, said:

> All these changes disclose the new spirit of the organization of the Pittsburgh Railways and are the first fruits of the plan of co-operation between the city and the company. All these changes will inure to the benefit not only of the car rider, but to the public generally.

Electrics Not Hard Hit in Ohio Tornado

Heroic efforts of repair men of electric railways operating in the tornado swept district of northern Ohio have paved the way for a quick resumption of service. It was expected that July 5 would see the interurban lines running on complete schedule. The Cleveland, Southwestern & Columbus possibly was the hardest hit by the tornado, which leveled the business districts of Lorain and other Ohio towns. Officials of the Lake Shore Electric said on Monday that all lines would be in operation by the end of the week. The Cleveland, Southwestern & Columbus suffered between fifty and sixty washouts, with both poles and wires down. A special carrying 200 people to a picnic at Chippewa Lake was marooned there. People slept in the car all Saturday night and were not able to return to Cleveland until late Sunday afternoon.

The greatest loss to the Lake Shore Electric was from interruption of service, officials say. Wires and poles were blown down in some instances, but extra men from various utility companies were rushed out and damage is being rapidly repaired. The company's service to Lorain was not cut off, while the Toledo & Fremont division also operated. The Fremont & Sandusky division was cut off by storm damage. The roadbed is practically intact. A Lorain city car was picked up from the tracks by the cyclone and hurled across the street. With the resumption of service on all lines of the Cleveland, Southwestern & Columbus the problem facing the company now is to make construction work permanent. Company officials say the damage will run not more than $7,000.

Connecticut Wages Advanced Three Cents

Negotiations between the Connecticut Company, New Haven, Conn., and its employees were terminated on June 28 when wages were adjusted on a basis of 3 cents an hour increase effective June 1, 1924, for a period of one year. This agreement covers motormen and conductors, one-man car operators, shopmen, power station men, substation and line men. The new schedule makes the blue uniform rate 53 cents for the first three months, 56 cents for the next nine months and 60 cents an hour thereafter. The one-man car differential remains at 7 cents.

Controversy in Cleveland Over Arbitration Reaches Court

Peace—temporary at least—has come in the differences between the trainmen and the Cleveland Railway. By mutual consent the date for hearing the injunction action of the union against the company, in the dispute over the 12-cent wage award, has been postponed until Sept. 8.

All strike activities of the union and preparations on the part of the company to meet a possible strike have been abandoned until the case is settled. Both sides now are busy preparing for the court hearing. In the meantime the employees are working under the agreement in effect before the wage arbitration.

Strike preparations of the company cost $47,000, according to City Traction Commissioner C. M. Ballou. The average expenditures were more than $10,000 a week and included an extra pay roll of non-union crews held in reserve, which at times ran as high as 400 men.

Paul E. Wilson, secretary of the company, says a few of the extra men might be employed permanently, but that under the temporary restraining order of the court they would be employed only subject to customary closed shop rules and would have to join the union after sixty days.

It was the general opinion of observers that the union men, after voting to strike when the company refused to accept the award of the arbitrators, really did not want to strike. John J. Stanley, president of the company, openly declared that the men could not be driven from their jobs by any threats of intimidation.

Weekly Pass Shuts Out Monthly Commutation Books

Permission has been granted by the Railroad Commission to the San Diego Electric Railway and the San Diego & Coronado Ferry Company to cancel and discontinue the sale of the monthly commutation fare books from San Diego and Coronado, Ocean Beach, National City, Potash and Chula Vista.

It was shown at the public hearing in San Diego that since the establishment of the weekly pass on Jan. 1, 1923, the sales of monthly commutation books have steadily declined, and that the weekly pass now supplies all reasonable demands of the commuting patrons. It was shown that the weekly pass has solved to a substantial extent the financial difficulties of the applicants, 321,547 weekly passes having been sold during 1923 for $330,610. During the first three months of 1924 the weekly passes produced 2,257,191 passengers, compared with 1,948,043 passengers for the same months last year.

Delinquent Seattle Tax Paid Under Protest

Officials of the Puget Sound Power & Light Company, Seattle, Wash., on June 7 issued to County Sheriff Matt Starwich a check for $655,296 as payment in full of taxes in litigation. Of this sum $254,262 represented interest accumulated since the tax fell due in 1920. The payment represents another move in the litigation between the company and King County over $401,018 street railway taxes for 1919 plus interest.

The company accompanied the check with a protest which sets forth that the payment was made under compulsion and that the company reserves all legal rights, which it may succeed in establishing in court.

On the same day the payment was made to King County, counsel for the Puget Sound Power & Light Company submitted an amended bill of complaint in the federal court, to take the place of complaints dismissed recently, in which it was set forth that the tax had been paid, and that action would be taken to collect three-fourths of the amount from the city. The city, through George A. Meagher, assistant corporation counsel, contested acceptance of the amended complaint, holding that the case was not one for the federal court. Specific performance of the contract between the city and the power company, made at the time the railway lines were purchased by the city, is sought in the amended bill. Mr. Meagher indicated that he intended to attack the sufficiency of the bill on the ground that it did not set forth a cause of action in equity.

The payment of the tax has been the subject of litigation since it became delinquent on March 15, 1920. Collaboration by the city and company to avoid payment of the tax altogether was attempted, but failed, the United States Supreme Court ruling that the tax is valid. Then, with the company officials avowedly ready to pay the company's share, Corporation Counsel T. J. L. Kennedy advised the City Council that it was without authority to raise the tax money. The Council, Attorney Kennedy held, had been without authority to bind the city in the tax agreement. Unable to wait longer for the money, the county treasurer took steps to force collection, with the ultimate result that the county sheriff seized $2,000,000 of company property in distraint proceedings upheld in the federal court, which refused to grant the power company a stay of execution.

Motorman Held at Fault

San Francisco Operator Failed to Report Broken Brake Rod on Car Which Ran Away

Various probes have disclosed that the accident on the San Francisco Municipal Railway on June 2, in which fifty persons were injured, was due primarily to the failure of a motorman to report a broken brake rod. This is the substance of the report of the police, the railroad officials and the city authorities following an exhaustive investigation.

No Formal Report Made

In the opinion of the investigators the motorman should have done one of two things:

1. Halted his car and reported the broken rod when he first discovered it.
2. Waited for another car to tow his car to a repair shop.

The motorman's own story, as related to the police, is at variance with these findings. The official police report reads:

> Motorman Frank Cronin of K line car No. 65, Municipal Railway, reports that the rod broke just after leaving the Forest Hill station eastbound. He proceeded down hill, being able to control the car for a time. It finally got away from his control and hit three autos in its rapid descent to the entrance of the tunnel at Market and Dolores Streets, where it telescoped L line car Number 176.

The police report adds, however, that Cronin admitted having trouble with his brakes before reaching the Forest Hill station, which is a half mile from the scene of the accident.

The grade is very steep leading to the tunnel. It appears from reports and from statements that Cronin believed he could control the car until it started on its wild dash down the hill toward the tunnel.

Immediately following the crash Superintendent Boeken of the railway made a statement blaming the motorman and also suspended Cronin. Later Cronin was discharged.

No official report of the accident had been made available to the press up to June 17 and officials of the city and railway appeared reluctant to discuss details. The public utilities committee of the Board of Supervisors, however, has the matter before it.

The city engineer, Mr. O'Shaughnessy, has made an investigation through his electrical engineer, but up to June 17 he had made no report.

It is claimed that there was no trouble with the air pressure, as the police at first reported. The main pull rod was found on examination to have broken in two, due to wear.

City officials say that there will be no more investigations or probes. They all refused to be quoted. It was stated in behalf of the railway that a full report on the matter will probably be printed in the annual report, which was due on June 30. This report, however, is not likely to be given out for publication, it was also stated, until some time in the fall.

Employees Clearing Away Wreckage from One of the Cars in San Francisco Collision

Buses Discussed in Kansas City

Application for incorporation of the Kansas City Motor Coach Company is the first move toward urban bus line operation in Kansas City. The initial capital of the company is $10,000. Powell C. Groner, a representative of the J. K. Newman interests, which are active in the reorganization of the Kansas City Railways, owns 996 shares of the 1,000 which have been subscribed, it is said.

On the same day the application was filed Mayor Beach was sounded in behalf of the company on the administration's attitude toward urban bus line service. The Mayor would not discuss the proposition and would not give his views on a franchise for the proposed bus line, as he was not familiar with the street railway's reorganization plans, being newly elected to his present office.

Until a reorganization of the railway can be effected the bus service will probably not be started in conjunction with the operation of the railway system. An extensive survey of the bus for use by downtown shoppers has been conducted by the Business District League, which is convinced that Kansas City cannot afford to lag in this traffic development. One definite offer to install a fleet of buses already has been received.

The City Commissioners have designated A. H. Strickland, one of their number, and H. J. Smith, city attorney, to draw up an ordinance to regulate the bus lines and to make bus operation legal. Harry J. Kaelin, park commissioner, and Commissioner L. H. Chapman are in favor of the bus lines and Mayor Gordon has voted for the appointment of the committee to frame the bill.

Additional Comforts of Interurban in Ohio Attract Patronage

Seat covers have been introduced by the Northern Ohio Traction & Light Company on cars in its Akron-Cleveland interurban service to promote travel between the two cities. Figures indicate there has been approximately a 10 per cent increase since June 4, when this particular service was started. In addition to this, the cars were repainted inside and out.

Attention was called to the new service by newspaper advertising and by cards in the street cars. These cards displayed a picture of the interior of one of the cars with a solid blue background and lettering of white saying, "A Pullman Service for You—Clean Seat Covers and Clean Cars Daily. Please Do Your Part by Co-operating to Keep Them Clean. The N. O. T. & L. Co."

Folders were circulated calling attention to the covers for the seats and the cleanliness of the cars.

Another folder issued was intended for the trainmen. It pointed out the necessity for courtesy, declaring that the increase in business secured by the added feature could easily be driven away by one discourteous act on the part of a trainman.

New Bus Lines for Boston

The City Councils of Cambridge and Somerville have recently passed enabling ordinances whereby the Boston Elevated Railway will start three new bus lines connecting these cities with Boston. In addition, the Cambridge Council on July 1 authorized three new bus lines within Cambridge, to be operated by the Boston "L." One of these will take the place of a rail line on which one-man cars are operated, and for which the bus service will be substituted rather than to replace the track. The other two lines will be in the nature of additional service, increasing the usefulness of the Boston "L" transportation system. About twenty buses will be required for these new lines and further expansion of the Boston "L" bus operation is coming very rapidly. The company also has applications pending for bus lines which will extend the rail service beyond Malden. This means the carrying out of the transportation plan at the Malden Center as announced by the company about a week ago.

Messrs. Delaney, Ryan and De Ford on New York City Board

Mayor Hylan of New York completed the selection of the personnel of the new Board of Transportation on July 1 when he named as its third member William A. De Ford. The three members of the new board are:

John H. Delaney, until recently Commissioner of Docks, who was the Transit Construction Commissioner antedating the present Transit Commission. He is regarded as an expert in transit matters and has been Mayor Hylan's chief adviser on subways.

Daniel L. Ryan, who was Deputy Commissioner under Transit Commissioner Delaney. He is secretary of Tammany Hall, a position which it is expected he will relinquish.

William A. De Ford, who has been personal counsel to William Randolph Hearst and general counsel to Mr. Hearst's organization since Oct. 1, 1915. He was also special counsel representing the Mayor at the hearing held by the State Transit Commission.

Commissioner Delaney will be the chairman of the new department for a term of six years. Commissioner Ryan's appointment is for four years and Mr. De Ford's for two years. The Board of Transportation will plan and construct all new city subways. The salaries of the new commissioners have been fixed at $15,000 each.

Ten-Cent Fare Authorized in Westchester

Holding that the present fares are not carrying the necessary provision for the upkeep of the properties and other operating charges, the Public Service Commission approved on June 26 a fare of 10 cents on the Tarrytown, Silver Lake Park and Scarsdale lines of the Westchester Street Railroad. Action on the proposed increase within the city of White Plains and the zones in the Mamaroneck Avenue line was deferred until further order. The increased fares are effective to Dec. 1, 1924.

The decision of the commission was made on the petition of Leverett S. Miller as receiver of the road. With his application there was filed an order of the Supreme Court of Westchester County, directing the receiver to stop service on portions of the lines and to apply to the commission for an increase in fare on other lines or portion of lines.

Revenue passengers carried in the five month period in 1923 numbered 1,517,752 and in 1924, 1,303,999. A falling off of nearly 10 per cent in the Tarrytown and Scarsdale lines and about 5 per cent on the other lines in passengers carried in the same period by lines operated in the two years is shown by the evidence.

What the Motorist's Outgo Could Do for the Beaver Valley

Human nature as embodied in an automobile owner rather resents the suggestion that he is unduly extravagant in the use of his pet. But there are more ways of giving that hint than the cut direct. This has been cleverly proved by C. D. Smith, manager Beaver Valley Traction Company, who instead of stating that automobilists are liable to go broke, takes the opposite tack, in his advertising, of apparently assuming them to be a bunch of Crœsuses whose mere riding expenditure would carry everybody free via trolley, make 300 pairs of honeymooners still happier and pave 48 miles of streets to boot. A typical ad follows:

> If the 7,500 automobile owners in Beaver County will pay to us annually a sum equal to the cost of operating their automobiles we could transport them and all our patrons free of charge and build, completely furnish and donate to each of 300 couples an $8,000 home, or pave 48 miles of streets in the towns.

New Fare in Effect on Queens Line

The New York & Queens County Railway, Long Island City, began collecting a 6-cent fare at midnight on June 29. Large placards announcing the new fare were carried on all the cars of the company. So that there might be no delay for the passengers, the receiver for the lines had collectors at important transfer points to make change for the passengers while they were waiting for cars. The company officials said no objections to paying the extra cent fare has been reported by conductors.

Corporation Counsel Nicholson announced on June 30 that, in compliance with Mayor Hylan's instructions, he was preparing papers for injunction proceedings to restrain the company from collecting the additional fare.

Officials of the company said that they believed the company was $350 richer as the result of the operation for the first day of the 6-cent fare, which the New York Transit Company ordered it to put into effect.

Electrification of Texas Steam Line Progressing

Work is progressing rapidly on the electrification of the Missouri-Kansas-Texas railway from Dallas, Tex., to Denton, Tex., a distance of 48 miles. Richard Meriwether, vice-president and general manager of the Texas Interurban Company, which is carrying out the electrification project, has announced that service over the line will probably be started by Oct. 1.

Work of setting poles and stringing the trolley wire is going forward rapidly, crews working out of both Dallas and Denton. About on-half the line has been completed, with reference to the stringing of the trolley wire. Work of repairing the track and putting it in condition for fast interurban service is also going forward.

The three substations that are to be established are nearing completion, and electrical equipment will be installed in the building soon. These stations will be near Carrollton, near Lewisville and near Denton. Each will be altomatic.

Orders have been placed for cars to be delivered prior to October 1, Mr. Meriwether said. Cars are of the type now in use on the Dallas-Terrell interurban, described recently in the ELECTRIC RAILWAY JOURNAL.

South New Orleans Property Destroyed by Lightning

The shops of the South New Orleans Light & Traction Company, Algiers, La., were struck by a bolt of lightning June 27, during an electrical storm, and was completely destroyed by fire which followed.

The officials of the company declined on June 29 to attempt to appraise the measure of damages sustained by the company, though it was said that the reported losses were greatly overestimated. The company will, it stated, rebuild anew, but this was as much information as the company was prepared to give out at this time.

Maryland Line Granted Fare Increase

An increase of 20 per cent in all one-way and round-trip tickets has been granted the Washington, Baltimore & Annapolis Electric Railway by the Maryland Public Service Commission. The decision was handed down on June 30 and the new rates became effective July 1, to remain until July 1, 1926, unless modified or abrogated by the commission. In granting the company's petition for the increase on straight fares, the commission denied the request for a 10 per cent increase in commutation fares.

The increase granted is expected to add approximately $313,200 to the annual revenue of the company, the commission said. During 1923 the company increased wages of shopmen and trainmen a total of about $194,000.

The commission said that it believed it inadvisable to raise commutation rates at this time or to do anything which would tend to discourage the rapid development of the country along the lines of the road.

Boston "L" Officials Inspect Property

Officers and heads of departments of the Boston Elevated Railway, under the guidance of Edward Dana, general manager, made their annual inspection of the property on June 12. The purpose of this was to acquaint the staff with recent developments.

The party started from the company's new offices at 31 St. James Avenue and visited in turn the South Boston power station, the Andrews Square substation and the Lotus Place carhouse, stopping en route to call upon superintendent of inspection Clarence E. Learned, who has been seriously ill. Next the party covered the new Roxbury bus route, and after stopping for lunch at the Engineers' Club, examined the work on the East Boston tunnel, which had recently been changed from surface line to rapid-transit operation. The new school rooms at Sullivan Square and the extensive Everett shops were visited, and finally the George Street yard with its new fireproof storehouse.

Rights of Commission Upheld in New York Fare Case

The Legislature of New York has the power to change rates even though they were established as a condition for the consents given to franchises, and to exercise that power through the agency of the Public Service Commission. This is the substance of the opinion of the Appellate Division just handed down in the case of the village of Brownville against the Public Service Commission and the Black River Traction Company of Watertown. The decision was a result of a review by certiorari of the action of the commission in permitting the traction company to eliminate a 15-cent rate for round trip tickets between Watertown and Brownville and substitute a rate of 20 cents. The opinion confirms the determination of the commission in the matter, with costs and disbursements.

The court speaking through Justice Harold J. Hinman, said among other things:

> The present determination of the Public Service Commission was made during the period in which the Legislature had conferred upon the Public Service Commission the power to regulate such rates of fare notwithstanding any "franchise condition, consent or other agreement."
>
> The petitioner contends that the amendments of 1921 are unconstitutional, and further that the new rates are unjust and unreasonable. The Public Service Commission has determined that this increase of rates was just and reasonable, and we see no reason for disturbing that determination.
>
> We are also satisfied that the Legislature has the power to change rates even though they were established as a condition for the consents given under the constitutional provision in question. . . . In the case of People ex. rel. Village of Mamaroneck vs. Public Service Commission, we expressed the opinion that the Legislature had the authority to delegate this power to the Public Service Commission, but that the Legislature had revoked that power by the repeal of the statute conferring it and that the Public Service Commission should be prohibited in that case from exercising such delegated authority after the revocation of its authority. That situation is not involved here, but the Public Service Commission has made its determination in this case during the period during which it had the express authority to act under Section 49 of the Public Service Commission Law as amended by the laws of 1921 . . . we think the determination of the Public Service Commission should be confirmed.

Electrics Join with Trucking Company

The Buffalo & Lake Erie Traction Company, Erie, Pa., has filed a joint freight tariff with the Interstate Commerce Commission, the New York Public Service Commission and the Pennsylvania Public Service Commission for handling freight in conjunction with the E. H. Scott Transportation Company, a large trucking company operating from Buffalo to Cleveland and points West.

In making this arrangement the trucking company has agreed to withdraw from the territory served by the Buffalo & Lake Erie Traction Company between Buffalo and Erie and devote its energies to points West. Under the new agreement the trucking company will no longer be a competitor of the railway, but the railway adds to the territory it can serve. It is expected that a lucrative business can be secured through this connection.

The Scott Transportation Company operates a fleet of about 50 trucks and trailers of large capacity. It has just received a certificate of public convenience from the Pennsylvania Commission.

The new connection will also enlarge the territory served by the electric fast freight lines, which association includes the following:

Auburn & Syracuse Electric Railroad.
Empire State Railway Corporation.
New York State Railways.
Northwestern Electric Service Company.
Rochester & Syracuse Railroad.
Rochester, Lockport & Buffalo Railroad.
Jamestown, Westfield & Northwestern Railroad.
Chautauqua Traction Company.
Buffalo & Lake Erie Traction Company.

Moreover, the new arrangement fills the gap in the route between Cleveland and Erie which was caused by the discontinuance of the Cleveland & Erie Railway, an electric railway which ran west from Erie.

$25,000,000 New York Bus Bill Put Over to Fall

Mayor Hylan of New York, at a meeting of the committee of the whole of the Board of Estimate and Apportionment on June 9, declared that he was working on what he hoped would be a solution of the bus problem in New York City. The Mayor intimated that he had a plan which he thought would eventually obtain authorization from the Legislature for the appropriation of $25,000,000 wherewith to purchase and operate a fleet of 3,500 buses. This prediction followed discussion on the proper disposition of an old resolution calling for such an appropriation.

In conformity with the Mayor's wish, the committee of the whole also laid over until September a total of twenty-three resolutions which dealt with bus franchise matters.

Investment and Advertising Books Coming

Thomas Conway, Jr., president of the Chicago, Aurora & Elgin Railroad, Aurora, Ill., reports to the Investment Bankers' Association of America that satisfactory progress is being made in preparing the book on public utility investments, upon which he is at work. The time limit fixed for the completion of the work is the beginning of the fall academic term. Mr. Conway says he has every reason to believe that the volume will be completed within the time limit specified. With respect to the book on investment advertising, E. Paul Young, manager of the investment department of the Illinois Power & Light Corporation, Chicago, says that his activities in connection with the book for the past few months have been devoted mostly to the collection of information and illustrations to demonstrate the principles explained.

Increase in Fare in Effect in Des Moines

Des Moines went back to the 8-cent fare on June 29. F. C. Chambers, president of the Des Moines City Railway, recently notified the City Council of an intended increase in fare to 8 cents as required by the franchise agreement.

The auditor's report for the month of May showed an operating deficit of $29,852. This reduced the stabilizing fund to $75,174, or practically $25,000 below the figure necessary to continue the 7-cent fare.

Under schedule B, which becomes operative again for the first time since Dec. 27, 1923, when the present 7-cent fare took effect, the fare is 8 cents, with ten tickets selling for 75 cents. The next relief measure provided by the franchise, which will be to abolish the ten-ticket sale after another thirty days.

Figures presented by President Chambers showed that the number of revenue passengers carried in May was 2,577,124, a decrease of 98,410 from May, 1923. At the same time wages of the trainmen advanced $10,666, and operating revenue dropped from $207,489 a year ago to $177,599.

Philosophy Behind Richmond Publicity Discussed

"Frank Publicity for a Public Utility" was the topic of an address which A. H. Herrmann, assistant to the president of the Virginia Railway & Power Company, delivered June 24 at the Richmond, Va., Advertising Club meeting. In concluding his address Mr. Herrmann said:

> Unlike some utility companies, we do not have what is known as a public relations department. Every department in our company is made responsible for maintaining cordial relations with the public and gaining good will for Virginia Railway & Power Company service, particularly with the part of the public with which that department is coming in contact. To the end of educating employees our company issues to them a little bulletin entitled: "Man to Man Talks." Some of these messages are signed by the president of the company, and others by the general manager, and they are followed up by suggestions from superintendents and department heads, who discuss them with the men.
>
> We encourage a speaking, or at least a writing acquaintance, with our riders through a little leaflet "Public Service News," which we place on all of the cars. We get many letters from the public, some of them lauding service and some making suggestions concerning it. We get lots of communications through this leaflet and these letters from the public encourage the men. We consider them very valuable.
>
> Our Car Bulletin is another medium adopted by the company to bring to the attention of the public matters of interest to them. Newspaper space is, of course, the most far-reaching medium to be had and our company is not unmindful of its great value. Of late we have been using the newspapers to inform our patrons of extensions of service that our company proposes in connection with its new franchise.
>
> Practically all our ads are captioned "At Your Service." We believe this carries the spirit which marks our effort to serve the public.
>
> The State of Virginia has been dilatory in providing proper protection for invested capital, particularly investment in transportation, and until there is a change for the better or until Virginia municipalities recognize the situation and take some steps to correct present injustices, public utilities must confine their efforts to protecting the capital that already is invested, rather than attempt to reach out for more. You can confiscate capital already invested, but you cannot force new capital to invest.

The company, through Mr. Herrmann, relates in a twenty-two-page pamphlet what public good will really is and what are the main elements in the making of good public relations in Virginia. To this company the only sound basis for good public relations lies in good service plus frank publicity and personal contact. In summarizing the situation the pamphlet says that the maintenance of good public relations rests on three legs—the regulatory body, the investor and the company, including all of its employees.

California Commission Denies Request to Abandon Part of Line

The California Railroad Commission recently denied the Pacific Electric Railway, Los Angeles, Cal., permission to abandon a portion of its service on the Santa Monica Air Line from Santa Monica along the ocean front to the terminus of the line at Santa Monica Canyon. Some time ago the commission held a hearing in Los Angeles and the company presented much evidence showing that the operating costs of the line were in excess of the revenue. At a rehearing on Jan. 2, 1924, considerable testimony was introduced to show a possible future necessity to the territory northwesterly from the terminus of the line.

The commission ruled that the future development of the territory served by the line would require rail transportation and that for the present the line should not be removed. The commission recognized the loss connected with the operation of the line and agreed to allow the railroad to put into effect a supplementary proposal for the operation of only a portion of the line. The commission's order allows the railway hereafter to operate hourly service over the route.

Plainfield Buses Authorized.—Substitution of buses for electric cars on three routes in Plainfield, N. J., has been authorized by the Board of Public Utility Commissioners of New Jersey in two decisions disposing of an application by the Public Service Railway for permission to abandon its lines and the Public Service Transportation Company for approval of an agreement with the city of Plainfield for operation of motor buses. As noted previously in the ELECTRIC RAILWAY JOURNAL all railway lines of the company in Plainfield are to be abandoned except the Union Line, which runs through Bound Brook, Elizabeth and to Newark.

Men Awarded Increase.—According to a decision of the board of arbitration, employees of the Manchester & Derry Street Railway, and the Manchester & Nashua Street Railway, Manchester, N. H., were awarded an increase of 5 cents an hour for operators of two-man cars. An additional 7 cents an hour was granted to operators of one-man cars. Both properties are owned by the Manchester Traction, Light & Power Company.

Seven-Cent Rate Asked in Ogden.—The Utah Rapid Transit Company has petitioned the Utilities Commission for permission to raise fares from 5 cents to 7 cents within city limits of Ogden. The company proposes to sell fifteen tickets for a dollar and to raise students' commutation tickets from $1 for forty tickets to $1.40. Current revenues are declared insufficient to cover operating costs and maintain satisfactory service. The petition also says the railway has never paid dividends on its capital stock, is in arrears on bonded debt interest and in the next year will be required to set aside a sinking fund to apply on the mortgage.

Men Seek Wage Advance.—Employees of the Berkshire Street Railway, Pittsfield, Mass., are seeking an increase in wages. Conferences between the management and the committee have not resulted in any decision. Trainmen on two-men cars now get a maximum of 50 cents an hour and on one-man cars 66⅔ cents an hour.

New Extension Opened.—The Shreveport Railways, Shreveport, La., began service on the Jewella extension on June 26. Jewella is an industrial suburb of Shreveport and it is the company's belief that the expenditure involved in making the extension has been made for Shreveport's future. The extension which begins at the end of the Fair Grounds and runs through Jewella to the city limits is 3,400 ft. long. The opening was extensively advertised and was attended with much celebrating and speech making.

Wage Scale Continued.—The present wage scales of the Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., will be continued for another year, according to a recent decision of the board of directors. It conforms with the recommendations of President William S. Menden, which followed conferences between Mr. Menden and committees of the employees. The wage scales are effective Aug. 1 and apply to all motormen and conductors on the surface lines and to all trainmen on the subway and elevated lines. The directors also authorized the officers of the company to agree with other groups of employees on continuance of present wage scales.

New Bus Line Started.—The New Orleans Public Service, Inc., has started a new cross city bus line, along Carrolton Avenue from Tulane Avenue to the city park. Two single deck buses have been placed in service, but three more will be added as the exigencies demand. The fare will be 7 cents, the same as obtains on the railway lines, to which transfers will be issued. The New Orleans Public Service, Inc., also has in contemplation the installation of a new bus service along Frenchmen Street.

Further Arbitration Hearings to Be Held.—Another series of arbitration hearings will be held to determine what the wages and working conditions are to be on the Boston Elevated Railway system, Boston, Mass. Officials of the company and of the carmen's union have been unable to reach any agreement, except to agree to arbitrate. James H. Vahey has been selected as the representative of the union, and Charles F. Mulcahy will represent the company. They will select the third member of the arbitration board, and he will serve as the chairman. It is understood that the union is preparing fourteen points to submit to the board for its consideration.

Operation Resumed in Atlantic City.—The strike of the platform men on the Atlantic City & Shore Railroad, Atlantic City, N. J., has ended in favor of the company, according to a check-up made. The traction company has resumed operation with new employees. Many of the older employees are applying for their jobs, but are being treated as new applicants by the management, which charges they went out on strike in the face of a warning that loss of seniority would be the penalty. Some of the strikers had been with the lines for many years and were eligible soon for pensions.

Wages Will Be the Same.—Motormen and conductors of the Cincinnati, Newport & Covington Railway, Covington, Ky., will receive the same wages during the next two years as this year. This was announced on June 28, after the men had voted favorably on a proposal submitted by the company. The wage scale is as follows: First three months, 48 cents an hour; second nine months, 51 cents and after one year service, 53 cents. The contract becomes effective Aug. 6.

Group Insurance Plan Started.—In recognition and appreciation of loyal co-operation rendered by its employees in helping build and improve its city and interurban transportation services to the public, the Rockford & Interurban Railway, Rockford, Ill., has started a group insurance plan retroactive to June 1. All employees in the service one year or more will receive policies at no charge to themselves. Those in service for one year and less than two receive $500 policies. An additional $100 is added for each year of service up to eleven years or more, where the sum is fixed at $1,500.

Detroit United Contract Renewed.—The employees of the Detroit United Railway through their union have renewed last year's wage and working agreement of 61 cents an hour for beginners, 64 cents after three months and 66 cents after one year, with 5 cents an hour extra for operators of one-man cars.

Application Denied.—The California Railroad Commission has denied the application of Peerless Stages, Inc., for a certificate to operate auto stages between points in the cities of Oakland and Alameda on three routes, all originating and terminating at the present depot of applicant at Eleventh and Clay Streets in Oakland. The action of the commission was conditioned, however, upon the establishment within sixty days of the commission's order of fifteen minute bus service by the Key System Transit Company, in the east and the west ends of the city of Alameda as proposed by that company.

Will Operate Two Days. — The Gardner & Templeton Street Railway, Gardner, Mass., will operate on Tuesdays and Saturdays on the stretch between West Gardner Square and Greenwood's factory in South Gardner, according to an announcement of Charles Melhado, president and general manager. Operations were discontinued on June 14 owing to competition from jitney lines. Tuesdays and Saturdays are the shopping days in Gardner and it is believed that sufficient patronage will be secured to make the running of cars a paying proposition. This property was formerly under the management of the Northern Massachusetts Street Railway, whose joint lines were disposed of in a receiver's sale on Jan. 1.

New Rate Filed.—The Citizens' Traction Company has filed notice of a new tariff on its city lines in Oil City and Franklin, Pa., effective August 4. The new fare will be 10 cents. Two metal tokens will be sold for 15 cents and a weekly pass, good on all cars in either city, will retail at $1.25.

Fifteen for $1 Discontinued.—The sale of car tickets at fifteen for $1 and seven for 50 cents will be stopped in Davenport, according to Tri-City Street Railway officials, who notified Mayor Louis Roddewig of the action. A straight fare of 10 cents or three tickets for 25 cents, will be put in effect from July 1 to November 1. If it is shown after Nov. 1, that the company can no longer operate without a monthly deficit, the fares will be changed permanently to 10 cents each. This action taken by the street car officials is in accordance with an ordinance adopted by the former City Council of Davenport and the Tri-City Railway on Dec. 19, last.

Railway Wins Damage Suit. — The Phoenix Railway, Phoenix Ariz., won a verdict recently against Mrs. Iva Carroll, who sought damages of $50,000 for personal injuries. She charged that the car started with a jerk as she was alighting and threw her to the pavement. The conductor in charge testified that she had stepped on a particle of loose mud, slipped and fell.

Bus Permits Stand. — The Public Service Commission has denied the request of the Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., for a rehearing in the matter of the petition of Benjamin W. Pizzuto, Jr., and Dennis J. Haggerty for permission to operate bus lines in Poughkeepsie to Seneca and Hopewell Junction, respectively. The commission on May 29 granted these men certificates of public convenience for the operation of bus lines over routes requested. The certificates provide that neither bus line shall carry passengers in either direction between the bus terminal in Poughkeepsie and the intersection of East Main Street in Wappingers Falls. The railway sought to restrain either from carrying passengers from any point to Wappingers Falls.

Subway Section Opened in New York.—The completed section of the Fourteenth Street-Eastern District subway, extending from Fourteenth Street and Sixth Avenue, Manhattan, to Montrose and Bushwick Avenues, through the Williamsburg quarter of Brooklyn, was successfully opened to public traffic on June 30.

Complete Guide Book Issued.—A complete guide and information book of Boston and its environs has been issued by the Boston Elevated Railway, Boston, Mass. In addition to pictures and maps, an alphabetical and classified list is included of local communities, buildings, parks and other notable places of Greater Boston, with brief directions for reaching them for a single fare on the cars of the Boston "L."

Special Twenty-five Cent Rate Draws Crowds.—More than 3,000 tickets were sold in one day recently when the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., by permission of the Public Service Commission instituted a special 25-cent rate between any two stations and good for any car during the day. The rate was made in order that patrons could have an opportunity of riding on the new cars purchased by the company and inspecting other new equipment.

Store Utilizes Cars for Event.—On the occasion of the opening of the fourteenth annual buyers and managers' sale at Goldsmith's department store at Memphis, Tenn., it was announced that chartered special cars of the Memphis Street Railway would bring patrons to the store gratis on opening day. Last year the same plan was tried and found to work well.

Jitney Operation in Dover Refused.—The applications of Arthur Seldney and Michael Kelly for permission to operate jitneys through Dover, N. J., were not approved by the license committee, on the ground that the granting of these licenses would only lead the town into controversial difficulties. In the refusal it was pointed out that some months ago checks submitted by these applicants had been permitted to go to protest; that the jitney operators in conference over the interpolation of the traction company schedule did not appear to have changed their tactics. The report stated that in the event conditions warranted a reconsideration of the applications at a later date the committee would be glad to review the subject again.

Franchise Deadlock in Rockford.—Members of the City Council of Rockford, Ill., recently refused "to kill" the twenty-year franchise application of the Rockford Traction Company which has been pending before the aldermen since January. Mayor Hallstrom and his supporters want the railway to submit an application for a ten-year franchise in conformance with recommendations of the Council's special transportation committee. It is the contention of the company that it will be unable to make the promised extensions unless a franchise is obtained for twenty years as it would be unable to borrow money for betterments on a franchise of shorter length.

Stage Service Sanctioned.—San Francisco-Sacramento Railroad has been authorized to operate an auto stage line for the transportation of passengers between Walnut Creek and Diablo, Contra Costa County, serving the intermediate points of Alamo and Danville. This service is established as a substitute for the electric railway service on the San Ramon branch of the railroad, which the commission recently authorized the company to abandon. This abandonment was referred to previously in ELECTRIC RAILWAY JOURNAL. The same rates and schedules will be maintained by the buses as formerly applied to the electric railway.

Additional Bus Authorized. — The Public Service Transportation Company a subsidiary of the Public Service Railway, Newark, N. J., has been authorized to operate an additional bus on the Cramer Hill route in Camden. Recently the Board of Public Utility Commissioners of New Jersey granted permission to the Public Service Railway to abandon service on the North Cramer Hill line, Camden, N. J. The company has also been authorized to abandon service between Roselle Park and Kenilworth, N. J.

A Four Months' Bus Experiment.—The East St. Louis & Suburban Railway has received permission from the Belleville, Ill., City Council to substitute buses for cars on the Oakland division of the Belleville city lines for a four months' experiment. At the expiration of that time the city will determine whether to continue the buses or restore the cars. The buses will connect with the St. Louis line at the Court House Square and other local lines of the company. The fare will be the same as that charged on the cars.

Financial and Corporate

Grand Rapids Does Better

$58,000 Increase in Net Income in 1923—Prospects Ahead for Payments to Preferred Stockholders

For the year ended Dec. 31, 1923, the Grand Rapids Railway, Grand Rapids, Mich., reports net income of $64,674. This compares with $6,583 for the previous year. The report was presented to the stockholders under date of June 19. The statement in which the results of operation for 1923 and 1922 are compared is presented in the accompanying table.

The improvement program carried out in 1923 was one of the most extensive ever undertaken by the company. Total expenditures during the year were $346,129 of which $221,404 was devoted to the reconstruction of railway track, paving, etc., and $124,725 to the purchase of eight one-man safety cars, six buses and the remodeling of twenty-eight double-truck cars into a modern type equipped with standard safety-car devices so that they could be operated as one-man cars.

STATEMENT OF INCOME AND EXPENSES OF GRAND RAPIDS RAILWAY

	1923	1922
Gross earnings:		
Passenger revenue	$1,754,300	$1,813,246
Revenue from special cars, etc.	1,604	1,171
Rent of equipment, tracks, etc.	54,979	43,223
Non-operating revenue	6,723	3,836
Total	$1,817,606	$1,861,476
Operating expenses and taxes:		
Operating expenses	$1,121,186	$1,215,521
Taxes	135,963	132,404
Total	$1,257,149	$1,347,925
Gross income available for fixed charges, depreciation and dividends	$560,457	$513,551
Interest on funded debt	222,000	223,000
Other fixed charges	102,087	107,837
Depreciation	171,696	176,131
Total interest, other fixed charges and depreciation	$495,783	$506,968
Net income	$64,674	$6,583
Ratio of operating expenses to gross earnings	61.91%	65.29%
Ratio of operating expenses and taxes to gross earnings	69.16%	72.41%

L. J. Delamarter, vice-president and general manager of the company, says the full effect of the improvement expenditures was not realized during the year just closed, but that the changes will bring about savings in maintenance of track and equipment in the future and will better the service rendered car riders. Mr. Delamarter says that service to the public has been further improved by other expenditures made and new policies adopted such as:

1. Building loading platforms in congested districts.
2. Establishment of "Safety Zones."
3. Establishment of skip-stop operation on outbound cars during rush hours.
4. Establishment of "Pay-as-you-leave" cars on outbound traffic.

In addition, the experiment was tried of equipping a one-man double-truck car with the so-called "rear door control." The results obtained have been so satisfactory that the management is equipping other cars with this device.

The payment of the bonded indebtedness due June 1, 1924, was provided for through the sale of $3,200,000 of first mortgage 7 per cent sinking fund gold bonds due May 1, 1939, and $700,000 of twenty-year 7 per cent gold debenture bonds due May 1, 1944. Mr. Delamarter says that the financial position of the stockholders has been materially bettered as a result of this financing and with improvement in earnings, the directors will be enabled to work out a plan which will result in some distribution of income to the preferred stockholders. Just when this will take place, however, it is not possible to say definitely at present. The preferred stock is a 5 per cent cumulative issue. The amount outstanding is $2,000,000. Dividends are in arrears since Nov 1, 1918.

A review of the business conditions in Grand Rapids during the year 1923 shows a continued improvement in all lines.

Bus Merger Terms Announced

Details were announced on July 2 of the unification under a common management and control of the two largest motor bus operations in the United States. Under the proposed plan bus operation in New York and Chicago, so far as it is privately operated, will be put in the hands of a single organization. The controlling corporation will be known as the Omnibus Corporation. Provision will be made in its financial structure for future expansions of its field in other large cities of the United States and Canada.

In this deal the following companies are concerned: Fifth Avenue Bus Securities Corporation, New York Transportation Company, which owns the Fifth Avenue Coach Company, and the Chicago Motor Coach Corporation, which controls the Chicago Motor Coach Company and has a minority interest in the St. Louis Motor Coach Corporation, controlling the Peoples Motorbus Company, St. Louis.

An interesting feature of the unification plan is the intention declared on behalf of the new company by John A. Ritchie, president of the Chicago Motor Coach Company, and emphasized in the text of the plan of unification, to cooperate wherever possible with existing street railway lines and to supplement these and other transportation facilities. Illustrating this policy, the Chicago company now operates 335 buses over 85 miles of streets and parkways and by next September expects to operate 480 buses over 109 miles of routes, only 2½ miles of which are on streets occupied by surface railway lines. The New York company operates an average of 303 buses over approximately 25 miles of the city's main thoroughfare. The Chicago Corporation at present owns also a minority interest in the St. Louis Motor Coach Company. Negotiations are pending for the sale of this company as an entirety, presumably to interests representing the committee that is at work on the plans for the reorganization of the United Railways, St. Louis, the idea being to unify the operations of the two means of transport.

John Hertz, chairman of the board of the Chicago Motor Coach Corporation, and John A. Ritchie have agreed to serve as chairman of the board and president, respectively, of the Omnibus Corporation.

$20,105,707 Value Fixed at Denver—7½ per Cent Return

Special Master in Chancery Henry A. Dubbs on June 25 handed down his findings in the case of the city of Denver vs. the Denver Tramway. He holds the company is entitled to earn a net return of 7½ per cent. The city contended that the company was not entitled to earn more than 6 per cent net on its valuation. The value as placed by the special master is $20,105,707. The company claimed a valuation of $33,000,000, while the city contended the valuation was only $12,000,000. With regard to the fare to be charged, the master's report reads:

> I do not understand that it is for me to pass on the question as to what rates should be authorized during the receivership. That matter seems to me to be one for the court's general direction of the receivership, having in mind not only the value of the property, but the general administration of the trust, the conditions and demands of operation, and the probabilities of revenue.

Judge Dubbs fixed the valuation as per the following tabulation:

1. Land, etc.	$ 1,042,695
2. Track	4,896,176
3. Bridges, etc., (a)	25,711
Bridges (b)	785,252
4. Paving	1,273,044
5. Electric distribution system	999,347
6. Rolling Stock	3 951,283
7. Power station equipment	1,411,520
8. Substation equipment	249,412
9. Shop equipment, etc.	362,072
10. Buldings	2,356,000
11. Furniture, etc.	144,918
12. General stores	425 000
13. Working capital	200,000
14. Franchise cost	100,000
15. Engineering, etc., 5 per cent on foregoing, excluding 1, 3b, 11, 12, 13, 14	776,228
16. Administration, etc.	500,000
17. Taxes	275,000
18. Interest: 3.75 per cent on foregoing, excluding 1, 3b, 11, 12, 13, 14	1,664,889
19. Going value	1,500,000
Total	$22,938,547
Less depreciation—15 per cent on total, excluding land, general stores, working capital, franchise cost and going value.	2,832,840
Present value	$20,105,707

It is contended that the present fare, 8 cents, does not bring a return of 7½ per cent on a $20,000,000 investment, and it is also added that there is such a thing as raising the "price" so high that the end sought may be defeated. On this account it is not expected the company will seek to raise its fare beyond 8 cents, with two tokens for 15 cents.

Financial Writer Comments on Chicago Accomplishment

In his department, "The Investor," in the New York *Evening Post* for June 30, Paul Willard Garrett told the story of how Chicago, through a merger of all its rapid transit lines and a simplification of the capital structure, is now restoring traction credit. In his introduction Mr. Garrett said:

> For a traction company to improve its credit to such a degree that preferred stock can be sold to customers, although notes of the holding company have been in default for five years, is something of an achievement. It has been done in Chicago.

The details of the story of how this has been accomplished are not new to readers of the ELECTRIC RAILWAY JOURNAL, but Mr. Garrett put them all together in his story in so readable a way that the article, particularly since it is syndicated, ought to help toward a better understanding on the part of the general investor of what has been accomplished in Chicago and of the prospects apparently ahead of the company operating the rapid transit lines there.

More than 5,000 shares of preferred stock of the Chicago Rapid Transit Company have been sold to customer-riders up to June 30. A total of 13,326 shares were sold to employees prior to the time that the public was solicited to buy the securities. Under the original plan $1,000,000 of stock was set aside for the employees, but when the demand increased beyond the allotted amount, all restrictions were removed with the result that $1,332,600 of stock was purchased.

President Kurtz Frowns on Purchase Offer

Charles L. Kurtz, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, does not look very kindly upon the offer to the holders of the common stock of that company to dispose of their interest at $115 per share, made presumably in behalf of the Continental Gas & Electric Corporation. The purchase offer was made on behalf of Cyrus S. Eaton of Otis & Company, Cleveland, chairman of the Continental Gas & Electric Corporation.

Mr. Kurtz characterizes the plan to buy the stock as a "payment plan which, fairly stated, is contingent upon their ability to meet payments." Mr. Kurtz is reported to have said:

> Under foreign management the city had a breakdown in service, the stockholders had a cessation of dividends, and the property was allowed to deteriorate greatly. Home management has given the city service and the stockholders dividends, while the property has been thoroughly upbuilt. If the stock is worth more than $115 a share to capitalists or management corporations, it is worth more than $115 a share to present stockholders under home management.

Mr. Kurtz declared that within a very short time seven attempts had been made by foreign interests to buy control of the company, and that the board of directors recently refused important Eastern interests seeking control the right to examine the books of the company. He said that the board at that time was convinced the best interests of the city and stockholders would be served by a continuance of home ownership and home management. Mr. Kurtz said that he is the fourth largest personal holder of common stock of the company, and that he will not accept $115 a share. He says that in making this statement he is prompted by the desire to give stockholders the benefit of his own best judgment and to advise them of the action of the directors.

Mr. Eaton is said to have declared that the amount of stock named should be inclusive of what may have been already acquired, the amount of which he did not fix.

Fewer Passengers Being Carried in St. Louis

The United Railways, St. Louis, suffered a decrease of $95,501 in gross receipts, in May compared with the corresponding month in 1923. Exclusive of the Missouri Electric Railway, which operates between Wellston and St. Charles, the United Railways carried 24,388,642 passengers this year in May compared with 25,712,394 in May, 1923. Passenger revenue was $1,680,506 against $1,772,955 in May, 1923. It was the poorest May business since 1919.

For the first five months of this year the revenue from pay passengers was $148,655 less than for the similar period in 1923. The totals are $8,611,203 in 1924 and $8,462,548 this year.

The May decrease is attributed to unemployment, general business depression, bad weather and bus competition. However, the buses took fewer passengers from the railway in May than in previous months, due to it being impossible for bus riders to use the upper decks in bad weather.

The drop in passengers carried occurred mainly on lines serving large employment centers.

$6,300,000 of 7 per Cent Issue Offered at Par.—A syndicate including E. H. Rollins & Sons, Marshall Field, Glore, Ward & Company, H. M. Byllesby & Company, Inc., and Janney & Company, New York, offered for subscription on July 1 at 100 and accrued interest $6,300,000 of thirty-year 7 per cent sinking fund secured gold notes of the North American Light & Power Corporation. It is explained that the North American Light & Power Corporation, organized under the laws of Delaware, will control the Illinois Power & Light Corporation and the Missouri Power & Light Company, which serve a population of about 1,250,000 in more than 350 municipalities in Illinois, Iowa, Missouri, Kansas, Ohio and Oklahoma. The North American Light & Power Company will own all the common stock of the North American Light & Power Corporation. About three-quarters of the net earnings are derived from power and light. The railway properties consist of 540 miles of trunk line 248 miles of track within city limits.

Seeks to Abandon Line.—The Geneva, Seneca Falls & Auburn Railroad, Geneva, N. Y., has filed an application with the Public Service Commission for permission to abandon its route on Pultney Street in Geneva.

Receivership Petition Filed.—A petition for receivership has been filed in the Supreme Judicial Court of Massachusetts against the Milford, Attleboro & Woonsocket Street Railway by Augustus G. Bullock and others, trustees of the New England Investment & Security Company. The petitioners allege that the road is in debt to the extent of $19,198 and that they hold $350,000 in stock and $56,000 in 5 per cent gold bonds of the company, as well as notes amounting to more than $40,000. The road is 30 miles long. It runs through Blackstone, Mendon, Hopedale, Milford, Franklin, Wrentham and Plainville.

Line Bought.—The Towson & Cockeysville Electric Railway, Towson, Md., which operates a line with a storage battery between Towson and Timonium, Md., a distance of 3 miles, and which has been abandoned, was bought by the Boston Iron & Metal Company of Baltimore, for $9,710. It is reported that it will probably be torn up and the material disposed of by the new owners.

May Take Over Line.—The New Brunswick Power Company, St. John, N. B., may take over the Valley Railway, extending from Westfield to Centreville in New Brunswick, a distance of 150 miles, and change from a steam railroad to an electric railroad. Originally this line was to have been an electric line. However, it was eventually converted into a steam railroad and handed over to the Canadian National Railways system for operation. The latter system has not been operating the line successfully and is not anxious to continue.

Decrease in Passengers Carried.—For the month of May, 1924, the City of Detroit Department of Street Railways had a total revenue from transportation of $1,842,039 against $1,762,160 in May, 1923. The total operating revenue which included the above mentioned amounts was $1,887,077 and $1,852,154 respectively. Total operating expenses differed slightly being $1,352,793 in May of this year and $1,352,338 in May a year ago. The net income showed a falling off from $73,115 in May, 1923 and $67,107 in May, 1924. Total passengers carried also showed a decrease. In May, 1923, the number totaled 43,391,267 and in May, 1924, the number of passengers carried was 39,578,651.

Montreal Tramways & Power Deal Pending.—Two sections of the board of directors of the Montreal Tramways & Power Company, Montreal, Que., are fighting for control of the company. One section, headed by Senator Webster, wants to pass the concern on to a new company named the United Securities, financially sponsored by the Montreal Power Consolidate and Shawinigan Water & Power. These interests already control the Montreal Public Service, hitherto one of the Tramways & Power group. The section headed by President Beauvais is fighting for better terms. Shareholders are given until Aug. 1 to deposit their stock with the Montreal Trust Company. They are offered $15 of stock in United Securities, half common and half preferred, the latter with a guaranteed 6 per cent dividend. Mr. Beauvais claims it is worth $20 to $25 cash. The Montreal Tramways & Power Company controls the Montreal Tramways through its ownership of slightly more than half the stock of that company.

Middletown City Trolleys Abandoned.—The Public Service Commission has approved the petition of the Walkill Transit Company to abandon its entire route in the city of Middletown, N. Y. It was brought out that the city officials had requested the abandonment in order to accommodate increasing vehicular traffic in the narrow streets. A few weeks ago the company was granted a certificate for the operation of bus lines in the city of Middletown to replace the trolleys. The electric railway route between Middletown and Goshen will not be abandoned. Passengers will be conveyed by bus to and from the city limits of Middletown where the electric car may be boarded.

Preferred Stock Sale Authorized.—The Milwaukee Northern Railway, Cedarburg, Wis., has been granted permission by the Railroad Commission to sell a preferred stock issue of $200,000. The proceeds will be used to finance additions and extensions to the company's lines.

Ceases Operation.—The Adrian Street Railway, Adrian, Mich., ceased operating on June 28 through an agreement between Henry L. Doherty & Company and the City Council. The line has been operated for a number of years for the purpose of providing a terminal for the Toledo & Western interurban line. It has not made a profit in recent years. Some months ago the Doherty interests acquired the power properties in Adrian and have tied them in with the Toledo Suburban Electric Company, which serves towns along the Toledo & Western Railroad.

Successor to Buffalo-Lake Erie Line Chartered.—A certificate of incorporation was filed on July 1 in the office of the Secretary of State of New York for the Buffalo & Erie Railway capitalized at 7,005 shares preferred stock $100 par value and 30,000 shares common stock of no par value. The corporation is apparently formed to take over a considerable portion of the properties of the Buffalo & Lake Erie Traction Company, the plan for the reorganization of which was recently declared operative. The charter of the new company is broader in its provisions than was the old one. It is so drawn that the company may operate buses or other vehicles.

Bond Issues Authorized.—The Indiana Public Service Commission has authorized the Interstate Public Service Company, Indianapolis, Ind., to issue $151,700 of 6 per cent bonds to reimburse its treasury for capital additions. The company asked permission also to issue $79,400 of preferred, common or prior lien stock, but the commission did not grant this request because, the order said, of lack of sufficient information concerning what the issue would cover. The Union Traction Company, Anderson, Ind., was authorized to issue $222,000 of 7 per cent notes, $400,000 of 6 per cent notes, and $1,000,000 of 6 per cent bonds. Seven hundred thousand dollars of the bonds are pledged as collateral for the $622,000 of notes and the other $300,000 is to remain in the company's treasury.

Dividend Action Deferred by Interurban.—At a meeting of the directors of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., on June 27 it was decided to defer until a later date any action on dividends on the company's preferred stock for the quarter ending June 30. The dividend has not been earned for the first six months of the year because of the increased cost of operation, especially increases in wages to employees. The company has been granted an increase in rates. It was stated that this will place the rates more nearly on a parity with those of the steam roads. The directors believed that no declaration of dividend should be made until the effect of any new rates had been determined.

Preferred Stock to Be Advanced in Price.—The 7 per cent preferred stock of the Illinois Power & Light Corporation, Peoria, Ill., which has been selling at $95 a share will be increased to $96.50 a share after midnight of July 31. This fact was announced recently by E. Paul Young, head of the investment department. The stock at the new price will yield 7.25 per cent. The news of the rise in price is of interest to more than 13,000 stockholders, who have purchased it during the last eight months under customer ownership.

Legal Notes

FEDERAL COURT—*Payment of Accumulated Dividends Held Not Subject to Mandamus.*

Under the plan of reorganization of the Chicago Railways, a series of participating certificates was issued, entitling the holders to 8 per cent cumulative dividends. These were paid up to 1917, but then were discontinued. It was shown that the company had accumulated a surplus over prior charges of $1,928,000 and certain holders of the participation certificates brought suit to compel the payment of dividends, which the defendants had not paid out because of their contention that a large surplus was necessary for the protection of all parties concerned. The court held that in this case it could not issue an order opposed to the judgment of the board of directors, the finance committee, and the stockholders of the company, in the absence of bad faith or abuse of discretion on their part. [Thatcher et al vs. Chicago Railways et al, 297 Federal Rep., 466.]

FEDERAL COURT—*Validity Upheld of Proviso on Ticket Limiting Carrier's Liability for Safe Carriage to His Own Line.*

A passenger purchased a round-trip ticket covering three lines and was injured on one of those from which he did not purchase the ticket. He instituted suit against the seller of the ticket, although the ticket carried the notice "In selling this ticket and checking baggage hereon, the selling carrier acts only as agent and is not responsible beyond his own lines." The Supreme Court held that it was not responsible and reversed the decision of the Supreme Court of Arkansas. [Missouri-Pacific Railroad vs. Prude, 44 Supreme Ct. Rep., 450.]

NEW JERSEY—*Definition for an Interurban Road of Business "Within a State."*

The New Jersey franchise tax law requires every street railway corporation to report its gross earnings within the state, and it then has to pay a tax upon such proportion of its gross receipts as its length of line in New Jersey compares to the length of its whole line. The Phillipsburg Transit Company operates a line in New Jersey and some of its cars cross an interstate bridge, then use for about two blocks track belonging to the Easton Transit Company. This latter company owns all the capital stock of the Phillipsburg Company and the latter has no franchise in Pennsylvania. Prior to Jan. 1, 1920, the New Jersey company operated its cars to the terminal in Easton on a rental basis. Following that date, the rental was given up and the Easton company took all of the eastbound fares in lieu of rental. The court declared the Phillipsburg Transit Company must include all such fares in its return to the State Board of Taxes. [Phillipsburg Transit Co. vs. State Board of Taxes and Assessments, 124 Atlantic Rep., 122.]

PENNSYLVANIA.—*Physical Examination Justified.*

In an action for personal injuries, after the trial and pending a motion for a new trial, the court did not err in ordering a physical examination of the plaintiff by a disinterested physician, where the trial judge was satisfied that the extent of the plaintiff's injuries had been thoroughly examined by two physicians who testified for her and by three who testified in behalf of the defendant. Where there is no evidence of concealment from physicians in examination, the matter of allowing further physical examination after trial is within the discretion of the trial court. [Schroth vs. Philadelphia Rapid Transit Co., 124 Atlantic Rep., 279.]

TEXAS—*Storm Sewer Not a "Street Improvement" Assessable Against a Street Railway.*

The city charter of Dallas, when defining street improvements, requires street railways to pay the cost of such improvements between and for 2 ft. on each side of its rails. The court held that a storm sewer under its track, from which it receives no special benefit but rather detriment did not come within the definition of the improvements, for which the company could be required to pay. [Dallas Consolidated Electric Street Railway et al. vs. City of Dallas et al., 260 Southwest Rep., 1035.]

Personal Items

Ross Schram Made Manager at Detroit

Ross Schram, former assistant general manager of the Detroit Department of Street Railways, has been appointed general manager of the municipal system, succeeding William B. Mayo, who relinquished his duties as general manager on June 27, to take a consulting engineer's post in the department.

Temporary appointments made by Mr. Schram to hold until the Street Railway Commission meets to decide upon and confirm the final organization include: H. M. Gould, electrical engineer of the Detroit Street Railway, to be acting assistant general manager and I. N. Merritt, auditor, to be acting secretary to the Street Railway Commission, succeeding Mr. Schram, who also held that position in addition to being assistant general manager.

It was announced that the commission's action in declaring the general manager's office vacant and appointing Ross Schram general manager was taken with the consent and counsel of Mr. Mayo whose duties with the Ford Motor Company prevent him from spending the time required as manager of the Detroit Street Railway. Mr. Mayo felt that to Mr. Schram should go responsibility for the position and full credit for the work. The new appointments have been aproved by acting Mayor Joseph A. Martin. Mr. Schram's salary in the new post will be $15,000 a year. He formerly received $9,000.

Changes in Personnel Announced in Boston

Several changes in personnel on the Boston Elevated Railway, Boston, Mass., became effective on July 1, 1924. They are as follows:

John A. Smith transferred from assistant to superintendent of transportation to the assistant to supervisor of timetables.

E. A. Kelley transferred from superintendent of Division 2 to assistant to superintendent of transportation.

A. W. Senter transferred from superintendent of Division 4 to superintendent of Division 2.

A. S. Scott advanced from supervisor to superintendent of Division 4.

Charles A. Bauch advanced from supervisor to superintendent of Division 1 on account of the death of C. J. Leonard.

John R. Guilliams, for years general attorney in charge of the legal and accident investigation department of the Chicago Surface Lines, has been elevated to the position of general counsel for the organization. The announcement was made by Henry A. Blair, president. Mr. Guilliams will succeed the late William Wirt Gurley, who was general counsel at the time of his death. Mr. Guilliams was formerly connected with the legal department of the Chicago & Northwestern Railway and was later trial attorney of the Chicago Consolidated Traction Company. Upon the consolidation of the north and west side lines as the Chicago Railways he served as general attorney for that corporation.

Major Burpee Promoted

Popular Canadian Electric Railway Executive Made Vice-President of Ottawa Electric Railway

"Ottawa can point with pride to the new vice-president of the Ottawa Electric Railway as a native son, for Frederick deMille Burpee was born in the Capital city on April 25, 1876."

These are the words that were used by the Ottawa *Citizen* in announcing to its readers Mr. Burpee's recent advancement with the company. Naturally the *Citizen* saw Mr. Burpee first of all as an important local personage. But he is more that that. Mr. Burpee is really one of the outstanding figures among electric railway operating men in Canada, and is more than fairly well-known in public utility circles in the United States for his able handling of affairs in Ottawa.

F. D. Burpee

Like many other electric railway operating officials, Mr. Burpee has had to contend with all the war-time and post-war time complications, but in addition to this, during part of 1921 he had to battle somewhat stubborn agitation for municipal ownership. This agitation culminated in a popular vote, but so well did Mr. Burpee and his associates do their work that the proposal was defeated. In Canada, of course, municipal ownership is always impending somewhere or other. Had municipal ownership been brought about in Ottawa Mr. Burpee would undoubtedly have continued to run the road, that is, if he could have been induced to do so, for Ottawa had no idea of losing him, agitation for his intention being started long in advance of the taking of the vote.

These facts regarding Mr. Burpee are set down not for the mere pleasure of indulging in idle speculation about something that did not happen, but to show the popularity of the man with the public and the esteem in which he is held locally for his operating ability. His rapid rise with the local company attests to the appreciation of his talent by his immediate business associates.

The matter-of-fact record of Mr. Burpee's career shows that he received his education in the Ottawa public and normal schools, and at his father's death, which occurred when he was only fifteen years of age, he started out on the business career. In 1912 he succeeded Col. Hutcheson as superintendent of the Ottawa Electric Railway. After his overseas service he returned to the post and on March 20, 1920, was appointed general manager.

In February, 1922, Major Burpee became a director of the Ottawa Traction Company, Ltd., which is the holding company and the owner of the stock of the Ottawa Electric Railway. These two positions Major Burpee held up to the time of the death of the late Warren Y. Soper.

In January, 1923, Major Burpee was one of the promoters of the Auditorium Limited, of which company he was electer president, an office which he still holds. He is a past-president of the Ottawa Rotary Club, of which he is a very active member. He is also past-president of the Canadian Electric Railway Association. He is keenly interested in athletics.

Grover A. Whalen has resigned as commissioner of plant and structures of New York City under Mayor Hylan to become assistant to Rodman Wanamaker, president of the John Wanamaker merchandising organization. Mr. Whalen made a great reputation for himself as a city employee not only for his affability, but also for the rare ability which he displayed in handling matters that came under his jurisdiction. As part of his city work he was in charge of the municipal railway on Staten Island and directed the operation of the city's shuttle line on the Williamsburg Bridge. Buses operated under city auspices were also under his direction. Even those who disagreed with some of Mr. Whalen's methods recognized in him a man of unusual capabilities.

A. F. Campbell has been appointed supervisor of stores for the entire system of properties of the Illinois Power & Light Corporation, Peoria, Ill. His headquarters will be at Decatur, Ill. Mr. Campbell has been in charge of stores of the Illinois Traction System, a subsidiary of the Illinois Power & Light Corporation with offices at Decatur, Ill. He was formerly for twelve years with the Santa Fe Railroad. The office, which is a new one created by the company, is effective July 1. It will be under the supervision of the general operating engineer of the power company.

H. J. Hoffman has been promoted to the position of general auditor for the San Francisco, Napa & Calistoga Railway, with headquarters at Napa, Cal., vice F. H. Groat, who resigned effective July 1, to enter business for himself. Mr. Groat had been with the company in the capacity of general auditor for six years.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Exhibits Do Pay

By J. C. McQuiston

Chairman Exhibit Committee,
American Electric Railway Association

Do exhibits pay? This question is asked as regularly as the years roll by. Many doubt whether much if any benefit is derived; yet the progressive manufacturer is always found among the exhibitors.

Exhibits, after all, are real advertisements. Generally the manufacturer shows his product, and many times the apparatus is displayed in motion. This is the best kind of an advertisement, because it is alive, it is actual, it is real. In order that we may really give fair consideration to the "worth-whileness" of the mass of exhibits, let us imagine a situation extending over a period of five years, in this progressive age, in which there would be no exhibits of any kind.

Exhibits Are Stimulating

From the standpoint of progress in industry, there can be little doubt that the result would be a tremendous slowing down of advancement along the lines of applications of new and improved methods of carrying on the world's work. The absence of stimulating influences that are generated at great exhibitions would certainly have a negative effect on modernizing the ways and means of carrying on our commercial activities.

Suppose we hark back to the days when exhibits were rare; or even to the days when exhibits were confined to the great national exhibits like the Centennial, World's Fair and the Panama-Pacific Exposition. The manufacturer who had a new and wonderful device to bring to the attention of the railroad operators of the country was then compelled to carry his device on a car or on cars to all parts of the country. In other words, he was compelled to set up a separate and special exhibit on the premises of the prospective users. Such a plan, requiring an itinerary all over the country, involved a tremendous outlay of money, and, furthermore, only those who made apparatus of most ususual importance and costing a large amount of money could afford to resort to such a plan.

Now consider the wonderful opportunity afforded by such exhibitions as those provided by the American Electric Railway Association, the National Electric Light Association, the American Railway Association, and others of similar importance. These exhibits, which parallel the conventions of these associations, make it possible at least once a year for all who are interested in the use of improved machinery and in improved methods of bringing about the best service with greatest economy to review all the new and improved appliances and become familiar with anything and everything that a year of progress in invention and development have made available. No one can tell what this is worth to the world's business, and even the discontinuance of these exhibits would not reveal the real loss to the progress of the world—at least not for many years.

Exhibits and advertising are necessary. These activities are progressive, and those identified with the worthwhile businesses are those who carry their business message in properly selected advertising media and exhibit their products at the exhibitions that reach their trade or business, as well as the general public.

Trackless Trolley Corporation to Manufacture in New York

The Trackless Trolley Company of America, New York City, has filed a certificate of dissolution in the office of the Secretary of State at Albany.

The Trackless Trolley Corporation, Wilmington, Del., Charles Berg president, has filed its duplicate certificate at Albany and will enter New York State to manufacture these vehicles, with offices at 501 Fifth Avenue, New York City. J. C. Rowe, 30 Church Street, is attorney for the corporation.

The capital is stated as 10,250 shares preferred stock, $100 par value ($1,025,000), and 21,000 shares common stock, non-par value.

$85,000,000 for Roadway Improvements

Estimates received by Electric Railway Journal during the first six months of the year covering the amount of money to be spent by railways in the United States and Canada during the current construction season on track and roadway improvements total approximately $85,000,000. About 1,140 miles of single track are involved in the jobs covered by these estimates. Paving in excess of 2,500,000 sq.yd. will be required. Track built or rebuilt by the electric railways in 1923 totaled about 1,114 single-track miles. Thus it will be seen that the mileage of the reconstruction work included in the estimates received from Jan. 1 to June 30, 1924, are greater by about 25 miles than those for the entire year of 1923. In explanation of this it may be said that in a number of cases the figures include work which it will require several years to complete and that the entire mileage should therefore not be credited to the first six months of the current year. On the other hand detailed information is not yet available on a number of large jobs which have actually been undertaken and the total figures for the year may therefore be safely assumed to be nearly double those for last year. Details of the various jobs were given in 126 news items which have appeared in the Journal between Jan. 5 and June 28 this year.

Several subway projects, the actual undertaking of which is still somewhat problematical, have been omitted.

ELECTRIC RAILWAY MATERIAL PRICES—JULY 2, 1924

Metals—New York

Copper, electrolytic, cents per lb.	12.50
Lead, cents per lb.	7.00
Nickel, cents per lb.	27.00
Zinc, cents per lb.	6.15
Tin, Straits, cents per lb.	43.625
Aluminum, 98 to 99 per cent, cents per lb.	27.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b vessel, Hampton Roads	$4.325
Somerset mine run, Boston	2.175
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	1.825
Central, Ill., screenings, Chicago	1.675
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.52
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.00
Steel bars, cents per lb.	2.15
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	2.90
Sheet iron (28 gage), cents per lb.	3.50
Sheet iron, galvanized (28 gage), cents per lb.	4.60
Galvanized barbed wire, cents per lb.	3.70
Galvanized wire, ordinary, cents per lb.	2.65

Waste—New York

Waste, wool, cents per lb.	15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal	$0.99
White lead (100 lb. keg), cents per lb.	11.75
Turpentine (bbl. lots), per gal.	$0.84
Car window glass (single strength), first three brackets, A quality, discount*	84.0%
Car window glass (single strength), first three brackets, B quality, discount*	86.0%
Car window glass (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.25
Rubber-covered wire, No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, cents per lb.	17.25

Paving Materials

Paving stone, granite, 4x8x4, f.o.b.	
Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.48
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	53–54
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.00
Light copper, cents per lb.	8.25
Heavy brass, cents per lb.	5.75
Zinc, old scrap, cents per lb.	3.50
Light brass, cents per lb.	4.75
Lead, cents per lb. (heavy)	6.00
Steel car axles, Chicago, net ton	$16.75
Cast iron car wheels, Chicago, gross ton	16.25
Rails (short), Chicago, gross ton	16.75
Rails, (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	7.75

Rolling Stock

Toledo & Indiana Railroad, Toledo, Ohio, has placed an order for seven new cars with the Cincinnati Car Company. Delivery on the cars is expected about Oct. 1. The new cars will be of lighter construction than present equipment on the road and will enable considerable increase and betterment to service. They will weigh 16 tons, seat 50 passengers, and be equipped with four 35-hp. motors.

South New Orleans Light & Traction Company, Algiers, La., suffered the loss of four cars by fire when the shops were struck by lightning on June 27.

United Railways, St. Louis, Mo., through general manager Perkins for Receiver Wells will ask permission of the court to build fifty cars in its own shops of the 700 type of front-entrance-side-door delivery cars. Several months ago the court turned down a request for 100 of these cars.

Morris County Traction Company, Morristown, N. J., has ordered ten of the latest type safety cars at a cost of $12,000 each. The cars are now being built by the Osgood Bradley Car Company at Worcester, Mass.

Boston Elevated Railway, Boston, Mass., has recently placed an order for fifty more one-man, two-man cars. This will make a total of 355 cars of this latest Boston standard type. Of these new cars twenty-five will be built by Brill and twenty-five by the Laconia Car Company.

Track and Line

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., is planning improvements to its line en route to Gulfport, Biloxi and Pass Christian. The work will include the laying of 75-lb. steel rails.

Wilkes - Barre Railway, Wilkes - Barre, Pa. has been ordered by the Public Service Commission to extend its tracks to the main line tracks of the Central Railroad of New Jersey in Wilkes-Barre township, a distance of about 3,600 ft. from its present terminus.

New York State Railways, Syracuse, N. Y., plans to pave Spring Street at a cost of $35,000; also new loop at end of Irving Avenue at a cost of $10,000.

Seattle Municipal Railway, Seattle, Wash., may relocate and reconstruct a considerable portion of the Faunteleroy car line, at an estimated cost of $65,800 if a bill introduced in the City Council and referred to the city finance committee is passed. It is also proposed to reconstruct and relocate a portion of the Lake Burien line.

Omaha & Council Bluffs Street Railway, Omaha, Neb., will reconstruct practically a mile of tracks in Council Bluffs, Iowa, at a cost of $46,678. The tracks on Pierce Street from First to Oak and on Fifth Avenue, Main to Fourteenth Street, are to be relaid, at an estimated cost of $45,700. Tracks over the Milwaukee Railroad tracks at Sixteenth and Main Streets and the Wabash tracks at Tenth Street are also to be repaired.

Cincinnati, Ohio. — The Cincinnati Rapid Transit Commission has awarded to Hickey Brothers, Cincinnati contractors, the contract for the construction of the subway and rapid transit system from Mitchell Avenue to Oakley. This new route of approximately 5.3 miles is the connecting link of the rapid transit system. The award was made on their bid of $1,089,000. It is $42,400 above the estimate.

Arkansas Central Power Company, Little Rock, Ark., recently began the work of installing new curves at Capitol Avenue and Main Streets, to permit the turning of north-bound cars from Main Street into West Capitol Avenue. The new curves will allow the combining of the East Ninth and the East Fourteenth lines with the Highland and South Highland lines, to make two through cross-town lines. The cost of the work is estimated at $25,000. The company recently installed new curves and tracks on Victory and West Third Streets, at a cost of 10,000, to combine the Pulaski Heights and South Main car lines into one through line.

Oklahoma Railway, Oklahoma City, Okla., will join with the State of Oklahoma in the construction of an underpass under the tracks of the Oklahoma Railway on the Oklahoma City-Norman hard-surfaced highway now being constructed about one and one-half miles north of the railway station at Moore. The railway will at its own expense construct the culvert under its tracks, excavate for its footings, build and complete the abutments and bridge, and build a temporary track to be used for operation during construction of the underpass. The state is to do all other excavating and grading with the exception of back-filling beyond abutments and making necessary cuttings for the drainage culvert which the railway company is to build. The state highway department is to do all other work not specified and will pay the railway company $7,000 to represent the state's share of cost of construction.

Union Traction Company, Anderson, Ind., will spend $222,000 on betterments, including the extension of the freight station and tracks in Anderson.

Power Houses, Shops and Buildings

United Railways & Electric Company, Baltimore, Md., plans to build a one-story brick substation at Caroline and Fairmount Avenues. The contract has been let to DeCou & Davis at a cost of $25,000.

Northern Ohio Traction & Light Company, Akron, Ohio, plans to construct a fireproof substation at Gorge power plant at a cost of $40,000.

Citizens Traction Company, Oil City, Pa., has engaged the firm of Day & Zimmerman, Philadelphia, to prepare plans and specifications for doubling the present capacity of its West End power plant in Oil City. A 500-hp. boiler has been ordered and a 7,500-kw. turbine will be purchased.

Trade Notes

Ben W. Buyer, Jr., formerly sales engineer with the Union Special Machine Company, Chicago, is now with the New York branch office of the Industrial Works, Bay City, Mich., as district sales engineer.

Gisholt Machine Company, Madison, Wis., has purchased the business of the Millholland Machine Company, Indianapolis, Ind., including its stock of finished machines, the parts in process, good will, trade marks, patents, patterns, drawings, jigs, tools and fixtures. It will continue at Madison the manufacture and sale of Millholland machines, which have gained an enviable reputation throughout the manufacturing world. The syndicate of firms owning the Millholland Machine Company of Indianapolis having passed through a receivership the latter company was forced to liquidate.

Rome Wire Company, Rome, N. Y., announces the opening of a sales office with a complete warehouse stock of its products at 1200 West Ninth Street, Cleveland. C. R. Evans, district manager will be in charge.

Conveyors Corporation of America, Chicago, Ill., has received an order from the Cleveland, Cincinnati, Chicago & St. Louis Railway for an American steam jet cinder conveyor for the power plant of the shops at Indianapolis. The new conveyor system is designed to handle cinders from four boilers in the plant, the cinders being discharged into an overhead bunker, holding approximately 25 tons of refuse. When the bunker is filled, a car is spotted on the side track below and the cinders withdrawn. This order is one of a number recently secured from the railroad field.

New Advertising Literature

Condit Electrical Manufacturing Company, South Boston, Mass., has issued a folder giving the principles of oil circuit breaker construction.

Thompson Electric Company, Cleveland, Ohio, has issued catalog B-20, describing the new Underslung model of safety disconnecting hangers enabling high lamps to be lowered "away from" the electric circuit for cleaning and renewals.

Quigley Furnace Specialties Company, New York, N. Y., has issued a new bulletin entitled "Hytempite in the Power Plant." This bulletin illustrates some of the successful applications of Hytempite in refractory construction.

Superheater Company, New York, N. Y., has published "Origin, Development, Results of Elesco." The booklet gives in brief form the history of the Superheater Company and the growth of its operations up to the present time. The development of the use of high degree superheated steam is traced from the earliest experiments of the late Dr. Wilhelm Schmidt of Cassel, Germany, to the present tendencies in steam generation in this country. An interesting paragraph explains the origin of the trade name "Elesco" applied to the products of that company.

New York, July 12, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 2

Some Recent Arbitration Awards and the Labor Market

THE bull stock market now in progress in the financial district gives the impression to some of another coming era of prosperity, inflation and high wages. Undoubtedly, the United States is in good commercial condition. But it should be remembered that call money and interest rates for short periods are at a very low figure, the lowest for a long time. This always has a stimulating effect on the market for securities, particularly bonds. Low money rates are also usually an indication that there is not a great call for capital by new enterprises or extensions of old ones. On the whole, then, high prices for securities are not a sure sign of that industrial activity which is usually considered the synonym in business of good times.

Electric railways are particularly interested in the situation because of its effect on the flotation of new securities and on the labor market. So far as flotations are concerned, this is undoubtedly a good time to market sound securities, and electric railway issues are coming to be considered by the investing public as being in this category.

In regard to the labor market, cheap money should eventually stimulate business and industrial activities and thus finally put up wages if no other conditions arise to intervene. Wages in the electric railway industry, however, do not move in such close parallel to the general labor market as in many other lines of business, and to some extent less even than formerly in the electric railway industry. The reason for this is partly that there is a lower turnover on nearly every property, so that wages are in somewhat less sympathetic touch with those of the general labor market either to go up or down, and partly because of the growing tendency to settle labor disputes by arbitration rather than by strikes.

A. S. Richey's June figure for street railway wages, published in the issue of this paper for June 28, shows that electric railway wages are now 120 per cent above the 1913 figure and within 12 points of the highest figure ever reached, namely, in September, 1920, when the wages index, as compared with 1913 at 100, was 232. In fact, there has been a constant increase in electric railway wages since April, 1923, as shown by the following statement, all figures being based on 1913 at 100: April, 207; May, 208; June, 210; July 212; August, 214; September, 215; October to December, 218; January to May, 219; June, 220.

Incidentally it should also be said that all of these figures are far in excess of those reached during the war. The armistice was signed Nov. 11, 1918, and at that time the electric railway wages index was the highest then reached, namely, 154, as compared with 1913. The present figure is more than 50 per cent higher than this figure of November, 1918.

The situation is one which demands attention by all electric railway companies. Are some recent arbitration decisions increasing railway wages to a greater extent than is warranted, and will not fares have to be raised if this constant upper trend continues?

Illinois Commission Takes a Broader View

A CHANGE of attitude on the part of the Illinois Commerce Commission from its previous position of antagonism to the Chicago Surface Lines is shown in two recent orders affecting that property. Both of these are distinctly for the benefit of the car riders of Chicago, one of them calling for extensions of track and the other for a rerouting of the cars in the downtown district.

Wartime conditions and other obstacles have prevented the railway from carrying out the provision of the ordinance under which it operates that calls for a regular extension program of track extension at the rate of some 23 miles per year. Under the present city administration, which has been constructive in its policies, a compromise program has been arrived at and placed before the commission for its approval. This program required modification of a previous order which authorized the constituent companies to draw from their reserve certain amounts for the addition of new cars to the system. Now the commission has extended the permission to allow part of such reserves to be used for track extensions. Further, it has taken a strong stand that the companies should not be required to construct tracks until the city has made provision for the paving of the streets on which they are to be built.

In this connection the order says:

"It is pertinent to point out that the practice of requiring a street railway to be laid in an unimproved street which involves the subsequent removal of the tracks and destruction of the roadbed to permit sewers, water mains and service pipes to be laid is uneconomical and imposes an unreasonable burden and hardship upon the street car riders."

The commission also disapproves of the previous requirement that the companies pave their rights-of-way while the rest of the street is unpaved. "It is obvious," states the decision, "that this is calculated to interfere with safe and efficient street railway operation and detrimental to the traveling public."

This new viewpoint of the Illinois Commerce Commission represents a standard of sane regulatory methods which may well be followed in the rulings of other commissions. If it continues it means much to the investors in utilities and in the end will be helpful also to the patrons.

Should the Railways Run the Taxicabs?

A STRONG argument in favor of the supply by electric railway companies of all of the kinds of transportation needed in the city is made in this week's issue by George H. Davis of Ford, Bacon & Davis, Inc. Mr. Davis approaches the situation from somewhat a new angle in that he estimates the number of vehicles required in cities of more than 100,000 population to give the public the transportation service which it needs. In general, his estimate of the number of passenger electric railway cars does not differ greatly from those at present. His figure, exclusive of rapid transit lines, is 30,000 44-passenger double-truck motor cars with trailers, but he would increase considerably the carrying capacity of the buses used in city service, and he believes the railway company should control them and also the taxicabs in the city. The purpose of this would be to eliminate duplication—sometimes triplication—of existing service.

All may not agree with Mr. Davis's total figures or with the division which he proposes for the different means of transportation, or with the types and capacities of vehicles suggested. The suggestion that railway companies should engage in taxicab service will also provoke comment, as this individual service seems a little far afield from that supplied by the average electric railway. There is no doubt, however, that the taxicab is a favorite form of public transportation and that by the application of scientific principles of routing, in co-ordination with other means of transit, much of the present taxicab dead mileage could be eliminated. In other words, if the principles of co-ordination of all means are to be followed to their logical conclusion, there are arguments in favor of the operation of taxicabs by the organization that runs the cars and buses.

Decision to Abandon Synchronized Traffic Control Not Based on Its Shortcomings

THERE has been so much muddling in the matter of traffic control, so much talk about the complexity of the problem and so little energetic action to solve it that it was refreshing to see Gen. Smedley Butler, Director of Public Safety in Philadelphia, attack the subject forcefully and put into effect a new method of regulation. Although General Butler's plan was similar in some respects to the synchronized traffic control systems found elsewhere, several novel features contributed materially to its successful operation.

Probably the most important difference between General Butler's plan and those tried in other cities was that the signal lights were used primarily for the information of the traffic policemen and were not intended directly to control the actions of the drivers of vehicles. On that account his system had a flexibility far greater than that of electrically interlocked signals at individual street intersections. At the same time it accomplished to a considerable extent the synchronization of the signals of the various traffic officers. Even a skeptic, distrusting all schemes for regulating traffic by colored lights must have been impressed by watching how it worked on the street.

After several weeks' trial, during which it appeared to meet with the almost universal approval of the traveling public, both automobilists and street car riders, the plan has had to be abandoned because the City Council refused, apparently for political reasons, to appropriate money for the installation of necessary equipment. That such was the reason for the refusal is indicated by the fact that the Council on the same day when it declined to appropriate the funds necessary to carry out the plan of the Director of Public Safety appropriated an equal amount of money for the purchase and installation of more old-fashioned signals.

However, General Butler should feel well satisfied with the results of this experiment. Philadelphia may not desire to avail itself of an improvement in traffic control methods, but other cities that have had a chance to see the plan in operation may well give it a trial.

Trying to Raise Himself by His Bootstraps

A POINT of view at variance with that of using technically trained men for motor testing work in a railway shop, as set forth in a recent editorial in this paper, was taken in a letter to the editors published in the July 5 issue of ELECTRIC RAILWAY JOURNAL. The correspondent believes that a more satisfactory plan would be for the railway men now supervising the various departments to secure the services of boys or young men and give them several years practical training in the shops.

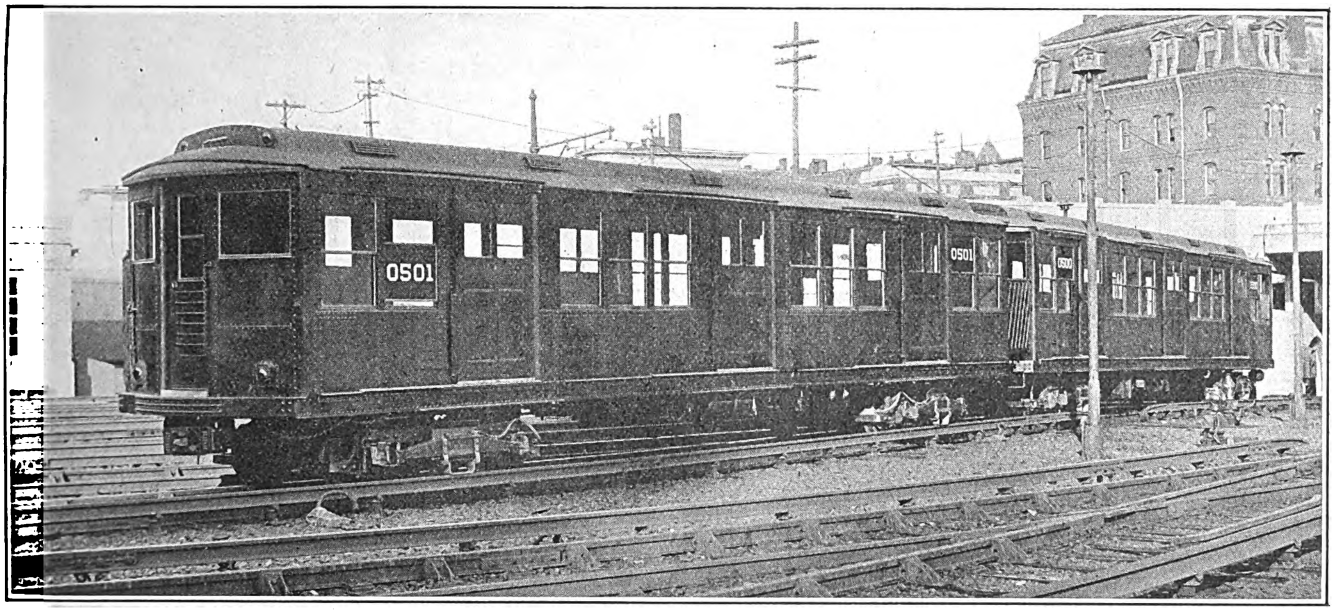
It may well be doubted, however, if this plan would be any better than, or indeed as good as, the plan of employing graduate electrical engineers. Not all such engineers would stick to the railway business and make a success of it; neither would all of the boys picked by the superintendent and trained in the shop exclusively. Experience shows that the knowledge that has been gained through consistent study places the college men above their competitors in those phases of the work that demand the use of engineering principles. The fact that the two classes of men are more or less in competition, however, emphasizes the failures of college men which do occur and gives the impression that they are rather numerous.

One of the largest electric railways in this country has for years made a practice of securing the services of engineers just out of college. They are put through a two-year training course to familiarize them with the various departments of the railway. At the end of that time they are given permanent positions where the course of training has fitted them to do the work. Only a small proportion of the men who begin this training course go through with it and take permanent positions with the company. Others find that their inclinations do not lie in the line of railway work or that more attractive opportunities exist elsewhere. But the company is satisfied to undertake the training of all these men for the sake of those who remain.

Aside from the question of whether more college men or non-college men are likely to stick at the railway game, there is another serious objection to the plan advocated by the correspondent. It might be possible to train the boys to do as good work as their teachers, but there would be little reason to expect them to do any better. Instead of having new men enter the organization, bringing with them new ideas, he would have the old ideas passed on from generation to generation. So far as improving the quality of the work and modernizing methods in the railway shop goes, this procedure would resemble that of a man trying to raise himself by his bootstraps.

Changing Tunnel for Rapid Transit

In 50 Hours with 1,526 Men the Boston Elevated Railway and the Boston Transit Department Converted the East Boston Tunnel from Surface Car Operation with Overhead Trolley to Third Rail Rapid Transit Train Operation—A New Station Was Built at Maverick Square



Two-Car Units of Type Used in East Boston Tunnel

ONLY a short time ago the local newspapers of Boston carried items announcing that the Boston Elevated Railway had changed its operation in the East Boston tunnel from surface trolley cars to third-rail rapid transit trains. This information was also published in the news columns of ELECTRIC RAILWAY JOURNAL, issue of April 26, page 671. Behind these bare statements of fact was hidden a story of engineering and construction achievement, a story of railroading, of interest to every railroad man.

On Friday evening, April 18, when the last scheduled trolley car entered the East Boston tunnel, it made its routine trip in the usual way. No ceremonies marked its entrance but feverish construction activity followed the completion of its trip. No formal speeches marked its exit but the curt, forceful language of engineers, superintendents and foremen followed in its trail. It was the last surface passenger car to travel through this twenty-year old hole under Boston harbor.

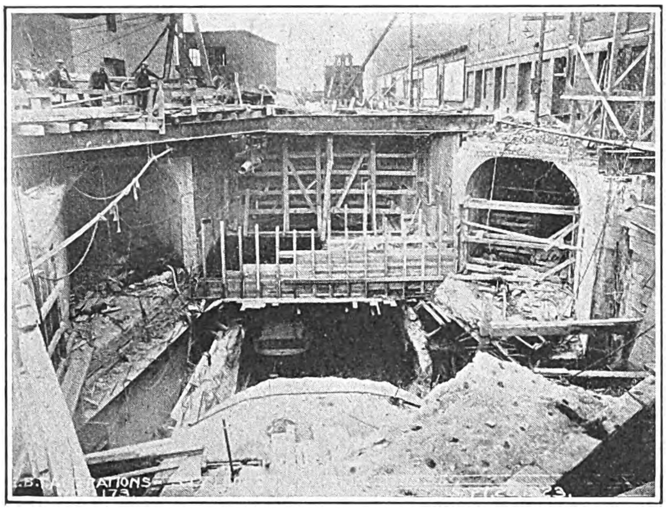
For two decades, trolley cars operated through this tunnel had met the transportation requirements. To be sure they had been crowded in up to the maximum frequency possible with a modern block signal system. And then they had been coupled together in two and three-car units, so heavy had the traffic become. But at last the fact had to be faced that this service was inadequate. Rapid-transit operation, with high-speed, multiple-unit trains of greater length had to be introduced.

To make the change involved the construction of a terminal station at the East Boston end of the tunnel. Formerly no station had been needed as the surface cars simply ran up the grade out of the tunnel onto the city streets at Maverick Square, the tunnel portal. But rapid transit trains must be kept off the streets—hence it became necessary to build a terminal under and around the existing tunnel portal, without interrupting the operation of the cars.

The East Boston tunnel, like other subway and tunnel facilities in the city of Boston, is the property of the city and is leased to and operated by the Boston Elevated Railway. All construction and reconstruction work on such tunnels is handled by a public commission, the Transit Department of the City of Boston.

Reconstruction work was commenced in the fall of 1921. An interesting feature of the undertaking was the employment of needy ex-soldiers on the work. At that time the unemployment situation throughout New England had reached alarming figures and a large proportion of the unemployed were veterans of the World War. With a view to reducing the constantly increasing payroll for soldiers' relief, Mayor Curley issued instructions to have this work done by day labor, preference to be given to former service men. Although many of these men were inexperienced in work of this character, they soon acquired the necessary knowledge under skillful supervision, and this massive structure was completed within the time limit, despite unforeseen construction difficulties and the abnormal weather conditions. Day and night for over two years, crews of men were engaged in excavating below tide water, removing and relocating water, sewer and gas pipes, telephone and telegraph conduits and electric lighting service without even momentary interruption. Night cars operated regularly regardless of the fact that more than 15,000 charges of dynamite were shot off for blasting sections of the old concrete tunnel which had to be removed.

About 125,000 cu.yd. of material had to be excavated, a great proportion being removed from under large buildings which had to be carefully underpinned; 28,000 cu.yd. of reinforced concrete was installed requiring



Cross-Section of Tunnel During Reconstruction at East Boston End

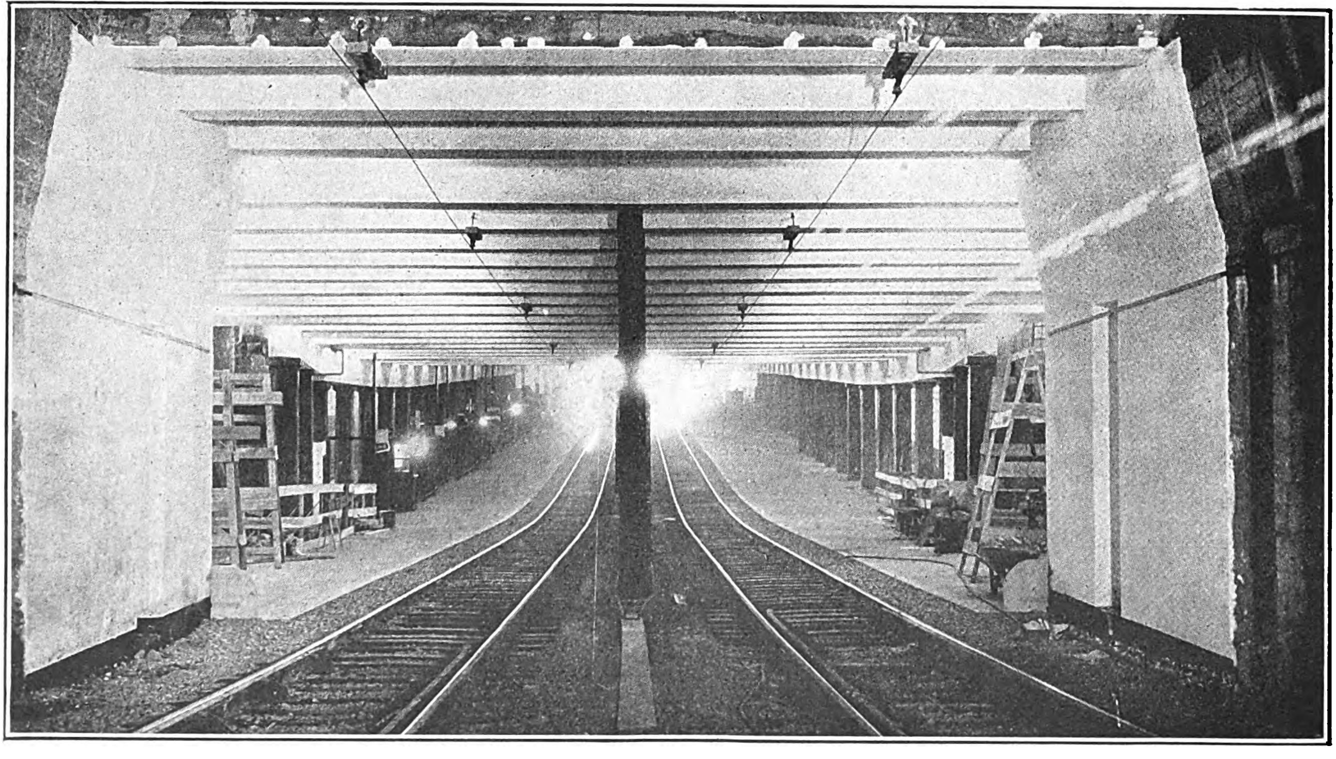
42,000 bbl. of cement, and more than 1,000 tons of steel reinforcing rods; 1,800 tons of heavy steel for girders and columns were fabricated and erected and 130,000 ft. of saturated fabric for waterproofing the structure was laid. Included in this underground structure is a completely equipped car shop, fitted with all the necessary tools and appliances for making repairs to the cars.

As the Maverick Square terminal station neared completion the problem of making the change-over from trolley car operation to third-rail trains had to be solved by officials of the railway. This involved the raising of all station platform levels to a height of 3 ft. 6 in., or on a level with the floors of the new subway cars. It involved the installation of third-rail construction for double tracks, the entire length of the tunnel. It involved the removal of old guard rail, and the placing of new. It involved the installation of an entirely new block signal system with automatic emergency stop devices. All special work had to be replaced to accommodate M.C.B. flanges. And the whole job had to be done in the shortest possible time, as this tube provided the only convenient means of transportation to thousands of suburbanites in their daily travel to and from the business section of Boston. To interrupt this traffic even for a day would have involved serious consequences. Ordinarily a week's work would have been required to do this job. But a week simply could not be spared. Accordingly a most carefully laid out and elaborate plan was devised by General Manager Edward Dana, Harry M. Steward, superintendent of maintenance and other officials, in collaboration with the Boston Transit Department.

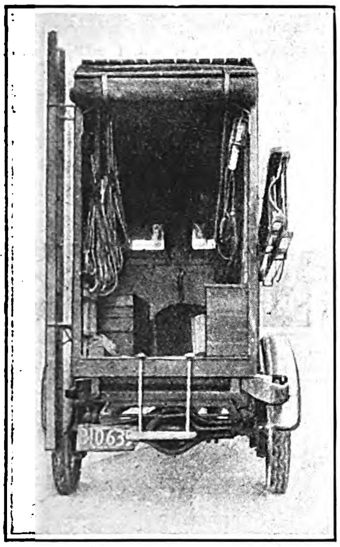
Saturday, April 19, was a legal holiday, Patriots' Hill Day, in Massachusetts. The plan involved suspending operation of the tunnel by trolley cars at 8:30 p.m. Friday, April 18, and resuming operation with third rail trains Monday morning the 21st. And incredible though it may seem this plan went through on schedule, with a few hours to spare.

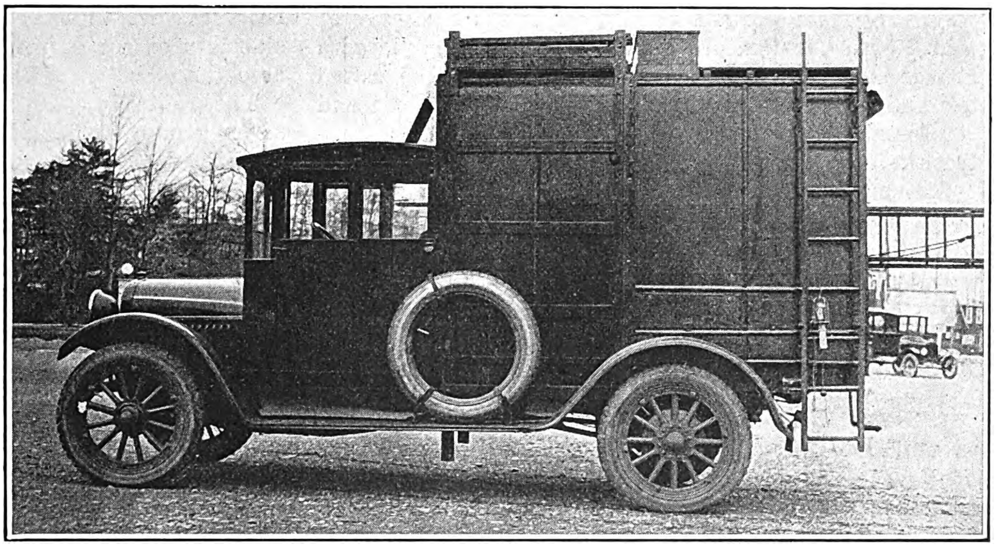
As that last trolley car made its way through the tunnel, Friday night, it was followed by construction cars, loaded with men, tools, equipment and material. Inside of fifteen minutes the tunnel became a hive of activity, apparently confused, in reality so well ordered and supervised that about 50 hours of stupendous effort wrought the entire change without a hitch. Gangs at each of the four stations en route threw up temporary wooden platforms to the new level. Other gangs set to work with acetylene torches cutting up and removing the old Z-bar guard rail—20,000 ft. of it in 23 hours. Rail cars followed and picked up the pieces. Third-rail insulators had been placed in advance with third rail laid alongside and bolted up. Now it was picked up and laid in place on the insulators. Special work to the extent of 340 ft. was cut up and removed, and 724 ft. of new special work was installed. Elsewhere, signal crews were at work on the new installation.

In all a total of 1,525 men were employed, with a maximum of 780 on one shift, all in a tunnel 1.7 miles



Where Surface Cars Enter Maverick Square Station—Rapid Transit Tracks Are Parallel and Outside Columns





Emergency Tower Truck of Middlesex & Boston Street Railway

As shown at the left, the interior of the body provides a warm and comfortable place for linemen to ride. Note the portable light hanging on the right-hand side. The inclosed cab which is shown in the view at the right protects the driver from inclement weather. Communication with men working on the tower is provided by an opening in the roof.

long. Twelve-hour shifts were worked; 2,185 meals were served to the men while on the job. Only two trifling personal accidents were reported during the whole period.

At 1 a.m. Monday morning Mr. Steward told the operating department they could have the tunnel. Power was turned on the third rail, the motorman of a waiting train turned on his controller and the first rapid transit train rolled down through the hole. Others followed, as the transportation and equipment executives hastened to break in their men during the two or three short hours left before the rush of Monday morning commuters was upon them.

The new cars used in the tunnel are unique in that they are always operated in units of two, or multiples of two, with control equipment on one end only of each car. They were built by the Pullman Company and are each equipped with four Westinghouse 514-E motors with Westinghouse electro-pneumatic variable load brakes. Other details of their construction and equipment were described in the ELECTRIC RAILWAY JOURNAL for Jan. 12, 1924.

The personnel of the Boston Transit Department which handled the engineering and construction of the Maverick Square station consists of Colonel Thomas F. Sullivan, chairman, formerly well known as a street railway man and later Commissioner of Public Works, city of Boston; Louis A. Rourke, formerly a division engineer on the Panama Canal and later Commissioner of Public Works, city of Boston; and Francis E. Slattery, a Boston lawyer. Ernest R. Springer is chief engineer.

An unusual degree of co-operation existed throughout the work between the Transit Department and the Boston Elevated Railway. A further remarkable degree of co-operation was enjoyed from the 1,500 men who labored day and night through a public holiday and Sunday to accomplish this remarkable achievement. Their pride was aroused to win and they did.

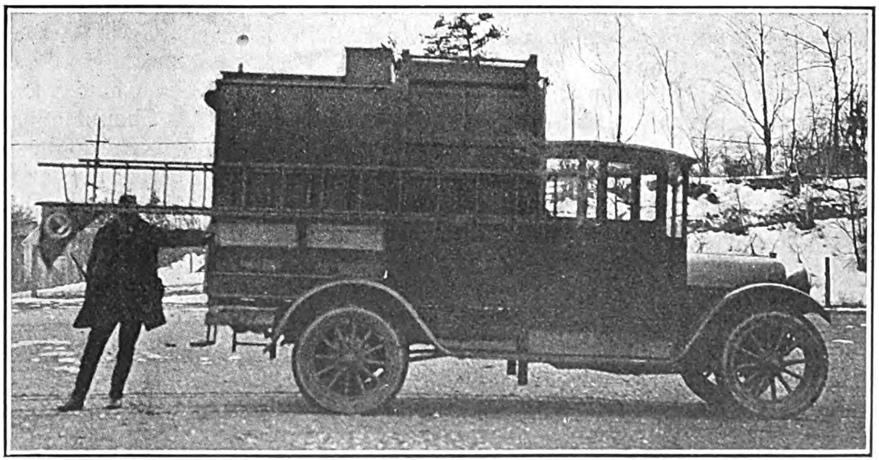
Tower Wagon for Line Repair Has Inclosed Body

Truck Used by the Middlesex & Boston Street Railway for Emergency and Light Overhead Construction Work Embodies Several Novel Features

MAKING repairs to overhead wires is a cold job in New England in winter. Not the least disagreeable feature of this work is the trip to the place where repairs are to be made. With this in mind the Middlesex & Boston Street Railway, Newtonville, Mass., recently purchased a Reo speed wagon chassis and built for it a special inclosed body, with a closed cab for the driver.

This company operates more than 100 miles of route, of which about 68 per cent is single track. As this is protected by signals and equipped with electric track switches and a private telephone dispatching system there is frequent need for a light emergency line wagon. The truck is operated by a crew of three men, all of whom have licenses to drive. One is a first-class signal, telephone and electric switchman. Another is a first-class lineman, and the third is an all-around helper.

The body was built in the Waltham shops of the rail-



An Emergency Wagon with Inclosed Body Built by the Middlesex & Boston Street Railway. Tool Boxes May Be Opened from Either the Inside or the Outside way. Its framework is of oak, while the sides are of ⅞-in. North Carolina pine. Over this has been placed a canvas cover which is painted bright red. The closed cab and closed body on this truck provide a warm and comfortable place for the men to ride to work and protect the tools and equipment from the weather.

Materials used in making line repairs are kept in boxes inside of the truck body. Easy access to these boxes is provided by several openings, one on the inside and another on the outside so that the men can reach materials from the street. A portable light to be connected to the trolley wire hangs inside of the truck. This is of 56-watt size and has 25 ft. of cord with an automatic retriever for taking up the slack.

A tower which rises to a height of 14½ ft. above the ground slides on a trackwork of channel irons. Workmen reach the platform by a stationary ladder on one side of the body. An opening with a hinged cover in the roof of the driver's cab makes it possible for the men on the tower to communicate easily with the driver. On the roof of the body is a box in which the heavy tools used for tower work are kept. An extension ladder for use in locations where the tower cannot be used is hung from iron hooks on the outside of the body. The rear step is hinged so that it may be thrown back into the body when desired.

The chassis cost $1,450 and the body slightly less than $400, making a total cost for the vehicle of approximately $1,850. Experience with the operation of this truck for a few months' time indicates that it costs approximately 5 cents per mile to operate without including depreciation or insurance.

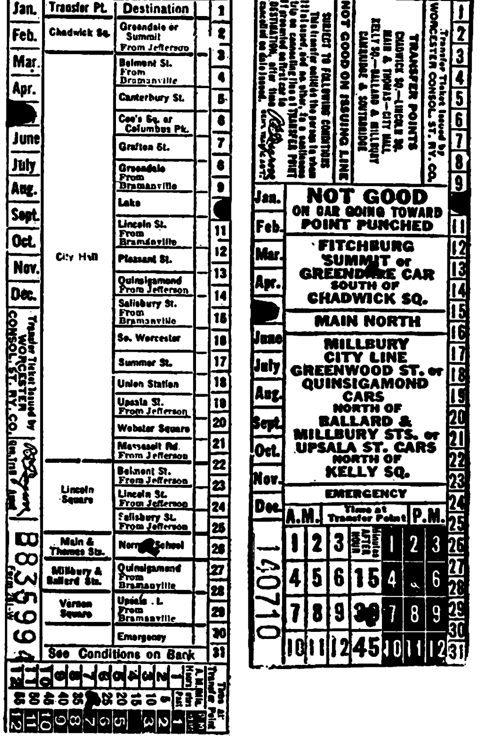
Simplified Transfer in Worcester

New Transfer Is Punched to Indicate Lines on Which It Is Not Acceptable—This Permits Grouping of Routes and Gives More Space for Other Features

INDICATION of the routes on which it is not good, instead of showing destination and transfer point, is the feature of a new form of transfer introduced by the Worcester Consolidated Street Railway, Worcester, Mass.. The point where the passenger boards the car determines the extent of the transfer privilege, hence the plan has been termed a "boarding-point" transfer system. While designed to prevent doubling back, the new type of transfer gives the passenger a greater degree of flexibility than the former one in that it does not restrict him to a particular line in order to reach his destination.

As may be seen from the accompanying illustration, the new transfer, like the old one, is a route transfer. However, instead of listing separately all the six transfer points and the 23 possible destinations for the line shown, the routes on which the transfer is not good are combined into three groups. This has made it possible to use much larger type and still keep the space for the route limitations down to half what it was on the old transfer. Part of the space gained has been used to print the conditions under which the transfer is issued, which formerly were on the reverse side. The space for time limit has been nearly doubled, and with a change from a 5-minute limit to a 15-minute limit, much larger type is used for the hours. Even with these changes the over-all size has been decreased from 2x7 in. to 2x6½ in. The space on the reverse side is used for printing the restrictions on issue and acceptance.

The routes on the system have been arranged in seven groups, for each of which a distinctive color of transfer has been adopted. This aids the conductor to determine the validity of a proffered transfer. The prepayment system is used and transfers are issued at the time of paying fare. In case there is a limitation of routes, which is determined largely by the point where the passenger boards the car, the conductor punches the proper block on the transfer. While the old form always required punching to indicate destination, the new form may be issued with only date and time indicated.



FROM
JEFFERSON & BRAMANVILLE LINE
ROUTE NO. 7

Transfer Pt.	Destination
Chadwick Sq.	Greendale or Summit From Jefferson
City Hall	Belmont St. From Bramanville
	Canterbury St.
	Coe's Sq. or Columbus Pk.
	Grafton St.
	Greendale From Bramanville
	Lake
	Lincoln St. From Bramanville
	Pleasant St.
	Quinsigamond From Jefferson
	Salisbury St. From Bramanville
	So. Worcester
	Summer St.
	Union Station
	Upsala St. From Jefferson
	Webster Square
	Massasoit Rd. From Jefferson
Lincoln Square	Belmont St. From Jefferson
	Lincoln St. From Jefferson
	Salisbury St. From Jefferson
Main & Thomas Sts.	Normal School
Millbury & Ballard Sts.	Quinsigamond From Bramanville
Vernon Square	Upsala St. From Bramanville
	Emergency

See Conditions on Back

Jan. Feb. Mar. Apr. June July Aug. Sept. Oct. Nov. Dec.

1 2 3 4 5 6 7 8 9 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Transfer Ticket Issued by WORCESTER CONSOL. ST. RY. CO.

B 835994

Time at Transfer Point

A.M. Hours: 1 2 3 4 5 6 7 8 9 10 11 12

Min. Past: 5 10 15 20 25 35 40 45 50 55

P.M.: 1 2 3 5 6 7 8 9 10 11 12

FROM
JEFFERSON & BRAMANVILLE LINE
ROUTE NO. 7

Transfer Ticket Issued by WORCESTER CONSOL. ST. RY. CO.

TRANSFER POINTS
CHADWICK SQ.—LINCOLN SQ.
MAIN & THOMAS—CITY HALL
KELLY SQ.—BALLARD & MILLBURY
CAMBRIDGE & SOUTHBRIDGE

NOT GOOD ON ISSUING LINE

SUBJECT TO FOLLOWING CONDITIONS
This transfer entitles the person to whom it is issued, and no other, to a continuous trip on connecting line at TRANSFER POINT if presented on first car to DESTINATION, after time canceled on date issued.

NOT GOOD ON CAR GOING TOWARD POINT PUNCHED

FITCHBURG SUMMIT or GREENDALE CAR SOUTH OF CHADWICK SQ.

MAIN NORTH

MILLBURY CITY LINE GREENWOOD ST. or QUINSIGAMOND CARS NORTH OF BALLARD & MILLBURY STS. or UPSALA ST. CARS NORTH OF KELLY SQ.

EMERGENCY

Jan. Feb. Mar. Apr. June July Aug. Sept. Oct. Nov. Dec.

1 2 3 4 5 6 7 8 9 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

A.M.			Time at Transfer Point	P.M.		
1	2	3	Minutes AFTER HOUR	1	2	3
4	5	6	15	4		6
7	8	9		7	8	9
10	11	12	45	10	11	12

140710

Left—The Old Form of Transfer Used by the Worcester Consolidated Street Railway. Right—The New Transfer, Which Is Punched to Indicate Where It Cannot Be Used

In addition to the various route transfers, a universal transfer has been provided. This lists the restrictions of all the route transfers. It is for use on special routes or when the regular supply of transfers is exhausted.

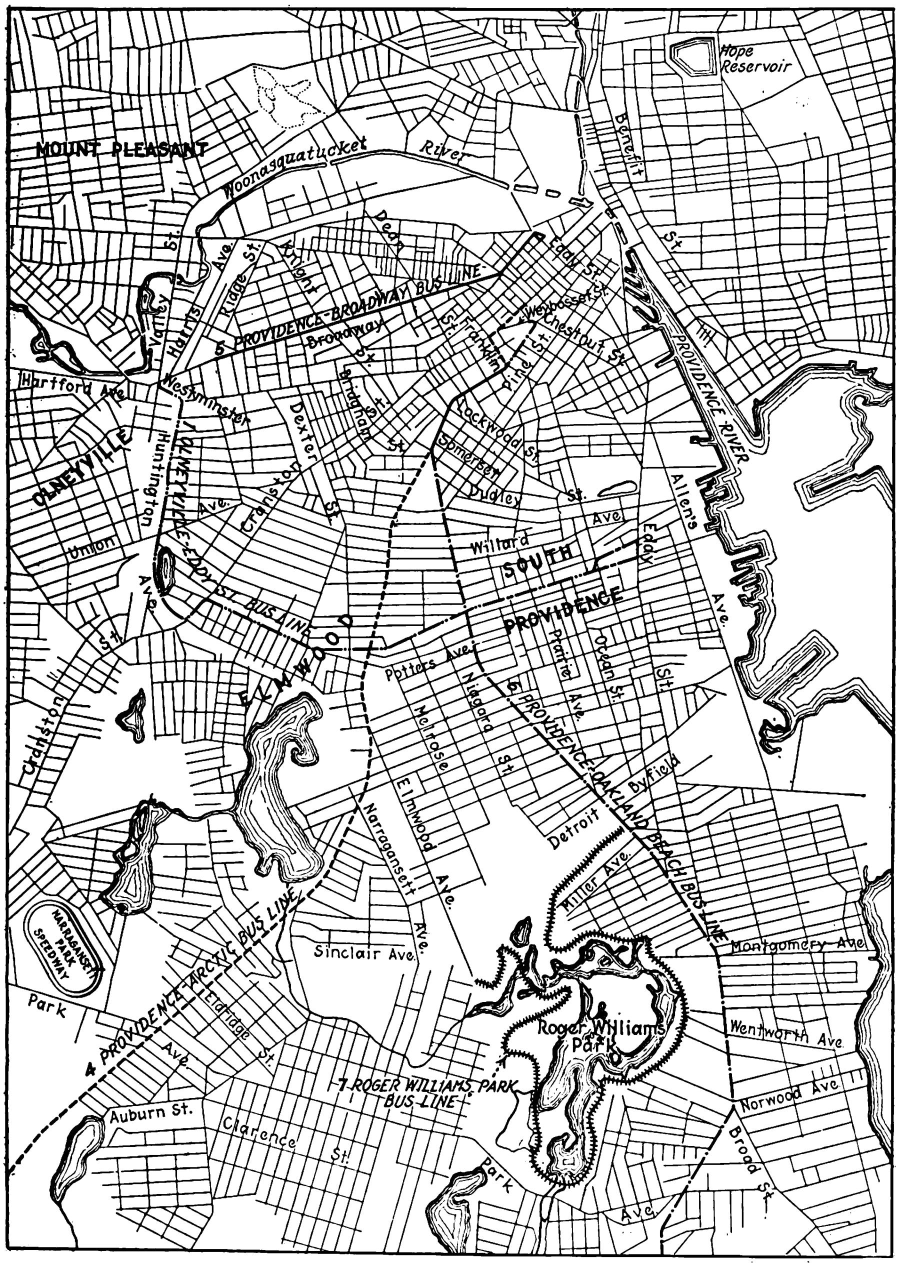
Should a passenger request a transfer to a line to which one could not be given the conductor would direct him as to how to reach his destination. Instructions governing such special cases are printed on the back of the transfer.

Since month and date are canceled at the office, the conductor has only to punch the time of arrival at the transfer point and, if needed, the line limit.

The new system applies to all of the 21 city routes and four in the county. On 12 of the city routes no restrictions govern transfers; the holder may ride anywhere on the system excepting back on the same line, hence only the time limit needs to be punched by the conductor. Retransfer privileges are not granted.

Bus Operating Results in Providence, R. I.

Total Figures for 1923 Show Only One Line of the Seven Made a Profit, Although Others Substituted for Rail Lines Show Less Loss than Rail Operation—Last Year the Company Ran Nearly 850,000 Bus-Miles with $200,000 Revenue


Hope Reservoir
MOUNT PLEASANT
Woonasquatucket River
Benefit St.
5 PROVIDENCE-BROADWAY BUS LINE
Broadway
Eddy St.
Weybosset St.
Chestnut St.
PROVIDENCE RIVER
Valley St.
Harris Ave.
Ridge St.
Knight St.
Dean St.
Hartford Ave.
Westminster
Dexter St.
Bridgham St.
Franklin St.
Pine St.
Lockwood St.
Somerset St.
Dudley St.
OLNEYVILLE
Huntington Ave.
1 OLNEYVILLE-EDDY ST. BUS LINE
Cranston St.
Union
Willard Ave.
SOUTH PROVIDENCE
Allens Ave.
Eddy St.
ELMWOOD
Potters Ave.
Prairie Ave.
Ocean St.
Niagara St.
Melrose St.
6 PROVIDENCE-OAKLAND BEACH BUS LINE
Byfield St.
Cranston St.
Elmwood Ave.
Narragansett Ave.
Detroit Ave.
Miller Ave.
Montgomery Ave.
NARRAGANSETT PARK SPEEDWAY
Sinclair Ave.
Park Ave.
4 PROVIDENCE-ARCTIC BUS LINE
Eldridge St.
Roger Williams Park
Wentworth Ave.
7 ROGER WILLIAMS PARK BUS LINE
Norwood Ave.
Auburn St.
Clarence St.
Park Ave.
Broad St.

Bus Routes Within Providence, Operated by the United Electric Railways. The Outlying Routes Are Shown in the Second Map

The United Electric Railways of Providence, R. I., was among the early companies to take up the operation of buses in co-ordination with railway service. It has therefore had an opportunity to find out operating costs and revenue possibilities in various kinds of service, such as but few companies have as yet experienced. These figures are presented in detail herewith. They show an average revenue for all lines of 23.40 cents, an average operating cost of 26.01 cents and an average operating ratio of 110.16 per cent.

Only the bus operation on Broadway, where the buses handle the local service and street cars run express on the same street, is showing a profit, although the operation of some of the other lines, where buses have been substituted for rail service, may be said to show a profit in the sense that it is causing the company less loss in providing a necessary service.

This bus operation on Broadway was treated at length in an article in ELECTRIC RAILWAY JOURNAL for March 15, 1924, page 411. The various types of bus service in which the company has engaged may be briefly summarized as follows:

1. Olneyville-Eddy Street. This is a crosstown service which intersects eight rail lines, terminating at two of them. The line is 2.83 miles long. Two buses are operated in off-peak service and four during the rush hours. The corresponding headways are 30 minutes and 10 minutes.

2. Pawtuxet-Lakewood. This is a substitution of buses for a car line. The buses feed into the Broad Street car line. It represents a very large saving over the former operation of cars. The company was faced with renewing the tracks and substituted buses instead. The length of line is 1.16 miles and it is operated with one bus on a 30-minute headway.

3. Pawtuxet-Warwick Downs. This is a wishbone line with the Pawtuxet-Lakewood. The buses make one trip to Pawtuxet and the next one to Lakewood. This service to Lakewood is provided only in the summer time except for a tripper for school children in winter. The length of route from Pawtuxet to Warwick Downs is 1.29 miles and that to Lakewood 1.16 miles, as noted above. This line is in the nature of an extension of the rail lines and a feeder to it. It handles largely summer business. It is operated with one bus on a 30-minute headway.

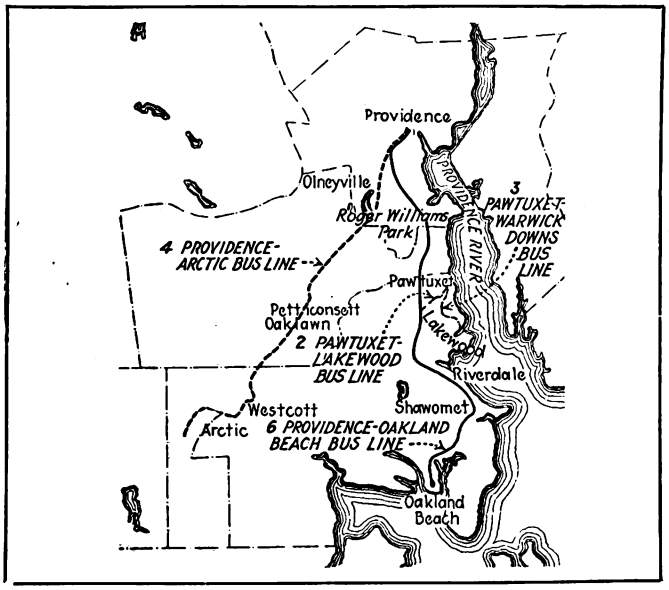
4. Providence-Arctic. This is an intercity bus line extending from the business district in Providence, 11.26 miles, to Arctic. Three buses on a 30-minute headway are used in off-peak service and eight buses on a 10-minute headway in the rush hours.

5. Providence-Broadway. This is tied up with the street car service on Broadway, the cars operating express and buses providing the local service. The length of the bus run is 1.35 miles. Five buses on a 5-minute headway are operated in off-peak hours and ten buses

on a 2½-minute headway during rush hours. The headway of street cars is 5 minutes.

6. Providence-Oakland Beach. This is an intercity line 11.62 miles in length with buses operated from the business district in Providence to the center of Oakland Beach. Two buses are operated normally on a 60-minute headway, with four in the heavy hours on a 30-minute headway.

7. Roger Williams Park. The service on this line has been abandoned, but it is included here because the operating figures for 1923 include the operations on this line. It was a park route 3.8 miles long which was essentially a pleasure ride and intended for operation during Sundays of July and August. The operation was started at the request of one of the park commissioners, anticipating that a large number of people would avail themselves of this service. The results were disappointing as indicated in the statement of earnings in an accompanying table.



In This Smaller Map the Outlying Bus Routes Operated by the United Electric Railways Are Shown

Up to the end of December, 1923, the company had 31 buses to supply the schedules noted above.

DETAILED STATEMENT OF EARNINGS AND EXPENSES EXPLAINED

The accompanying table of earnings and expenses for all bus operations of the Providence company for the year 1923 shows the full detail accounting followed by this company. The following comments tie in with this table by account numbers and are given to answer questions that naturally arise in one's mind upon examining this table.

12-A. The expenditure for removal of snow and ice was very low in 1923 and the company expects that this will be higher in the future. This expense will average about $3,500 in the city. The company operates over 21 miles of route on which the state will take care of the cost of snow removal.

24-A. The expense for buildings, fixtures and grounds set up in this table is a prorated amount of railway buildings, but it will be more in the future as the bus department now has a building of its own.

36-A. The item entered as garage equipment is really repairs to garage equipment.

40-A. Depreciation of buses is figured on a five-year basis, or approximately 200,000 miles.

INCOME STATEMENT FOR BUS OPERATIONS, COVERING THE TWELVE-MONTH PERIOD ENDED DEC. 31, 1923, UNITED ELECTRIC RAILWAYS COMPANY, PROVIDENCE, R. I.

		12 Mos. Ended Dec. 31, 1923	Per Bus-Mile, 12 Mos. Ended Dec. 31, 1923 Cents
	Operating Revenues:		
101-A	Passenger revenue, bus operation	$198,277.49	23.39
110-A	Station and car privileges (advertising)	1,050.06	0.12
116-A	Rent of bus equipment	4.00	.....
	Total revenue from transportation	$199,331.55	23.51
	Operating Expenses:		
12-A	Removal of snow and ice	$30.19	.....
24-A	Buildings, fixtures and grounds	879.86	0.10
	Total way and structures	$910.05	0.10
29-A	Superintendent bus equipment	$4,550.09	0.54
36-A	Garage equipment	21.21	.....
37-A	Shop expenses, bus department	1,164.24	0.13
38-A	Repairs, motor	27,130.95	3.20
38-B	Repairs, chassis	13,978.79	1.65
38-C	Repairs, body	2,569.44	0.30
38-D	Tire repairs and renewals	12,029.34	1.42
38-E	Miscellaneous bus maintenance	3,539.00	0.42
40-A	Depreciation of buses	29,237.65	3.45
	Total maintenance of equipment	$94,220.71	11.11
63-A	Superintendent bus operation	$10,134.70	1.21
78-A	Operators' wages	53,711.66	6.33
78-B	Garage employees	4,676.12	0.55
78-C	Garage expenses	1,033.31	0.12
78-D	Gasoline	26,746.40	3.15
78-E	Lubricating oils and greases	3,756.19	0.44
78-F	Miscellaneous bus transportation expenses	9,821.13	1.16
	Total conducting transportation	$109,879.51	12.96
80-A	Advertising buses	$729.39	0.08
84-A	Salaries and expenses of general office clerks	1,181.03	0.14
85-A	General office supplies and expenses	1.47	.....
86-A	Law expenses	52.64	0.01
89-A	Miscellaneous general expenses	814.91	0.10
92-A	Injuries and damages	10,700.93	1.26
93-A	Insurance	448.76	0.05
94-A	Stationery and printing	402.76	0.05
95-A	Stores expense	1,268.74	0.15
	Total traffic and general and miscellaneous	$15,600.63	1.84
	Total operating expenses	$220,610.90	26.01
	Net operating revenue	*$21,279.35*	*2.50*
	Taxes	$1,673.98	0.20
	Net income	*$22,953.33*	*2.70*

Operating ratio	110.68 per cent
Average passenger revenue per day	543.22
Revenue mileage	847,872
Revenue passengers carried	2,646,186
Gallons gasoline consumed	147,707.25
Miles per gallon gasoline	5.74
Gasoline cost per mile per gallon	3.15 cent
Investment, bus department, to Dec. 31, 1923:	
Motor buses	$170,522.99
Elmwood garage	92,168.51
Miscellaneous	41,354.39
	$304,045.89

BUS LINE EARNINGS, MONTH OF DECEMBER, 1923, UNITED ELECTRIC RAILWAYS, PROVIDENCE, R. I.

	Earnings	Mileage	Receipts per Bus-Mile, Cents	Receipts per Bus per Da
1. Olneyville-Eddy St.	$2,117.64	7,096.79	29.84	33.15
2. Pawtuxet-Lakewood	75.80	1,200.24	6.32	10.95
3. Pawtuxet-Warwick Downs	56.45	810.88	6.96	13.31
4. Providence-Arctic*	7,673.68	31,329.83	24.49	66.20
5. Providence-Broadway	7,841.05	22,042.81	35.57	45.86
6. Providence-Oakland Beach*	3,859.90	21,336.94	18.09	39.36

BUS LINE EARNINGS, TWELVE MONTHS ENDED DEC. 31, 1923, UNITED ELECTRIC RAILWAYS, PROVIDENCE, R. I.

	Earnings	Mileage	Receipts per Bus-Mile, Cents	Net	Average Speed Miles per Hr.
1. Olneyville-Eddy St.	$17,704.57	64,872.84	27.35	$869.30	6.07
2. Pawtuxet-Lakewood	1,162.78	16,048.64	7.30	*3,002.71*	9.73
3. Pawtuxet - Warwick Downs	2,123.68	13,175.78	16.15	*1,299.14*	10.40
4. Providence-Arctic*	66,877.48	325,224.71	20.60	*17,594.66*	15.00
5. Providence-Broadway	48,631.23	152,482.33	31.90	8,981.21	7.73
6. Providence - Oakland Beach*	61,547.80	274,327.09	22.42	*9,848.34*	12.10
7. Roger Williams Park†	144.35	1,640.05	8.80	*282.26*	7.60

* Six zones, 5 cents per zone, minimum fare 10 cents, no tickets, no transfers.

† Discontinued.

Figures in *italics* indicate a deficit.

AVERAGE REVENUE IN CENTS PER BUS-MILE, UNITED ELECTRIC RAILWAYS, PROVIDENCE, R. I., FOR YEAR 1923

Name of line	(1)	(2)	(3)	(4)	(5)	(6)
January	27.67	9.08	9.78	20.18	.....	17.27
February	28.36	8.93	9.68	20.45	.....	17.28
March	28.16	9.82	6.89	20.17	.....	18.01
April	28.27	7.48	8.68	20.39	.....	19.36
May	26.37	7.08	11.42	20.20	26.65	23.38
June	27.01	6.29	11.81	19.70	29.35	26.63
July	26.24	6.23	19.78	18.15	28.79	31.06
August	26.00	7.07	25.25	18.22	29.68	30.76
September	25.65	7.22	17.45	19.33	32.17	23.06
October	25.51	6.09	6.62	21.18	34.32	18.68
November	27.99	5.77	7.25	23.51	35.32	17.11
December	29.84	6.32	6.96	24.49	35.57	18.09
Average	27.34	7.25	16.14	20.56	31.90	22.42
Average all lines			23.40			

1. Olneyville-Eddy Street
2. Pawtuxet-Lakewood
3. Pawtuxet-Warwick Downs
4. Providence-Arctic
5. Providence-Broadway
6. Providence-Oakland Beach

78-A. Bus operators' wages are the same as those for two-man car operation, namely, 61 cents an hour. The operation is not considered as difficult as that on one-man cars, where a slightly higher wage is paid the men, since no standing load is carried, and there is not as much congestion.

89-A. Miscellaneous general expenses are charged against the bus on an arbitrary basis, prorated according to mileage operated by cars and buses.

92-A. The charge for injuries and damages in the 1923 statement is considered by the company to be abnormally high, and this is expected to be about 1 cent per bus-mile in the future instead of 1.26 cents as shown in this statement.

In the investment details given at the bottom of the table, the item of $92,168 for the Elmwood garage includes $19,000 of stock and spare parts and miscellaneous supplies. It also includes machinery and equipment and a wrecking truck.

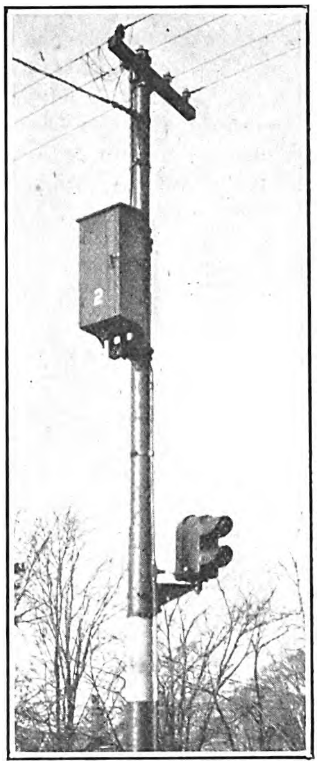
The entry for taxes includes the charge of $75 average per bus for a license from the State Board of Public Roads; the cost of bonding, which averages $120 per bus per year with a $50,000 maximum liability; a corporation tax of 1 per cent of the load, which goes to the state; the war tax included in the purchase price of twelve new buses, and a property tax in Providence, which amounts to $2.30 per $1,000 of assessed value.

Gasoline consumption by the various buses during 1923 was at the rate of 1 gal. for each 5.74 miles operated. This varied for different types of buses and under different service conditions all the way from 5.45 miles per gallon up to 8.80 miles per gallon. Most of the roads over which the buses are operated are level, the paving is good and little bad weather was encountered during the months covered in the statement.

Recorder Shows if Cars Make Safety Stops

Automatic Block Signals and Headway Recorders Are Electrically Connected to Prevent Cars Running by Red Lights

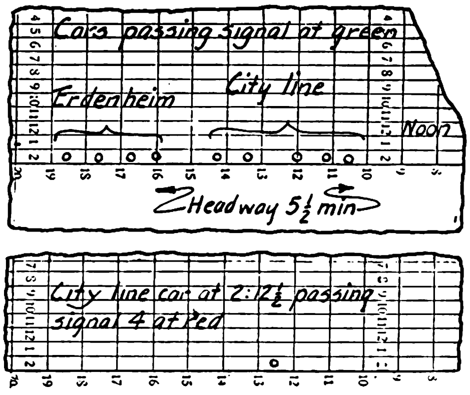
TO INSURE that motormen shall not fail to make the required safety stops on a bad hill at the outer end of its Germantown Avenue line, the Philadelphia Rapid Transit Company has recently installed a system of Nachod block signals operated in conjunction with headway recorders. From Chestnut Hill to the city line, a distance of about three-quarters of a mile, there is a long winding grade, which is rather deceptive because it appears less severe than it really is.



Two - Indication Normal Danger Signal Used by the Philadelphia Rapid Transit Company on a Steep Grade

Two shuttle extensions of line No. 23 use this track, one going to the city line and the other to Erdenheim, the latter branching off Germantown Avenue and Hillcrest Avenue. Both lines operate one-man cars. Formerly, there were six safety stops located equally distant along the Germantown Avenue grade. It required careful supervision to see that these safety stops were always observed, and six blocks of automatic signals have now been installed to insure the taking of the required safety precautions.

Each block has a two-indication signal, showing a red light normally which must be changed to green in the sight of the motorman before his car passes the signal and enters the block. Opposite the signal there is a setting contactor, and about 100 ft. before reaching the signal is a preliminary contactor. The setting contactor for one block acts as a clearing contactor for the block behind. When the trolley wheel of a car passes under the preliminary contactor, the motorman is only about 50 ft. away from the signal. Passing the contactor starts a time relay in operation, so that 5 seconds later the signal changes to green, unless there is a car already in the block ahead. The motorman must, therefore, bring his car to a stop in order to see the signal appear green before he passes. As soon as he passes the signal, the trolley wheel of his car changes it back to red again, the normal indication. So long as there is a car in the block, the signal cannot be changed to green. Thus, it not only serves as a safety stop, but also gives rear protection.



Cars Passing Signal at Green Record on One Side of the Sheet and Cars Passing at Red on the Other Side

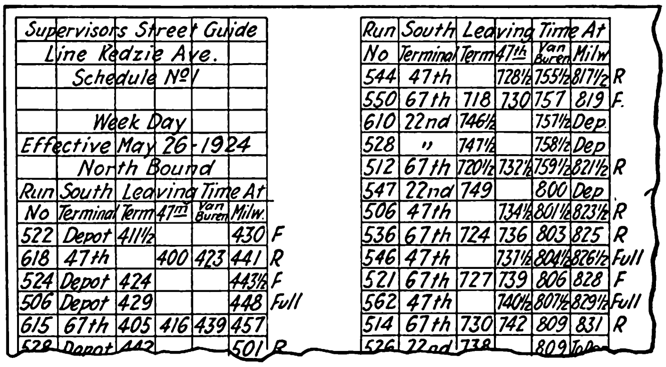
A Nachod automatic headway recorder is connected to each of the signals, so that a motorman cannot pass by a red light without that fact being recorded. All cars passing the signal at green register on one side of the record sheet, while all cars passing the signal at red register on the other side. The chart is renewed daily, and shows the exact time that proper and improper passages were made. The motorman must either make the stop or report not having done so.

Chicago Adopts New Form of Time-Table

The Surface Lines Give All the Information About Each Run in One Place on the Time-Table, so as to Make It More Easily Read

THE Chicago Surface Lines has had in use for a little more than six months a form of carhouse time-table in which the figures and other data for the entire day's run of each crew can be found in one place. The purpose of this arrangement is to make it easier for each man to understand his day's work, because he can see at a glance his time of arriving and of leaving each terminal and the terminal to which he should go on each trip. By reference to a table of running times in the lower part of the time-table he can also tell the exact time required for arriving at each intervening time point. This form of schedule is considered by the transportation department of the company preferable to the more common form, for the reason set forth, namely, because it enables each trainman to focus his attention on a single rectangular space on the blueprint. Indeed, a regular man could be given simply a section cut from a schedule blueprint.

The large illustration shows the upper part of such a time-table, giving the details of four of the fifty-eight runs in division No. 7 operating out of the Kedzie Avenue depot, and effective for week days beginning on May 26, 1924. Where a line is operated from two carhouses, two run guides are prepared, one for the runs out of each carhouse. The form of the time-table, as shown, is so simple that practically no explanation is required, except in regard to the method of indicating the pay hours. The hour in Chicago is divided into ten parts, and in the run guide the pay hours are expressed in hours and tenths. The division office has the detail of this pay time, showing the time per piece, the various allowance and overtime, time of beginning and ending work, etc., in summarized form.



Supervisors Street Guide						
Line Kedzie Ave.						
Schedule Nº 1						
Week Day						
Effective May 26-1924						
North Bound						
Run	South	Leaving Time At				
No	Terminal	Term	47th	Van Buren	Milw.	
522	Depot	411½			430	F
618	47th		400	423	441	R
524	Depot	424			443½	F
506	Depot	429			448	Full
615	67th	405	416	439	457	
528	Depot	442			501	R
Run	South	Leaving Time At				
No	Terminal	Term	47th	Van Buren	Milw	
544	47th		728½	755½	817½	R
550	67th	718	730	757	819	F.
610	22nd	746½		757½	Dep.	
528	"	747½		758½	Dep	
512	67th	720½	732½	759½	821½	R
547	22nd	749		800	Dep	
506	47th		734½	801½	823½	R
536	67th	724	736	803	825	R
546	47th		731½	804½	826½	Full
521	67th	727	739	806	828	F
562	47th		740½	807½	829½	Full
514	67th	730	742	809	831	R
526	22nd	738		809	[illegible]	

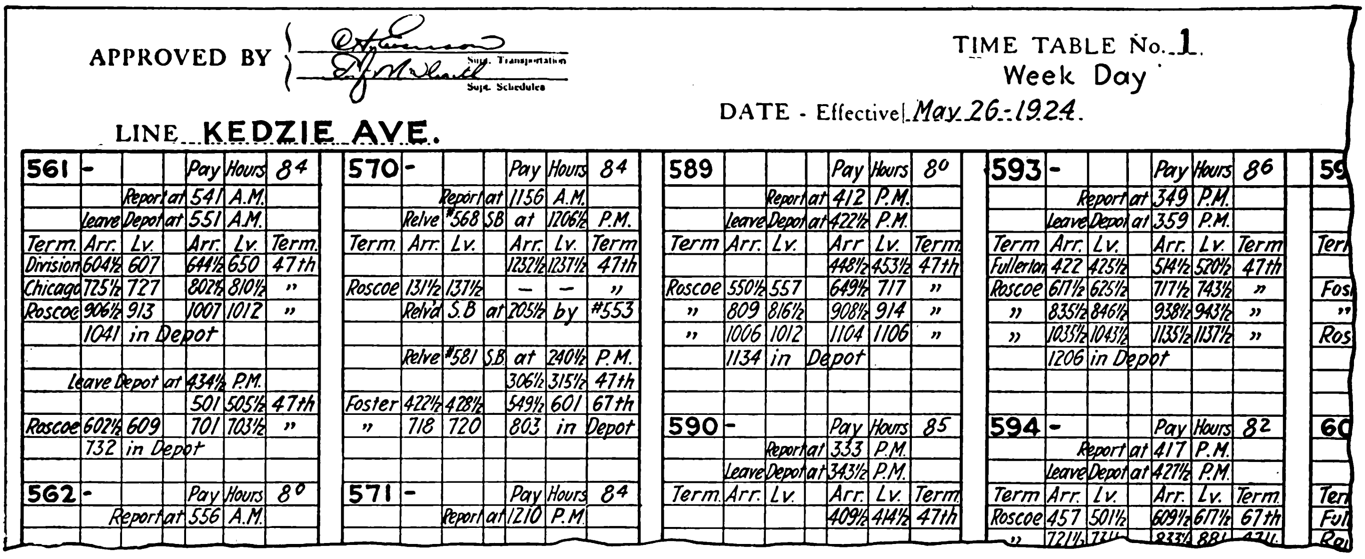
Upper Part of a Supervisor's Time-Table

The form of the time-table drafted for the supervisors, i.e., the uniformed inspectors, is somewhat different. This time-table, known as a "supervisor's guide," is arranged according to the times the cars are scheduled to pass the principal time points on each route. This time-table shows for each run number the terminals of that run for each trip and the time the car is due at two or more of the major time points. The running time between these major time points and the time points of lesser importance is so well known to a supervisor that he can interpolate very readily if he needs to do so. The supervisor's time-table is blueprinted with blue numerals on a white background rather than in the usual form of white letters on a blue background, so that he can make any notes on it which he desires.

The experience of the company shows the great desirability of preparing time-tables for supervisors rather than the more common practice of allowing them to make up their own form of time-table from the run guides posted in the carhouse. To quote only one advantage, it economizes their time when a change in schedule is made, because the running time has to be figured only once for the entire corps of inspectors.

Another outstanding feature of the schedule department of the Chicago Surface Lines is the use of a fairly large number of running times during the day. Thus on some lines there are from six to eight running times between 6:30 a.m. and 6:30 p.m. With the individual form of time-table, however, these changes in running times should not confuse the trainman. He can tell directly from his time-table the time he is expected to arrive at the terminal on each trip and then can govern himself accordingly.

Another feature of the schedule department of the Chicago Surface Lines is a readiness on the part of the department to change the running time between time points, where changes in street conditions indicate that existing running times are either too fast or too slow.



APPROVED BY
Supt. Transportation
Supt. Schedules

TIME TABLE No. 1
Week Day
DATE - Effective May 26-1924.

LINE KEDZIE AVE.

561	-			Pay	Hours	8^4
		Report	at	541	A.M.	
	leave	Depot	at	551	A.M.	
Term.	Arr.	Lv.		Arr.	Lv.	Term.
Division	604½	607		644½	650	47th
Chicago	725½	727		802½	810½	"
Roscoe	906½	913		1007	1012	"
	1041	in Depot				
	Leave	Depot	at	434½	P.M.	
				501	505½	47th
Roscoe	602½	609		701	703½	"
	732	in Depot				
562	-			Pay	Hours	8^0
		Report	at	556	A.M.	

570	-			Pay	Hours	8^4
		Report	at	1156	A.M.	
	Relve	#568	SB	at	1206½	P.M.
Term	Arr.	Lv.		Arr.	Lv.	Term
				1232½	1237½	47th
Roscoe	131½	137½		–	–	"
	Relv'd	S.B	at	205½	by	#553
	Relve	#581	SB	at	240½	P.M.
				306½	315½	47th
Foster	422½	428½		549½	601	67th
"	718	720		803	in	Depot
571	-			Pay	Hours	8^4
		Report	at	1210	P.M.	

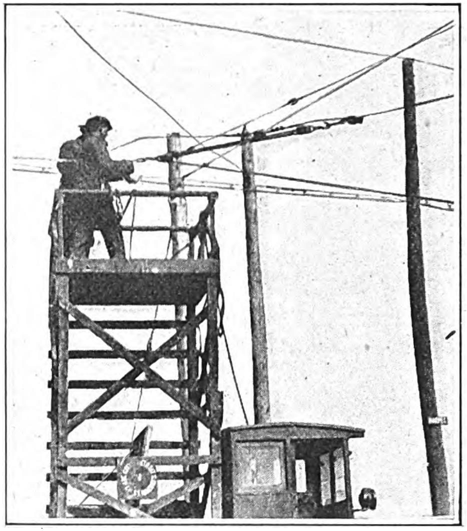
589				Pay	Hours	8^0
		Report	at	412	P.M.	
	leave	Depot	at	422½	P.M.	
Term	Arr.	Lv.		Arr	Lv.	Term
				448½	453½	47th
Roscoe	550½	557		649½	717	"
"	809	816½		908½	914	"
"	1006	1012		1104	1106	"
	1134	in	Depot			
590	-			Pay	Hours	8^5
		Report	at	333	P.M.	
	leave	Depot	at	343½	P.M.	
Term.	Arr.	Lv.		Arr.	Lv.	Term
				409½	414½	47th

593	-			Pay	Hours	8^6
		Report	at	349	P.M.	
	leave	Depot	at	359	P.M.	
Term	Arr.	Lv.		Arr.	Lv.	Term
Fullerton	422	425½		514½	520½	47th
Roscoe	617½	625½		717½	743½	"
"	835½	846½		938½	943½	"
"	1035½	1043½		1135½	1137½	"
	1206	in Depot				
594	-			Pay	Hours	8^2
		Report	at	417	P.M.	
	leave	Depot	at	421½	P.M.	
Term	Arr.	Lv.		Arr.	Lv.	Term.
Roscoe	457	501½		609½	617½	67th

The Chicago Surface Lines Has Adopted a Form of Time-Table in Which the Run of Each Individual Crew Is Shown Separately

Radio Calls Emergency Crews in Detroit

This Arrangement Enables the Three Electrical Department Emergency Trucks, with Their Crews, to Be Used for Outside Maintenance Work When Not on Emergency Service


The Emergency Man at Work

SINCE March, 1922, the Department of Street Railways, Detroit, has been experimenting with radio reception as applied to emergency trucks. The first experiments were carried on by means of a Ford touring car, as described in the issue of this paper for June 3, 1922, page 910. In May, 1923, three emergency trucks were equipped with receiving sets so that any one or all three crews could be summoned to the point of any trouble where their services were needed. The broadcasting is done from police headquarters, through operators who also broadcast news of stolen automobiles, holdups, etc. The system, which has proved so successful in the case of the Department of Street Railways for emergency trucks, has also been applied with very good results, during the latter part of April of this year, to the Police Department's patrol cars, or "fliers" as they are commonly termed.

Before the radio sets were installed on the electric railway emergency trucks, the crews had to stay in their stations to be ready to answer emergency calls by telephone. The only exception was when work could be done in localities where telephones were available, or, as was done in several instances, the crews did outside work but reported at frequent intervals by telephone to the despatcher.

In case of trouble on the lines, the despatcher at railway headquarters would notify the nearest emergency crew. After it had attended to the trouble for which it was summoned, it would return to its station. All the time that it was away from its station (emergency or temporary), the crew had to be constantly in touch by telephone with railway headquarters to learn if the services of the truck were needed elsewhere.

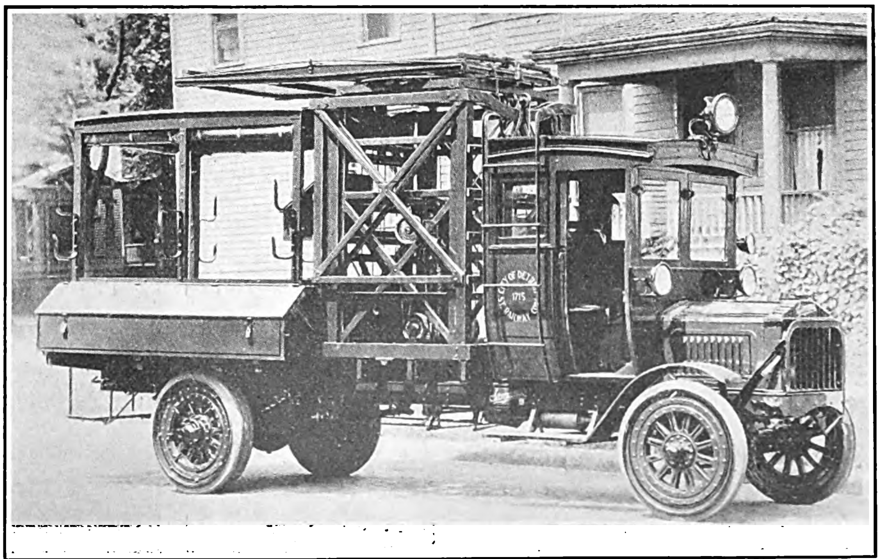
Radio has changed all this. Now any crew can be summoned at a moment's notice, no matter in what part of the city it may be. This permits the crews to do a great deal of miscellaneous outside work both in rehabilitation and maintenance, such as painting poles, replacing crossarms, cutting out annealing sections of trolley wire and substituting new, renewing worn-out ears, etc. It has been found that a great deal of this work can be done to better advantage at night than in the daytime. Thus, when poles are painted, particularly in the downtown district, there is no danger of spilling paint on pedestrians if the work is done at night, and it can be done more quickly. In renewing parts of the overhead construction, there is less traffic, both railway and vehicular, at night to interfere with the work.

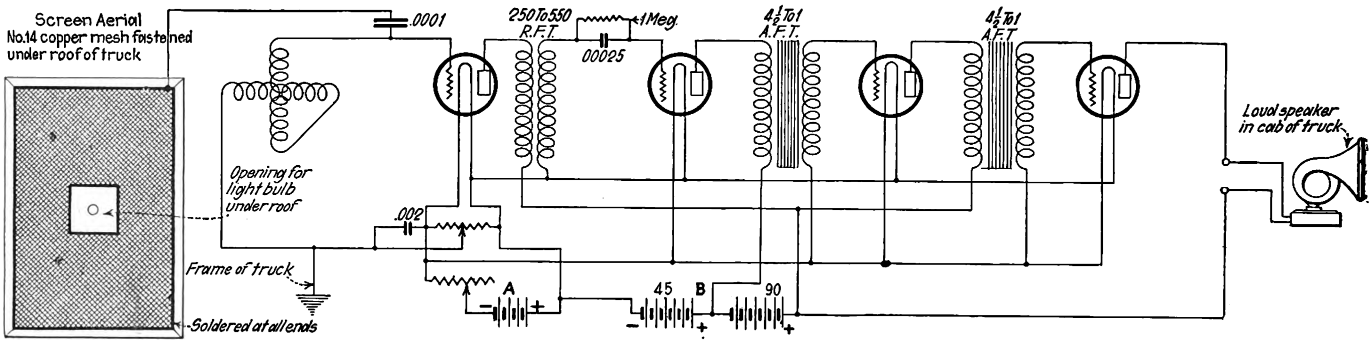
As explained, the radio messages are sent out through the broadcasting station at police headquarters. This station is downtown, about half a mile from the city hall. Whoever named the station must have had a sense of humor, because it is officially known as KOP. This station broadcasts on a 286-meter wave length.

When the plan of broadcasting to the emergency trucks was conceived, this station had authority only to broadcast music and police news. To summon an emergency crew, the practice at first followed was as follows:

CREWS CALLED BY MUSIC

When railway headquarters learned of a trolley break or other trouble requiring the services of an emergency crew the broadcasting station would be called (through a direct private circuit) and the broadcaster would put a piece of music on the victrola and broadcast it. All three crews then called the despatcher, who issued instructions appropriate for the occasion. In case one crew was sufficient for the trouble in hand, the other crews returned to their work. No attempt was made to pick and choose the type of music broadcasted except when KOP was broadcasting a musical concert, which it does occasionally. In that case the emergency crews only responded to one piece, viz., Sousa's "The Stars and Stripes Forever." Otherwise the music ranged from "Mama Loves Papa" to "The Tales of Hoffmann," depending upon the will and humor of the operator


These Emergency Trucks Are Told About Trouble by Radio



Hook-Up Diagram Used on the Emergency Trucks. Three of These Trucks Are Now Equipped with Wireless Receiving Sets

at KOP. Any amplification of this scheme which will call for a greater knowledge of music on the part of the crews obviously presents complications. It might make it necessary to require each member of an emergency crew to attend a recognized school of music.

Actual records with this wireless system of notification in Detroit show that the elapsed time between the receipt of a trouble call at railway headquarters and the report of a crew via wireless varies between three and nine minutes. The reporting by the crews is very materially expedited owing to the fact that they have access to the Police Department's telephones, located at frequent intervals along the main thoroughfares.

The expense to the railway department for this broadcasting service is the salary of one of the two radio operators. The broadcasting during this early period, or prior to April of this year, covered the period from 6:30 p.m. until 5 a.m., Sundays and holidays excluded.

SAVE $3,000 A MONTH

The direct gain to the railway comes from the amount of extra work which can be done by the emergency crews when otherwise they would be waiting in their stations. The record in May follows:

Number of radio calls to emergency trucks during May	30
Number of crew hours worked on line work by emergency crews who otherwise would have awaited calls at headquarters	822.5
Saving made due to these crews working all the time	$3,174.89
Maintenance and operation of radio equipment	250.75
Net saving	$2,924.14

Figures almost as good were obtained in earlier months.

The indirect advantage of keeping the men on the emergency crews busy instead of idle is undoubtedly also considerable, but is hard to evaluate.

Another feature of the practice with emergency crews is to rotate the crews among the different stations. In this way all the crews know all parts of the system. Incidentally, the foremen of the construction and maintenance crews are also rotated with respect to the crews, so that they learn to work with each other.

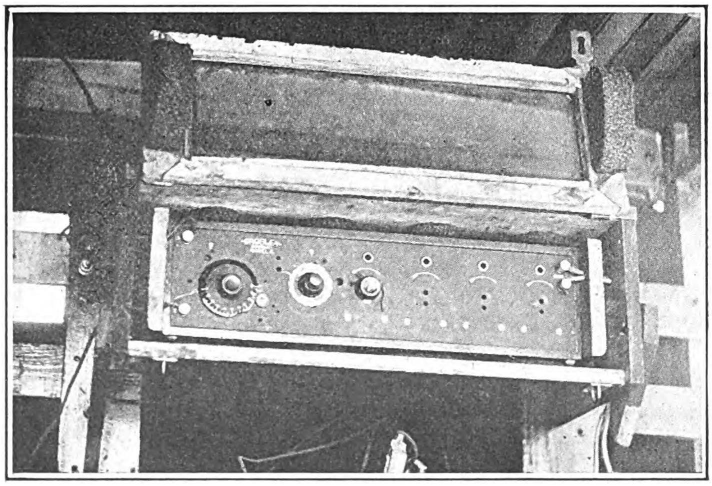
BROADCASTING PLAN CHANGED IN APRIL

As a check on whether the radio equipment was in service, it was the practice, prior to April, to run a test with a piece of music each evening at 6:30 p.m. The men would then report to the main emergency station at St. Antoine Street.

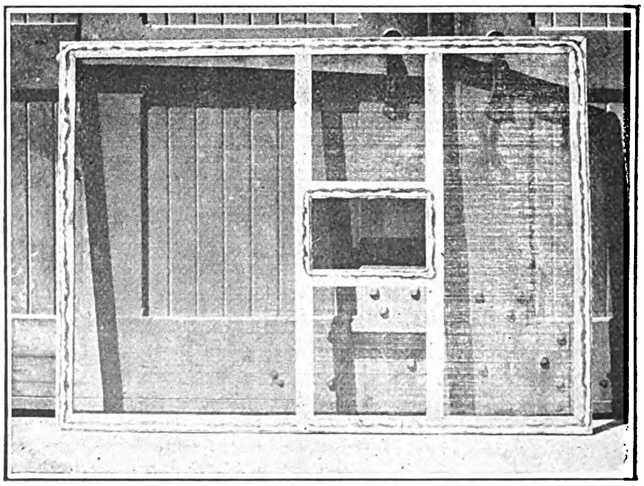
A change in the method of broadcasting had to be made in April under a ruling of the government that KOP had authority to broadcast music, but not when that music was used to notify utility crews that their services were needed. The department then tried broadcasting on 100 meters, but it was not satisfactory. Application was then made to the government to permit broadcasting for the summoning of emergency crews, and authority was finally granted by which a modified point to point broadcasting is now permitted. Under this plan, KOP, when it wanted to summon an emergency crew, broadcasted the emergency truck number and the type and location of the trouble, following this announcement with a victrola selection. The truck number, type and location of trouble were then repeated, followed by a victrola selection. KOP then signed off.

In June the plan was again changed by omitting the music, as it was found not necessary. The present plan, therefore, is for the broadcasting station to broadcast the information a few times and then sign off.

Altogether there are three emergency trucks, each



Receiving Apparatus Mounted on the Back of the Driver's Seat



This Is the Aerial Carried on the Emergency Truck

having three crews on eight-hour shifts, the broadcasting since April, 1924, having been done each day, except Sundays and holidays, from 11 a.m. until 3 a.m. Later, it is expected that three shifts will be put into effect, i.e., the system will be worked for twenty-four hours a day.

It is further anticipated that ultimately the electrical department's six construction trucks, one fire truck and the track department's two emergency trucks may be equipped with radio apparatus. The department realizes that there are many other applications for such apparatus not yet developed, such as equipping snow plows, snow sweepers, etc. These will doubtless receive consideration at a later date.

Receiving Apparatus on the Emergency Truck

The receiving apparatus on the truck is placed horizontally in a box with a glass cover on the back of the driver's seat about midway between the floor and the roof. The aërial consists of a copper wire screen, attached to a wooden frame and mounted horizontally under the roof of the body, housing space being left for a "dome" light. The screen is made of No. 14 gage wire and is carried on a wooden frame about 4 ft. x 5 ft. The edges of this screen are soldered and the lead wire is soldered to the screen at one corner. The frame of the truck is used as a counterpoise. There are four tubes, one radio frequency, one detector and two audio frequency. For tuning, a variometer is used, and all condensers are of the fixed type. This apparatus is suspended on and surrounded by sponge rubber. Originally springs were used, but sponge rubber was found to be more satisfactory. The "A" battery consists of an ordinary 6-volt, 120-amp.-hr. automobile storage battery, of which there are five assigned to this work, one for each truck and two as spares. The batteries are charged once every four days. The "B" battery lasts about two months.

The loud speaker is of the Westinghouse type, carried under the hood in the cab. The "A" battery switch is also in the cab. The department does not depend on the crews to check the apparatus, but has an inspector to check it. The variometer is fixed at 286 meters, so that it will respond only to that wave length, which is the wave length of the station.

The hook-up used is fundamentally an Eisemann, but with some modification. A wiring diagram is shown herein.

Some difficulty has been experienced with interference from other broadcasting stations when the trucks are within a quarter of a mile of such stations. The intensity of the sound is reduced somewhat, also, when the truck is under a steel viaduct. No interference is noted when the truck is under trolley wires, but the set is inclined to be noisy when the truck is adjacent to overhead 23,000-volt transmission circuits, especially on wet days. None of these drawbacks is serious, however; they simply require closer attention on the part of the crews.

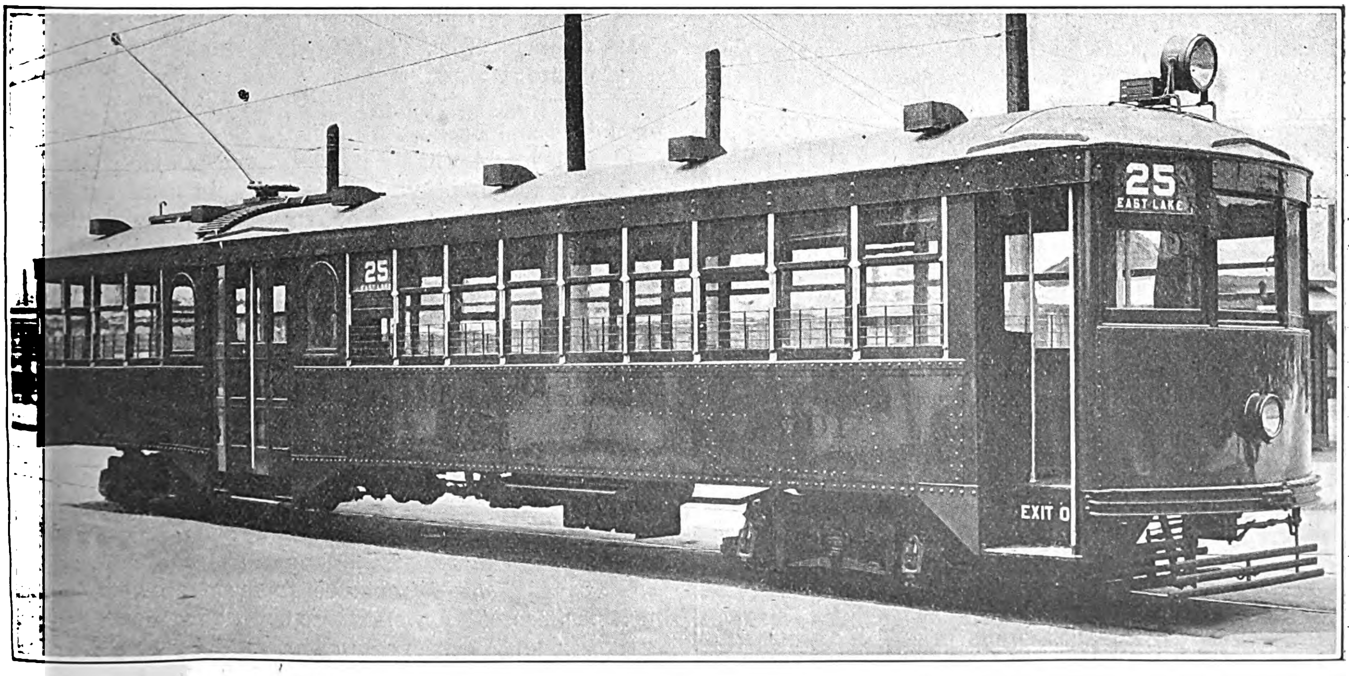
Double-Truck Cars Weigh 564 Lb. per Seat

New Side-Entrance Cars of the Birmingham Electric Company Are of Light-Weight Steel Construction and Seat 62 Passengers—A Unique Arrangement Is Made for Separation of the Races

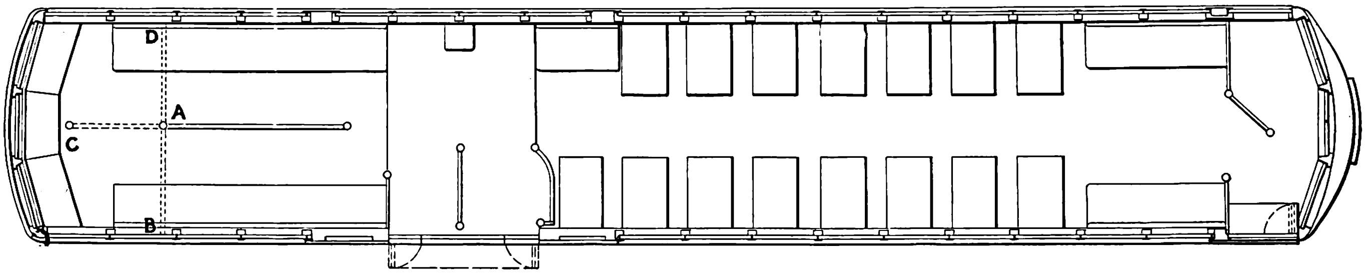
Twenty new side-entrance steel cars were received and placed in service by the Birmingham Electric Company, Birmingham, Ala., during May. They are of the Cincinnati light-weight curved side construction, but differ from previous designs in that the stiffening panels are beside the center doors instead of being at the ends of the car. Seats are provided for 62 passengers. The total weight, including car body, trucks and equipment, is only 35,000 lb., or 564 lb. per seated passenger.

Each car is equipped with four General Electric No. 265 motors of 35-hp. capacity. A maximum gear reduction is used, giving the car a free running speed of 36 m.p.h. with very quick acceleration. The trucks are Brill 76-E with outside-hung motors. Cast-iron wheels of 26-in. diameter are used.

A special feature of the car is the seating arrange-



New Birmingham Side-Entrance Car Specially Designed for Separation of the Races



Floor Plan of Birmingham Car Showing How 62 Seats Are Provided

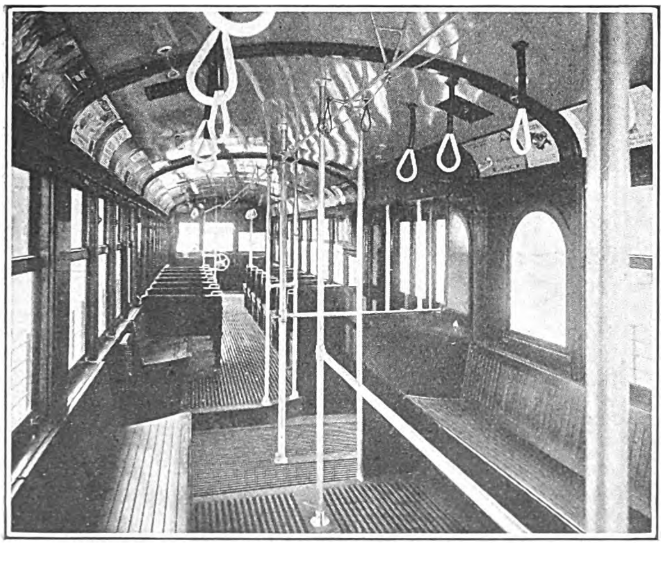
GENERAL DIMENSIONS

Length over all	49 ft. 5 in.
Length over dash	48 ft. 7 in.
Length of white compartment	25 ft. 5 in.
Length of colored compartment	14 ft. 0½ in.
Extreme width	8 ft. 5 in.
Height rail to trolley board	10 ft. $8\frac{11}{16}$ in.
Height from rail to side sill	2 ft. $4\frac{3}{16}$ in.
Window post centers	2 ft. 5 in.
Center door opening	5 ft. 0 in.
End door opening	2 ft. 5 in.
Truck centers	32 ft. 0 in.
Truck wheelbase	4 ft. 10 in.
Width of seat	36 in.
Width of aisle	25 in.
Height rail to first step, center	13 in.
Height first step to platform, center	10 in.
Height platform to car floor, center	7 in.
Ramp in platform, center	1 in.
Ramp in car floor, center	$1\frac{13}{16}$ in.
Height rail to step, front	$16\frac{9}{16}$ in.
Height step to car floor, front	14 in.
Ramp in car floor	2¼ in.

ment. In Birmingham a city ordinance requires the separation of the races inside the car and entering the car. To do this is made more difficult by the fact that the relative number of passengers of the two races varies greatly at times. Usually, however, the number of white passengers exceeds the number of colored passengers. For that reason the side door was placed toward the back, allowing approximately one-third of the seating capacity for the colored people and two-thirds for the white people.

All passengers enter by the side door. White passengers leave by the front door, and colored passengers by the same door through which they enter. The side doors are operated with National Pneumatic door engines, while the front door is manually operated by the motorman.

Normally the white section has 40 seats and the colored section has 22, but a more accurate adjustment of the seating capacity to suit the varying proportions of white and colored passengers is accomplished by means of stanchions and railings in the rear portion of the car. A swinging rail rotates around the vertical stanchion, located at *A* on the accompanying floor plan, and may be placed in any one of the three positions indicated as *B*, *C* or *D*. The amount of space available for colored passengers may, therefore, be varied from almost nothing to the entire rear third of the car. In the latter case this rail swings into a vertical position alongside the stanchions at *A*.



In This Car All Passengers Enter by Center Door. Colored Passengers Leave by Same Door and Whites by Front Door

The principal dimensions of this car are given in the accompanying table. Complete specifications were published in the ELECTRIC RAILWAY JOURNAL for March 8, 1924.

Many Benefits from Power Conservation

By F. HOLLINGSWORTH

Supevisor of Power Saving San Diego Electric Railway

ASIDE from a 10 per cent saving in the consumption of power, instructions and training given motormen relative to power conservation have proved to be among the greatest factors in raising the standard of platform efficiency.

The words "platform efficiency" cover a wide range of operation, including numerous important factors other than the saving of power. When a motorman becomes interested in saving power, he naturally takes an interest in the operation of car motors, learning more about the proper transmission of power than he would do otherwise. The knowledge so gained has a tendency largely to eliminate the abuse of motors and other parts of the equipment by allowing the car to coast when possible. This tends to keep down the temperature of motors, and at the same time eliminates many hard brake applications, thus prolonging the life of motors and brake equipment.

It is noticeable that a reckless operator is seldom low on power consumption. The same applies in regard to accidents, as 90 per cent of our operators who run low on power also show a marked decrease below the average in the number of accidents, indicating that safety and the saving of power go hand in hand. The prevention of accidents is a very important factor in the saving of dollars and cents, and since the training a motorman receives in the conservation of power has a tendency to make him a careful operator, the benefits are many and far reaching.

While it is very difficult to evaluate the saving which Economy meters bring to the mechanical department, nevertheless they are there and are very much worth while. We have no definite figures at hand showing the saving made, but it must be apparent to all who are in a position to know that proper judgment in the use of power and brake applications means fewer turn-ins on account of motor trouble, fewer brakeshoe replacements and less liability of flattened wheels.

New Traffic Control Successful in Philadelphia

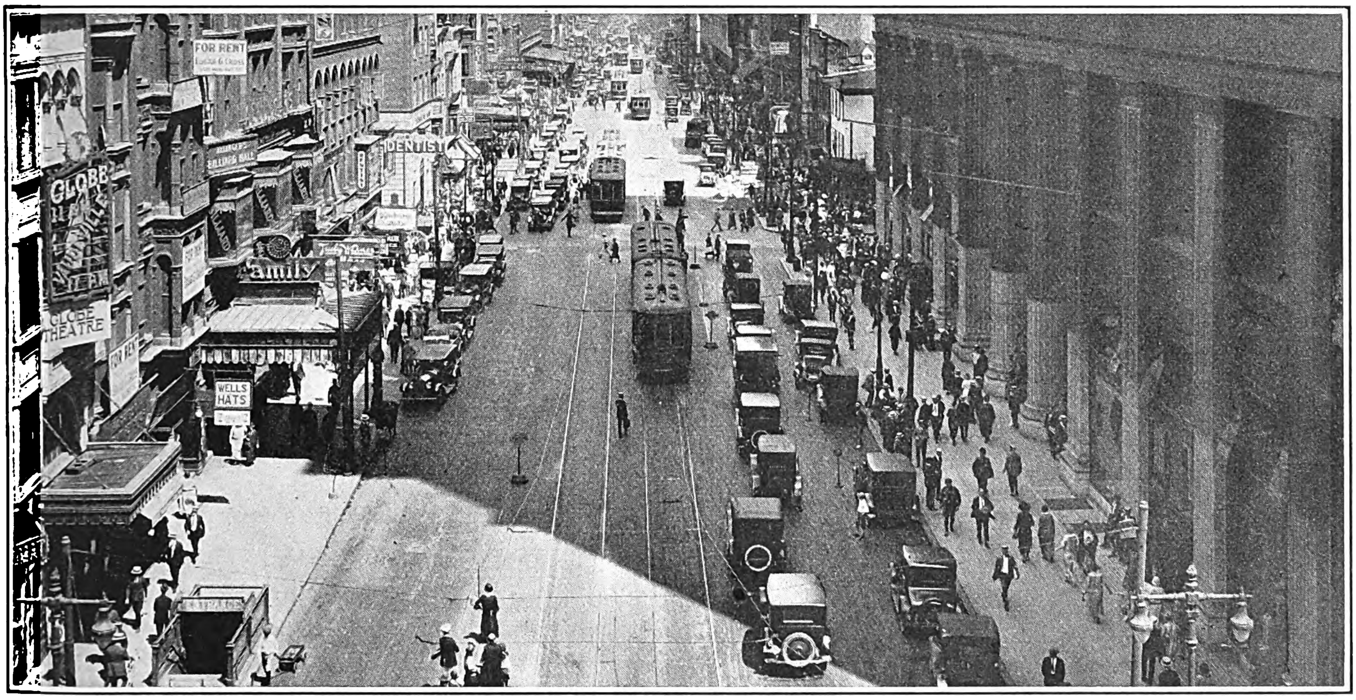
Installation of Master Signal Lights on the City Hall Tower Speeded Up Both Street Railway and Vehicular Movement, but Council Failed to Make Appropriations Necessary for Its Continuance

SYNCHRONIZATION of traffic movements on Market Street, Philadelphia, east and west of the city hall and on Broad Street north and south of that point was successfully accomplished for several weeks during May and June of this year by the installation of four master signals, one on each side of the city hall. This arrangement was part of a plan worked out by Gen. Smedley Butler, Director of Public Safety, to relieve congestion in the center of the city. While based in theory on the plan adopted some years ago for regulation of traffic on Fifth Avenue, New York City, the Philadelphia plan differed from it in a number of important details. The scheme was still in the experimental stage, but it had already resulted in an important increase in the speed of both street railway cars and other vehicles when the City Council brought it to an end on July 1, by failure to make necessary appropriations.

The plan called for the installation at a point about 350 ft. above the pavement of four 300,000,000-cp. searchlights, one on each face of the city hall tower. To obviate the necessity of those in the immediate vicinity of the city hall craning their necks to see the master light far up on the tower, a floodlight of 500,000 cp. was placed on each side of the building nearer the street level. Only one of the larger lights, that on the north side, was put in operation, but three more were contemplated. The four floodlights, however, were in place and were used for the regulation of traffic on the three other sides.

The master control signal consisted of only one light, orange red in color, and signals were given by turning on and off this single light. There were no other lights of different colors. This simple arrangement was possible because the primary function of the master light was to signal the traffic policemen rather than to signal the individual drivers of vehicles. When the red light was on, all traffic in both directions on the street in question stopped and the cross-streets were opened. As soon as the light went off cross-traffic had to stop and through traffic began to move.

An important feature of the plan was the latitude allowed to the individual policeman on the street. The time intervals of the master signal were necessarily based on the requirements of the heaviest cross-street. For that reason there were occasions at less important intersections when through traffic was stopped although no cross-traffic was waiting to move. In such cases, and in cases where there was waiting cross-traffic but no moving through traffic, policemen were allowed to exercise their discretion in order to speed up the movement.



Master Signal Lights on Philadelphia City Hall Keep Market Street Cars Evenly Spaced

Comparatively short time intervals were used on Market Street where the surface cars of the Philadelphia Rapid Transit Company operate. Somewhat longer intervals were used for the Broad Street signal. It was planned to regulate the searchlights by a mechanism made up of two disks. As the portions of these disks in relation to each other were changed, the lengths of time during which there would be light and no light were determined. These intervals could then be changed at will simply by removing the disks, and in fact it was the practice during the experiment to change the intervals several times during the course of the day to fit the needs of the situation at different hours.

The shortness of the intervals on Market Street was a contributing factor to the success of the scheme so far as it affected the street railway. Synchronized control resulted in keeping the cars separated into numerous small groups instead of allowing an accumulation of cars waiting to cross the busiest intersection as had been the case previously. Time intervals were arranged to fit the needs of this busiest point and the cars were "pushed across" as rapidly as before. Other cars, however, were held at intersections slightly less congested for a little longer time than might otherwise have been necessary, and were thereby prevented from creeping up and accumulating in large numbers at the most congested point. This phase of the operation of the new signal system is clearly shown in the accompanying illustration.

Under the new system, traffic movement was synchronized for 9 miles north and south on Broad Street and for 2 miles east and west on Market Street. As the Philadelphia Rapid Transit Company operates approximately 20,000 car trips through the downtown streets in the synchronized zone every day, extensive readjustment of car schedules was required. It is said that the westbound running time through the congested district on Market Street was reduced 10 minutes during the rush hour by the operation of the new plan.

General Butler explained the new system as being primarily a method adopted to avoid the necessity of installing expensive individual synchronized signals at many corners. To do that would require several years and cost $300,000. It was thought that the installation on the city hall tower of a single extremely powerful light which could be seen for miles would save the expense of many smaller lights at individual corners.

Several disadvantages to the plan as it developed during the trial resulted from the fact that the old hand semaphores which were formerly operated by traffic policemen at each intersection had been removed. It was difficult, therefore, for most of the traffic approaching an intersection to determine how to act. Only the drivers of those vehicles going in the direction of the city hall could see the master control light. Drivers going away from the city hall and drivers on the cross-streets could tell only by the actions of the policemen at the intersection what they were supposed to do. For this reason there was a certain amount of agitation for the restoration of the local semaphores.

Super-Highway Plan for Detroit Suburbs

These Highways Will Care for a Four-Track Rapid Transit Line and Express and Local Motor Ways

A SYSTEM of super-highways, each 204 ft. wide and extending from Detroit in all directions, has been recommended to the rapid transit commission of that city by its consulting engineer, Daniel L. Turner, and its engineer in charge, John P. Hallihan. The width of such a highway would be divided up as follows:

A central space of 84 ft. for the exclusive use of rapid transit lines on rails and the tree and shrub planting to screen it.

A 20-ft. roadway for express motor traffic on each side of the central space, making 40 ft.

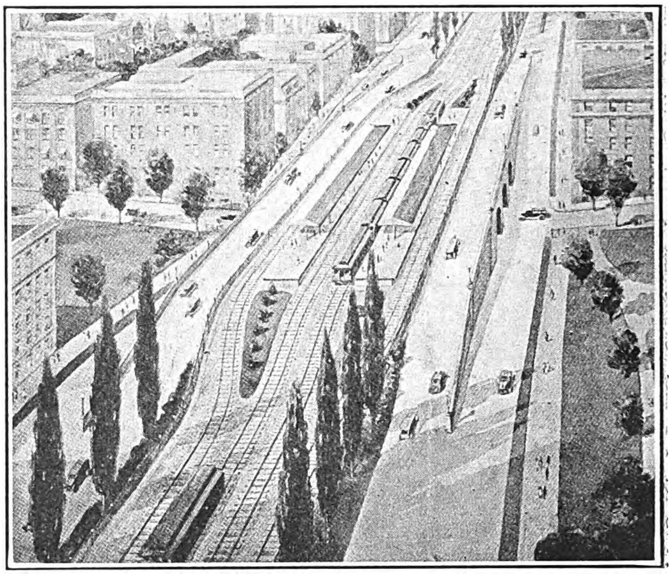
A 5-ft. planting or safety strip zone on the outside of the express roadway, making 10 ft.

A 20-ft. roadway for motor parking and local motor traffic on each side, making 40 ft.

A 15-ft. sidewalk on each side, making 30 ft.

The engineers point out that Detroit is growing rapidly and the present transportation arteries are becoming inadequate to accommodate the demand. In 1950 the city will probably extend out 11 miles from the present center, and in the year 2000 it will have a radius of 15 miles. It is for sections which are now almost entirely outside the city that the proposed super-highway system is designed. On such super-highway two-track rapid transit lines are recommended at the start. There should be sufficient width for ultimately four tracks.

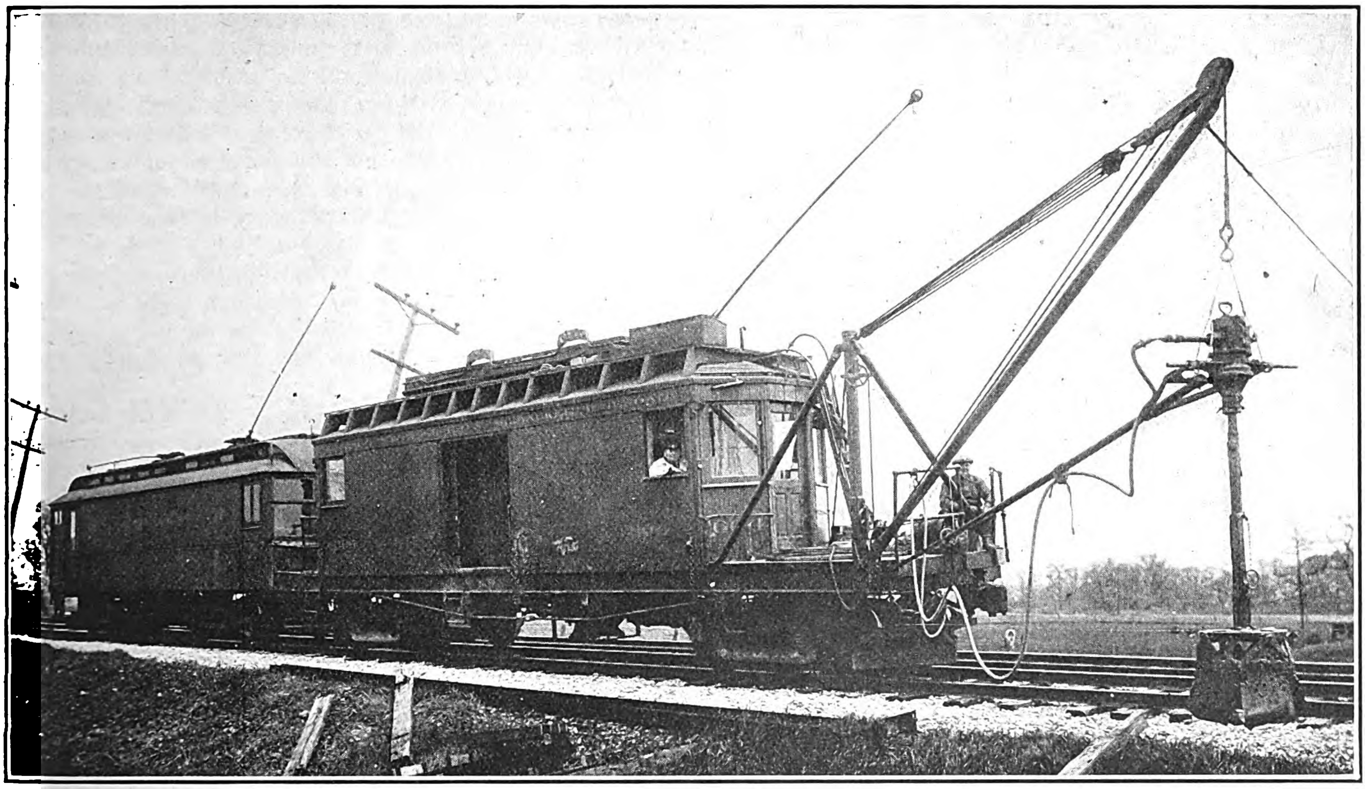
For the present built-up city sections, the cost of acquiring the necessary land for such wide highways would be prohibitive. Within these built-up sections the rapid transit lines would have to go underground, so as to cut the width of the thoroughfare to 120 ft., a width which will accommodate comfortably a four-track rapid transit line.



Arterial Highway for Greater Detroit

The report says that on Fifth Avenue, New York, where probably the densest traffic prevails, it has been estimated that the maximum capacity for a single traffic lane may be taken at about 600 motor vehicles per hour, with through traffic moving only about 42 minutes out of the hour. Similar observations made in Detroit on Woodward Avenue indicate a movement of about 440 vehicles per hour per traffic lane. But along one express motor traffic lane on a super-highway, with no crossing interferences and where the movement is continuous and at high speed, it has been conservatively estimated that 4,000 automobiles per traffic lane per hour can be accommodated. This is nearly seven times the capacity of a traffic lane of Fifth Avenue capacity and nearly ten times that of Woodward Avenue. This indicates what may be obtained by abolishing the intersection of cross-streets which, in the proposed plan, would pass under the highways at intervals of about ½ mile.

In submitting this report to Mayor Martin of Detroit, the rapid transit commission says that a special act will be necessary to make it legal as well as to provide means for financing the acquisition of the necessary land for the wide rights of way. The immediate need is not pressing, but the rights of way should be secured. Much of the property to be acquired is not within the present limits of Detroit, but the commission says it has received the utmost encouragement in its plan from the representatives of the various political subdivisions within the 15-mile circle of Detroit.



Apparatus Developed on the North Shore Line for Digging Holes. It May Be Converted Into a Machine for Setting Poles

North Shore Adopts Catenary Suspension

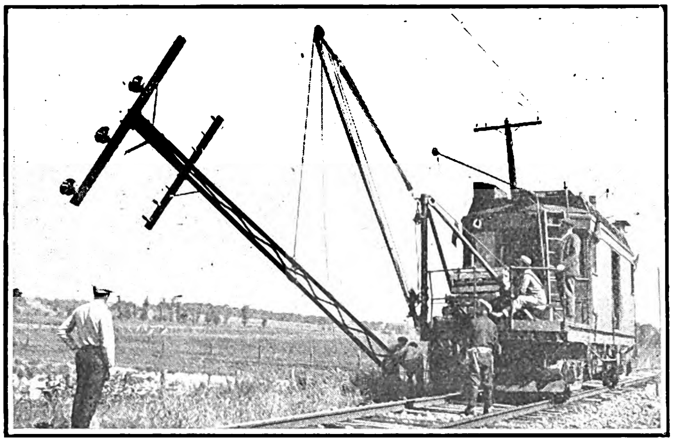
Each Power Line Pole Will Ultimately Be One Support of a Bridge—Use Made of Specially Rigged Line Car for Facilitating Work of Setting Steel Poles—Upon Completion of the Work Pantograph Trolleys Will Be Used on the Cars

BETWEEN Waukegan and Kenosha the Chicago, North Shore & Milwaukee Railroad is installing a 33,000-volt, 60-cycle, high-tension line, the poles of which will ultimately be used to support the catenary overhead trolley, which will become the standard type of conductor system for the road. This high-tension line became necessary in order to provide additional power facilities for the North Shore Line. It extends from a junction with the 132,000-volt line of the Public Service Company of Northern Illinois just north of Waukegan to the Kenosha automatic substation of the railroad. The three-phase line is carried on Bates 7-in. x 35-ft. poles, spaced at 180-ft. centers, set 10 ft. 8 in. from the center line of the southbound track. Each steel pole will be used as one support of a bridge from which will be suspended the catenary overhead construction. Following the completion of this type of overhead, the North Shore Line will adopt pantograph collectors.

In constructing this pole line, the electrical department of the North Shore Line made use of a specially rigged line car for digging the hole for the concrete foundation, and also for placing the pole on the foundation after it had set. Use was also made of a concrete mixer and train. The digging and hoisting outfit was developed by the electrical department and consists of an air-operated jib hoist from which is suspended an air-driven earth-boring tool. The construction of the hoist is particularly interesting inasmuch as it is collapsible and may be changed from one side of the car to the other. Steel tubing of two sizes is used for the compression members of the stationary part of the hoist, while a 1-in. rod with turnbuckle is used as the tension member. The main upright is of 5-in. tubing set in a socket at its lower end and braced by two 3-in. members at its upper end. These members are secured to the steel subframe of the car by bolts. The boom, which is a 20-ft. wood pole, is supported by block and tackle fastened to the top of the stationary upright. This tackle is hand operated.

The elevating hook is propelled by an air-driven winch mounted on the center line of the car near the end of the platform. A ¾-in. rope travels over three aligning pulleys on the stationary support and then over the pulley at the end of the boom. The air winch used is of 2,000 lb. capacity and was manufactured by the Sullivan Machinery Company. The air supply for operating the hoist is obtained from the car reservoirs, which are furnished with air from two 25-cu.ft. per minute air pumps. This outfit is capable of raising the pole into position with the crossarms, insulators and fittings all in place. These have been attached when the pole was on the ground by one man. If this was to be done after the pole had been set it would require two men on the pole and another on the ground.

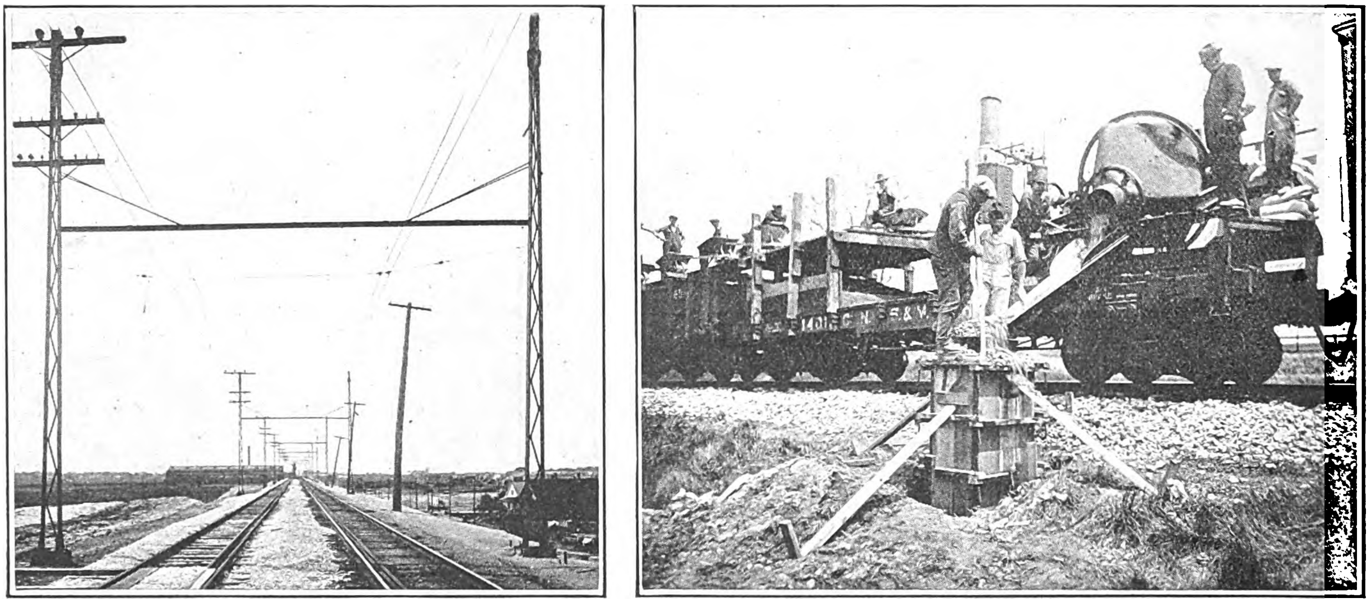
When the outfit is used for digging, the boring apparatus is suspended from the hoist. The boring tool resembles a small orange peel bucket with the sections so designed that they serve as cutting blades. The tool is raised from time to time and by opening the jaws or sections the contents is discharged. The propelling mechanism is an air drill of large capacity supplied with air from the car reservoir and pumps. The boring tool was developed by the Grunter Manufacturing Company and is capable of drilling a hole in soft clay 2 ft. in diameter to a depth of 6 ft. in approximately 6 minutes. A "Y" shaped brace or torsion arm connects the handles of the suspended air drill with the car, in order to prevent the apparatus rotating during the digging operation.


The Pole Is Raised Into Position with the Cross Arms and Insulators in Place

When the line car is moving the jib boom is lowered and fastened alongside the channel side frame of the car. The upright framework is left up if more work is to be done in the near future. However, the frame is of such construction that it may be easily dismantled and stored in one of the longitudinal compartments of the car. The members are also designed so that it is possible to place the hoist on either side of the car. The air winch, being in a central location, serves both positions.

After the hole has been dug it is trimmed up by hand so that it will accommodate the rectangular wooden form into which the concrete is poured. A train consisting of sand, gravel and cement supply cars, together with a flat car upon which is mounted a steam driven 1-yd. capacity concrete mixer, furnishes the concrete. The chute on the mixer is of sufficient length to reach to the center of the opening of the form. The foundation extends 6 ft. below the surface of the ground and is brought up so that its surface is level with the top of the rail. Imbedded in the concrete are four 1-in. bolts 6 ft. long to which the Bates pole is fastened.

After the second line of poles is set on the opposite side of the right-of-way they will be joined with the present poles by two light steel angle members placed 23 ft. above the rail. This bridge will carry the catenary construction. A short section of the road near Milwaukee has already been equipped with this type of overhead.


Left—Catenary Overhead Construction Will Be Carried on a Steel Bridge Which Connects Two 7-In. x 35-Ft. Bates Poles. This Will Ultimately Be the Standard Type of Construction on the North Shore Line. Right—Concrete for the Bates Pole Foundation Is Poured Directly Into the Form from the Mixer Mounted on a Flat Car Which Forms Part of the Concreting Train

The Readers' Forum

Taxicab, Bus and Railway Co-ordination

FORD, BACON & DAVIS, INC.
NEW YORK, July 7, 1924.

To the Editors:

The review of street railway traffic statistics for the period 1920 to 1923 inclusive in some of the cities in the United States having in excess of 100,000 population, written by J. F. Layng and published in your issue of June 28, shows in general a population increase with a decrease in revenue passengers carried. Of the 46 cities whose figures for 1920 and 1923 are listed, 33 show decreases in revenue passengers, and of the 19 cities between 100,000 and 250,000 population all but 3 show decreases in revenue passengers between 1920 and 1923. This decline in rail traffic is principally due to the operation of privately owned automobiles, and no one can now predict the end. The wholesale value of passenger automobiles and parts manufactured in the United States in 1922 was about $2,975,000,000. It is now probably the first industry in the country in value of products produced per year.

Although electric railway traffic is going backward, a study of transportation records, as I pointed out about a year ago in your paper,* shows that the passenger miles traveled per capita by the population of the continental United States in all conveyances is rapidly increasing. This suggests that the electric railway industry should take a page from the book of the manufactured gas industry. Manufactured gas was founded as a lighting utility and flourished as such up to 1880. With the advent of the electric light it looked as if the gas industry were doomed, but the development of the use of gas for fuel not only saved the situation but enabled gas companies to reach heights that had never before been anticipated.

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*See article by Mr. Davis in ELECTRIC RAILWAY JOURNAL, June 23, 1923, page 1035.—EDS.

Street railway companies were not organized simply to engage in a part of the street transportation business, but to carry *en masse* any passengers seeking public conveyances from any place to any place. They have had this obligation from the beginning and now have it.

Fewer advances have been made in this business during the twenty years just ended than have occurred in almost any of our other basic industries. Owners have not seemed to realize that the laws of change, growth and extension prevail here as elsewhere. Imagine the continuance of the hansom cab of 1900 in the street-carrying business, in competition with the taxicab of today.

Transportation by water, roadway, rail and air is quite analogous in requirements and potential completeness to that in the blood circulating system. We have the trunk line arteries, the veins, the arterial and venous branches leading to special distribution centers and, most important, the capillary routes reaching the isolated individual points of destination.

In the early rudimentary organization of transportation a capillary system was not of great importance, but with the growth of the cities and city areas and changes in residence requirements individual rapid transportation to the ultimate location of the passenger has become a requirement. This necessitates the taxicab and bus service.

Rail roadways, owing to inflexibility in use, have from the first been lacking in special advantages for individual transportation and delivery. In not adopting other means for supplementing and extending this service to the extent of the complete requirements in delivery of the individual passenger, the industry has failed to grasp its opportunity as a universal street carrier.

In a general review made by the writer of the transportation facilities and requirements of 50 principal cities in the United States, each having a population in excess of 100,000, it appears that there should be in a co-ordinated street transportation service of taxicabs, buses and street cars, depending upon the type and size of city, approximately the following:

One 5-passenger taxicab, of present type, maximum capacity, to each 600 of population.

One 68-passenger bus of double-deck type, maximum capacity or equivalent to each 2,500 of population.

One double-truck 44-seat passenger express motor street car with trailers for peak periods or equivalent to each 1,000 of population.

The cities in question have a combined population (1920 census) of about 30,000,000, revenue street car passengers per annum of 7,000,000,000, transfer passengers 2,500,000,000 and revenue car-miles of 1,000,000,000.

Based upon a population of 30,000,000, the potential number of vehicles for the immediate future in this proposed co-ordinated service in the cities considered would be: Motor passenger cars, 30,000 with trailers; buses, 12,000, and taxicabs, 50,000.

The relative importance of the automobile and electric street railway industries is shown by the amount of money invested in each. The total present value of electric street railway property in the United States after all previous expenditures is about $6,000,000,000, whereas the yearly expenditure for automobiles and parts is approximately $2,500,000,000.

The comparative extent of service of passenger vehicles of each type is shown by the passenger miles per capita per annum of each. This, in 1922, was about as follows:

Steam railroads	427
Street railways	364
Taxicabs, buses and private passenger automobiles	786
Miscellaneous	46
Total	1,623

The ratios just given apply to the present relative status of the street transportation business. For the future, if present tendencies continue, there will be a marked readjustment as between roadway and rail vehicles.

Again I want to emphasize that the original purpose of the organization of street railway companies was not to engage in a part only of the street transportation business, but to carry practically all passengers seeking public conveyances. They should now, through new and old means of street transportation, regain their former position.

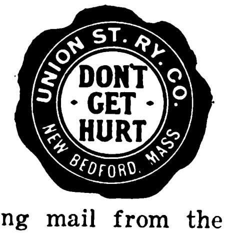
The present electric railway company in any city should not be content to undertake only transportation there by rail. The companies should, through new and old means, carry all passengers seeking public conveyances. As pointed out in the article in your issue of June 23, 1923, already mentioned, this would mean for the present electric railway companies:

1. The inauguration of a supplemental taxicab and bus operation, co-ordinated with the operation of the various lines of an express street car service.
2. The remodeling or supplementing of their roadways and equipment for express service.
3. The development of public sentiment in cities so that vehicular traffic on street-railway tracks will be lessened and limited through effective traffic regulations, particularly in congested areas, enabling reasonably high speeds by the street railway cars for the proper accommodation of the public.
4. The reorganization of their plans of operation.

This combination may save the situation for the taxicab, bus and street car services, which are at present, under independent operation, often triplicating a service for which they are not fitted and, through defective organization and resources, failing to earn a reasonable return on the respective investments.

GEORGE H. DAVIS.

Gaudy Seal Preaches Safety



A BRIGHT red and white sticker in the shape of a seal is used by the Union Street Railway, New Bedford, on outgoing mail. The words "Don't Get Hurt" are prominent in the design and the safety first idea is thus brought prominently to the attention of all local people receiving mail from the railway. The gaudy color of this poster stands out strongly in contrast to the color of the envelope, and attracts attention.

Association News & Discussions

Operating Problems with Electrification*

Various Methods and Practices Used in Handling Long Freight Trains on Heavy Grades with Electric Operation Were Reported on at the Annual Meeting of the American Railway Association

THE reports of a sub-committee appended to the report of the committee on electric rolling stock presented at the annual convention of the American Railway Association, Division 5, Mechanical, at Atlantic City, June 14, gave some information on the operating problems encountered in handling long freight trains under electric operation on heavy grades. The information presented was derived from the experiences of railroads in the United States on which electric traction in mountain territory has been in use for several years.

In each case the immediate results have been increased tonnage per train and increased train speed. These two things, whether brought about through the use of more powerful steam engines or with electric locomotives, produce certain problems. Communication between head and rear ends of trains will be more difficult and the slack action will be more pronounced. As a matter of fact, these features are more easily overcome in the case of electrification than under steam operation because electric locomotives produce a more uniform rate of speed and are subject to closer control.

In former years, when operating double-head or with pusher, it was the universal practice to signal by means of whistle blasts, but with the increase of train lengths this method became more and more unsatisfactory. The method now used in electrified territories of signaling with slack action through the train, produces a much smoother train operation.

There is no difficulty involved nor is there a serious burden placed on the operator in the control of trains on descending grades through regenerative braking; in fact, the operator's task is greatly lessened, for it is merely a matter of proper manipulation of his control, and he is always in possession of an additional factor of safety from the air brakes with a fully charged train line. The only existing problem is that of impressing upon the motormen the necessity for the same care to insure air brake operation as with steam operation.

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY

The Chicago, Milwaukee & St. Paul has 647 miles of main line electrification. Two territories are involved, the first, which embraces the Rocky Mountain and Missoula Divisions, and the second, embracing the Coast Division. These two sections of electrification include practically all of the mountain grades of this railroad.

Helper locomotives are used on eastbound tonnage trains out of Cedar Falls, Kittitas, Avery and Butte yards and on westbound tonnage trains out of Piedmont, Haugan and Beverly of 2,500 tons. Trains are handled with one locomotive on the 1 per cent grade west bound out of Harlowton, and the train is doubled over the short 2 per cent grade between Bruno and Loweth.

In the operation of helpers, the helper locomotive is placed in the center of the train to equalize the tonnage as nearly as possible. This practice has been found desirable to eliminate excessive drawbar strain and to overcome derailments from the tendency of buckling the train.

The handling of tonnage trains on grades and curves with locomotives placed at head and middle of train has been satisfactorily accomplished by readily interpreted signals transmitted through the train. When starting a train, the lead locomotive begins to pull and the engineman of the second locomotive, when he perceives the slack going out, applies power to his locomotive, thus starting the rear half of the train and accelerating at approximately the same rate as the lead locomotive. If the electric pusher were to push the train up onto the lead locomotive and hold the train until the lead locomotive was ready to proceed, as is customary in steam operation, the electric equipment on the helper would be subjected to an unnecessarily and probably injurious overload.

In the electrified territories, there are numerous tunnels and many curves, making it impractical to depend upon hand or light signals entirely, therefore the following method was devised for testing brakes at the summit of grades before making the descent.

When approaching the summit of the grade, the train is permitted to stop of its own accord and the engineer on the leading engine makes a 10 to 12 lb. reduction of brake pipe pressure; this is noted by the trainman in the caboose, who in turn increases this brake-pipe reduction by gradually opening the brake-pipe valve in the caboose until a full service application is made, or a total of 20 or 25 lb. This gives assurance to all concerned that the brakes may be applied from either end of the train and are operative throughout.

The most necessary task in successfully operating freight trains is the control of the train slack in or out slowly and without severe shock. A correct understanding of this feature of handling and ability to control accordingly results in successful operation.

The time element is an all important element, and the control operations should not be hurried. This applies in starting, stopping or changing from motor action to regeneration, or vice versa. To stop freight trains successfully there should be no change in train slack during the time train brakes are applied as the slack should be run in before the train brakes are applied and engineer's brake valve manipulated in a manner that will result in slack remaining run in until the train is brought to a stop.

The current required to start a tonnage train, particularly on heavy grades, is high and the train should be brought up to speed as quickly as practicable (within 15 to 20 minutes), in order to prevent damage to the electrical apparatus, especially the resistance grids. It is also more economical to utilize the electrical energy for accelerating the train to the free running speed than to dissipate it in the resistance through which the current must pass while the controller is on the intermediate notches.

Special rules and instructions have been developed with the adoption of electric traction, many of which have resulted in better train operation.

When starting regenerative braking some care is necessary on the part of the engineman to avoid severe shock, due to train slack. The most practical and safe method of starting regeneration is to make a train brake application, and while this is effective make the adjustment of levers so that regenerative braking will start slowly to be effective, being governed by the speed and indication on ammeters as to the proper time to release the train brakes. The retaining valves then gradually leaking off their holding effect permits, regenerative braking to be gradually increased to full effect without undue shock to train and without causing line surges in trolley voltage.

Overheated and cracked wheels are almost unknown in the electric operated territory, trains making a continuous and unvarying movement from summit to foot of mountain grades.

NORFOLK & WESTERN RAILWAY

The electric operation of long freight trains on the Norfolk & Western consists principally of handling heavy coal trains at comparatively slow speeds over what is known as the Elkhorn Grade, crossing the Allegheny Mountains in McDowell County, W. Va. The service consists in hauling empties westbound from Bluefield to the coal fields, delivering them to the mines and hauling loads back over the eastbound grade and on to Bluefield, the eastern terminus of the electrification.

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*Abstract of report presented at the convention of the Mechanical Division of the American Railway Association, Atlantic City, N. J., June 14, 1924.

If a train of empties is to be delivered to the mines located on the descending grades between Coaldale and Northfork, W. Va., it is operated down the hill at a slower speed, approximately 15 m.p.h. regenerating. This allows the slack in the train to accumulate and bunch against the locomotive. Under such operation it is an easy matter to stop the train by use of the straight air brakes on the locomotive, regeneration ceasing after dropping below 14 miles per hour. In this way undesirable shocks and surges in the train are materially reduced. If a portion of the train is to be taken to Northfork or beyond, the speed from the last set off point, continuing westbound, is held at approximately 20 to 25 m.p.h. regenerating.

Frequently electric locomotives are used to double-head time freight westbound trains hauled by Mallet locomotives, the latter engines making the entire division run. In this case the electric locomotive is placed ahead of the steam locomotive, regenerating on the grade, holding the Mallet engine and train at approximately 20 to 25 m.p.h.

Under normal operation, there are, approximately, 2,500 tons of westbound loads assembled daily at Flat Top yard from nearby operations. These loads are picked up currently and handled by the electric locomotives in trains of empties, and are handled to the western terminus of the electrification.

OPERATION WITH HELPER LOCOMOTIVE

In starting it is customary for the lead locomotive to drop back against the train, bunching the slack against the pusher locomotive. As soon as this bunching of slack is felt at the pusher locomotive the engineman on the pusher begins to apply power, steadily increasing it until he has maximum accelerating current on the motors. The engineman on the lead locomotive, to whom this starting impulse is readily felt, reverses his locomotive and commences to pull. The lead locomotive thus takes up the slack, picking up the train, car by car, until the load has been sufficiently balanced between the lead and the pusher locomotive to accomplish an easy moving off of the train.

The locomotives are equipped with relays, which limit the current applied to the motors during acceleration and the engineman regulates the rheostats so that the current is kept up to this limit.

Approaching a stop signal, the engineman of the lead electric locomotive reduces speed, which results in the load building up on the pusher locomotive, and this is an indication to the engineman on the pusher that the engineman on the lead locomotive desires to stop and acts accordingly, by gradually reducing the power and speed developed by the pusher. In this way the pusher locomotive keeps the train slack bunched, which is in the interest of making a better start.

When the train has reached the summit and begins to descend the grade the load on the lead locomotive gradually decreases as the train passes over the summit. When approximately half of the train is over the summit the speed gradually increases until it reaches about 15 m.p.h., when regeneration comes into action. The uncoupling lever between the caboose and the pusher locomotive has by this time been lifted and as the train passes over the crest of the grade it leaves the pusher. The pusher drops back, crosses over to the westbound track and returns to the foot of the grade.

Under certain conditions, when the rails are wet and slippery, it is sometimes the practice to bring the air brakes into action while the locomotive is still braking by regeneration. When this occurs, the engineman makes a reduction of approximately 5 lb. in brake pipe pressure, which applies the brakes on the train, at the same time keeping them released on the locomotive.

BALTIMORE & OHIO RAILROAD

That portion of the Baltimore & Ohio Railroad which is electrified lies within the city limits of Baltimore and is a part of the so-called Belt Line, extending from Camden Station on the west to Waverly interlocking tower on the east, a distance of 3.75 miles. There are eight tunnels in this zone, together amounting to 48 per cent of the total distance, the longest tunnel, which is between Camden Station and Mount Royal Station, being 7,300 ft. in length. This part of the zone through which trains are handled by electric locomotives is entirely on a grade, the difference in elevation amounting to 150 ft. which gives an average through grade of 0.9 per cent, the ruling grade being 1.52 per cent and the maximum curvature 10 deg., 16 minutes.

The electric service in this territory is very similar to steam helper locomotive service, except that the road steam locomotives they might be helping furnish no assistance.

The present maximum rating for freight trains handled over the Belt Line is about 2,650 adjusted tons or approximately 2,300 actual tons, excluding steam locomotive, weighing approximately 255 tons.

The ruling grade in the zone is 1.52 per cent eastbound, while that of the remainder of the steam locomotive division to Philadelphia is but 0.8 per cent. This requires the electric locomotives to develop practically twice the tractive effort of the steam locomotives.

The traffic at present consists in the handling of about 33 trains eastbound daily. Of these there are probably seven through passenger trains for the east and one or two locals, the remainder being eastbound freight trains. On special occasions a considerably greater number of eastbound trains are handled within a 24-hour period.

A.S.T.M. Holds Annual Meeting

Preservation of Timber, Corrosion of Iron and Steel, Varnishes and Insulating Materials and Concrete Were Among Topics of Interest to Electric Railway Men

THE American Society for Testing Materials held its twenty-seventh annual meeting at the Chalfonte-Haddon Hall, Atlantic City, N. J., June 24-27. The total registration this year was 758, which was slightly less than last year. The following officers were elected: President, F. M. Farmer, chief engineer Electrical Testing Laboratories, New York, N. Y. Vice-President, J. H. Gibboney, chemist Norfolk & Western Railroad, Roanoke, Va. Members of Executive Committee, William Campbell, A. E. Jury, Anson Marston and J. A. Mathews.

REPORT ON TIMBER

The committee on timber had continued its investigations during the past year, which were conducted under the auspices of the Central Committee on Lumber Standards. In reviewing the recommendations made at the Washington conference, these were indorsed as marking material progress in standardization. The committee proposes to use some of the basic principles agreed on in connection with future developments in proposing standard specifications for timbers.

The report of the sub-committee on timber preservatives included a proposed tentative method of chemical analysis of zinc chloride and a revision of the standard methods of sampling and analysis of creosote oil. This latter revision involves the float test of residue, a revision of the specifications for distillation thermometers in accordance with the recommendations of committee on thermometers and another regarding distillation vessels for creosote oil and other high boiling materials.

The sub-committee on methods of testing wood has been considering revision of the tentative method of testing small clear specimens of timber and the preparation of a new procedure for conducting static tests of timber in structural sizes.

CORROSION OF IRON AND STEEL

The sub-committee on inspection of the Fort Sheridan, Pittsburgh, and Annapolis tests reported additional failures at Fort Sheridan among the non-copper bearing groups of sheets, with no failures in any of the copper-bearing groups. The first failures at Annapolis were recorded at the October, 1923, inspection, the sheets failing being in the same non-copper bearing groups as failed first at Pittsburgh and at Fort Sheridan.

The sub-committee on total submersion tests reported the failure of all of the light gage sheets at the Washington location and about 60 per cent of the light-gage sheets at Annapolis. A comparison of the failures in the light-gage sheets in the Calumet mine test completed in 1921, and the corresponding groups of sheets in the Washington test show the average life of the sheets immersed in water from the city of Washington supply to be about eighteen and a half times longer than the corresponding sheets immersed in mine water. The tests thus far do not indicate any outstanding superiority for any one type of metal, and the presence of copper added to the various types of metal does not increase its resistance to corrosion, when the samples are totally and continually submerged in running water of acid or alkaline reaction.

The sub-committee on tests of metallic coatings reported plans for conducting comprehensive exposure tests on metallic products, coated by eight recognized commercial processes. The tests are to be located at four different points representing as many various conditions.

Preservative Coatings for Structural Materials

The committee on preservative coatings for structural materials reported that a new sub-committee on shellac has been formed. The sub-committee on linseed oil has carried out a considerable amount of experimental work during the past year, but has not as yet proposed any standard recommendation. Tentative methods of routine analysis of titanium pigments and a tentative method of tests for coarse particles in paint pigments were recommended. The sub-committee on methods of testing varnish also recommended that the tentative method of testing oleo-resinous varnishes be advanced to a standard. Specifications for lithopone, lamp black, bone black, chrome yellow and chrome green were proposed for consideration.

Electrical Insulating Materials

In addition to a further study of existing standards and tentative standards, the committee on electrical insulating materials has formulated additional methods and investigations for various phases of the general subject of insulation. A proposed method of testing sheet and tape insulating materials for dielectric strength was included in the report and also a method for testing untreated insulating paper.

Petroleum Products and Lubricants

The committee on petroleum products and lubricants recommended certain revisions in methods of testing grease and the viscosity of petroleum products and lubricants. Revision in methods of testing gasoline, naphtha, kerosene and similar products consisted of changes in the specifications for the high distillation thermometers.

Concrete

A paper by Cloyd M. Chapman gave results of an investigation conducted by Dwight P. Robinson & Company into the causes of cracking of the wearing surface of concrete floors. The cracking appears to be due to unusual contraction of the top coat. Shrinkage tests on mortar and concrete specimens showed that the aggregate used in 1:2 mortar and 1:2:4 concrete may exert a decided influence upon the amount of shrinkage which takes place when the mortar or concrete hardens and dries out. A paper by Duff A. Abrams on the use of calcium chloride in concrete for attaining rapid set and early strength gave the results of some investigations. The conclusion reached was that in the use of calcium chloride no advantage is gained for percentages of the commercial product greater than 2 or 3 per cent, corresponding to a chlorine content of 1 to $1\frac{1}{2}$ per cent. This amount when used in mixes of about 1:5 and in consistencies suitable for building construction showed an increase in strength of from 100 to 200 lb. per square inch. For richer mixtures and drier consistencies the strength increase was greater and for leaner mixtures and wetter concrete it was less.

Manganese Steel

A paper by John H. Hall and G. R. Hanks gave the average composition of manganese steel with brief comments on the proper limits for the different metalloids, together with a brief summary of steel-making methods employed in foundries making manganese steel. A summary was included on the physical properties, such as tension and bending tests, shear, hardness, resistance to wear, heat and electrical conductivity.

Fire Hose Coupling Threads Standardized

THE American Engineering Standards Committee announces approval of American national screw threads for fire hose couplings. This standard was submitted under the leadership of the National Board of Fire Underwriters, the National Fire Protection Association, the American Society of Mechanical Engineers and the American Water Works Association. It marks for the first time a national agreement on tolerances or limits of accuracy necessary to secure interchangeability in manufacture.

Wisconsin Association Midsummer Meeting

THE date for the midsummer meeting of the railway section of the Wisconsin Utilities Association has been set for Aug. 14 and 15 at the new Lorraine Hotel, Madison.

Mid-West Claim Agents' Association

THE fourth annual convention of the Mid-West Claim Agents' Association will be held at the Hotel Fort Des Moines, Des Moines, Iowa, July 18 and 19. The program follows:

Friday, 10 A. M.

Address of welcome by Honorable Carl M. Garver, Mayor Des Moines, Iowa.

President's address, by Trevor C. Neilson, claim agent, East St. Louis & Suburban Railway.

Report of secretary-treasurer, by O. L. Borgquist, chief clerk claim and legal departments, Kansas City Railways.

"The Rule of Res Gestæ," by Hon. Herman F. Zeuch, judge municipal courts, Des Moines, Iowa.

"Enlisting Co-operation in the Claim Department," by F. G. Kelly, superintendent railway and claim department, Fort Smith Light & Traction Company.

Friday, 2 P. M.

"Damage Claims," by F. W. Stockmar, St. Louis, manager Railway Audit & Inspection Company.

"Suggestions for Relief of Some of the Claim Agents' Problems," by W. E. Robinson, claim agent Cincinnati Traction Company.

"A Co-operation Plan for the Reduction of Accident Cost," by C. B. Proctor, claim agent Memphis Street Railway.

Saturday, 9 A. M.

Paper by F. R. Harrington, claim agent St. Joseph (Mo.) Railway, Light, Heat & Power Company.

"Preparation of Releases," by E. A. Funke, claim agent Lincoln Traction Company.

"Men," by R. S. Mahan, claim agent Kansas City, Clay County & St. Joseph Railway.

Election of officers.

Recent Improvements in Special Trackwork*

By P. Lo Balbo

General Manager Piedmont Steam Tramway Company, Italy

THE topic of special trackwork naturally divides itself into two parts, namely (1) the manufacture of parts and (2) their design.

One of the problems connected with electric railway frogs is means for reducing the blow which occurs when the wheel passes off the point of the frog and before the tread of the wheel reaches a support on the side bearing or wing of the frog. Obviously, with wide tread wheels there would be no trouble of this kind except at right angles or at angles approaching 90 deg. With the narrow tread wheels used on electric cars, however, a flange bearing in the groove is necessary. The Lille-Roubaix-Tourcoing Railway reports the use of some manganese steel frogs in which this flange bearing has kept its form since 1913. In others of similar type owned by the company this flange bearing has worn down, and an attempt has been made to build it up with the electric arc, but this method leaves a rough surface. The only way of smoothing a flange bearing renewed in this way, and thus reduce the noise, is to grind the welded portion with a wheel of the proper shape.

In its built-up Trail special work, the company used in early designs a hardened steel flange bearing held in place by screws, but in later designs these bearings have been put in as inset work.

Replies to the data sheet show that all types of special work are used. In general, preference is given to manganese steel, except for the cost, which seems to be higher than that in America. This has restricted its use considerably, and outside of England and France built-up special work is common.

One of the considerable factors in the cost of this special work is the large variety of patterns used. This suggests that economy can be secured through greater standardization.

This is primarily a question of standardization. The French Railway Association has attempted to establish certain standards and at the meeting on Dec. 20, 1923, the committee on tramways recommended four standard switches, namely, of 20 m., 30 m., 50 m. and 60 m. radii, and three frogs, namely with angles of $10\frac{1}{2}$ deg. 11 deg. and 13 deg. Other standards set have been by the American Railway Association and the American Railway

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*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

Engineering Association. Standards along this line are greatly to be desired and should not retard progress in the art if they are frequently revised to embody the results of experience and to care for newly developed needs.

Central Association Program

THE program for the Midsummer Meeting of the Central Electric Railway Association, to be held July 17 and 18 at the Breakers, Cedar Point, Ohio, will consist of morning sessions both days, devoted to general subjects, while the afternoon session on July 17 will be under the direction of the Engineering Council. The association dinner will be given the same evening.

There will be a meeting of the executive committee Thursday morning, after which the regular session will begin at 9:30 o'clock, Eastern standard time. Following is the program:

Morning Session, July 17, 9:30 a.m.

President's address.
Report of the secretary and treasurer.
Appointment of convention committees.
Committee reports.
"Constructive Publicity and What May Be Accomplished By It," by W. H. Boyce, commercial manager Pittsburgh Railways.
"What Are We Doing to Increase Our Passenger Business," by F. W. Shappert, traffic manager Chicago, North Shore & Milwaukee Electric Railroad.
"What Are We Doing to Increase Our Freight Business," by L. M. Brown, superintendent Interstate Public Service Company.
"What Are We Doing to Increase Our Light and Power Business," by J. C. Matthieu, commercial engineer Dayton Power & Light Company.
"Forestry Conservation," by David L. Goodwill, former chairman forestry policy committee United States Chamber of Commerce.

Afternoon Session, Engineering Council, 2 p.m.

"The Purpose, the Opportunities and the Future Possibilities of the Engineering Council," by K. A. Simmon, manager light traction division, Westinghouse Electric & Manufacturing Company.
"A Discussion of Some of the Latest Developments in High-Tension Insulation," by Arthur O. Austin, chief engineer and factory manager Ohio Insulator Company.
"Rolled Steel Wheels," a motion picture. Discussion by Lawford Fry, metallurgical engineer Standard Steel Works Company.
Reports of committees.
General business.

Morning Session, July 18, 10 a.m.

"What Does the Interurban Electric Railway Mean to the Economic Development of the Central West," by Joseph A. McGowan, secretary-treasurer Terre Haute, Indianapolis & Eastern Traction Company.
"The Financial Structure of the Electric Transportation Industry," by J. P. Harris, vice-president Union Trust Company, Cleveland, Ohio.

New England Outing

THE annual outing of the New England Street Railway Club will be held this year at Norumbega Park, Auburndale, Mass., on Thursday, July 24. A full program to interest all members of the family has been arranged. Things begin to happen at 10 a.m. and continue all day, ending with a show at the theater in the evening. The afternoon program will include the annual costume baseball game between the street railway men and supply men.

Standardizing Copper Wire

SPECIFICATIONS for copper wire, including hard drawn, medium hard drawn and tinned, soft or annealed wire, have been submitted to the American Engineering Standards Committee by the American Society for Testing Materials. The specifications include requirements for purity of material, diameter, gaging, finish, tensile strength and elongation, specific gravity, electric conductivity, chemical test methods, packing and inspection.

These specifications will be considered by a special committee of representatives of the principal engineering and commercial societies interested in copper wire. The representative of the American Electric Railway Association is G. C. Hecker.

American Association News

Itinerary of Committee on Foreign Operation

THE special committee of the American Association on foreign operation, consisting of Executive Secretary James W. Welsh, President Harley A. Johnson of the Engineering Association and Harry L. Brown, Editor ELECTRIC RAILWAY JOURNAL, sailed from New York, Wednesday, July 9, on the *Aquitania*. The members of the committee expect to arrive in Southampton, England, July 14 or 15. They will make their headquarters at London for approximately two weeks, visiting points of interest in that city and taking short trips out from London to reach the nearby cities. During the first week in August they expect to visit some of the northern cities in Great Britain and Scotland, such as Newcastle, Liverpool, Manchester, Edinburgh and Glasgow. Following this, they will cross the channel to France, and will proceed immediately to Paris. On their arrival at Paris they will visit the various electric railway properties in that city and some of the major steam railroad electrifications in Switzerland, the electrification of the Midi Railway in southern France and the electrification of the Paris-Orleans Railroad. They expect to sail from Cherbourg on the steamship *Berengaria* Aug. 23, which is due to reach New York on Aug. 29.

Entertainment

THE entertainment committee of the American Association held a meeting at association headquarters on July 8 to discuss plans for entertainment at the October convention. Members present were: F. H. Gale, chairman; M. A. Oberlander, George A. Barnes, S. J. Cotsworth, John Craig, George Rowland, L. W. Shugg, George R. Lyman, A. A. Hale, F. L. Butler, Harry L. Brown and J. W. Welsh.

William Graham of J. J. Habermehl Sons, decorators, presented sketches showing a proposed treatment for the balcony spaces and other decorations in the ballroom, so as to harmonize the decorative scheme with the general entertainment features to be provided.

The arrangement of the entertainment features to be provided during the convention was discussed and the following tentative program was laid out: (1) An opening dance or reception to be held in the ballroom Monday night; (2) a general session with special musical features to be followed by dancing, Tuesday night; (3) a carnival with special features and dancing, to be held in the ballroom on Wednesday night; (4) a grand ball to be held in the ballroom on Thursday night.

Mr. Gale was appointed chairman of a sub-committee in charge of the opening dance or reception, and it was agreed that the entire committee would assist him in preparing for this function. Mr. Hale was appointed chairman of a sub-committee to arrange for the carnival and for special features for the grand ball. Mr. Craig was appointed to assist Mr. Hale in this work. Mr. Cotsworth was appointed chairman of a sub-committee in charge of music and Mr. Barnes of a sub-committee to arrange for golf.

The sub-committee to make arrangements for the grand ball will be headed by Mr. Palmer, while John A. Dewhurst will head a sub-committee to provide for entertainment features for the ladies.

Special Reports Available

THE Bureau of Information and Service of the American Electric Railway Association has prepared the following reports, which are available to member companies in good standing upon request:

Traffic Ratios, Part II: Interurban Lines.—About 125 interurban companies are included and there is shown for each company the average speed, revenue passengers per car mile, per mile of track and per car operated, operating ratio, revenue per mile of track, passengers per car mile, operating income per mile of track and other ratios similar to those given for the city lines in compilation issued June 1.

Attitude of State Regulatory Commissions Toward Motor Bus Competition with Railways.—This is a revision of the compilation of the same name issued Sept. 1, 1923, in which a number of changes have been made in the light of recent decisions in the development of the regulation of motor vehicles. It comprises a study of the development of the policies of the various state commissions in regard to the issuance of certificates of public convenience and necessity to motor bus operators.

Trend or Material Prices.—New edition of the association's compilation bringing down to date the trend of prices of materials used by electric railways as furnished by manufacturers.

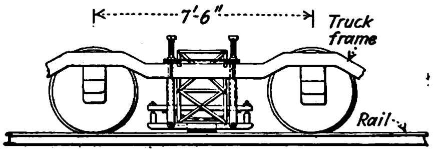
Motor Bus Operating Reports.—Gives figures on results of operation by different companies including the Washington Rapid Transit Company in Washington, D. C., the Sheffield Corporation Tramways, England, and others.

In addition to the above supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared, bringing them down to date.

Maintenance of Equipment

Scrubber Keeps Rails Smooth

AN UNUSUAL method of removing rail corrugation and of smoothing down new rail joints has been developed by J. H. Haylow, chief engineer of the Memphis Street Railway, Memphis, Tenn. Carborundum bricks mounted on springs attached to the truck frames of a railway car press against the rails.



Machine Used at Memphis for Smoothing Corrugated Rail

Corrugations are removed by operating the car back and forth over the rough spots.

This apparatus, the general appearance of which is shown in an accompanying illustration, is mounted on a single-truck work car equipped with a Brill 21-E truck and two GE-57 motors. Two flat steel bars 1 in. x 5½ in. extend across the top of the truck frame. Pressure adjusting screws of 1½-in. diameter pass through threaded holes in these bars. The adjusting screw at its lower end bears against a flat steel bar which, by means of a standard 21-E truck spring in turn bears upon the carborundum brick.

The carborundum bricks are 2½ in. x 3 in. x 12 in. and are held in U-shape frames. Pipe spacers allowing 1-in. play separate the frame which holds the brick from the bar against which the spring presses. Bolts with lock nuts are used to adjust the brick over the rail. A stiffening framework made of flat steel strips is used to give the apparatus rigidity.

The carborundum bricks bearing against the rail grind it down to a smooth surface. This work puts the motors of the car under a considerable strain, but inasmuch as the car is not used for other purposes it is felt that there is no objection to the practice. The machine is used at night when no other cars are passing over the track to be ground down, and has proved to be efficient and rapid in the performance of this kind of work.

Detroit Develops Truck for Arc Welding

TRACK welding and bonding on the municipal railway in Detroit is under the jurisdiction of the electrical department, and this department has recently put into service a welding outfit consisting of a welding unit mounted on a gasoline truck.

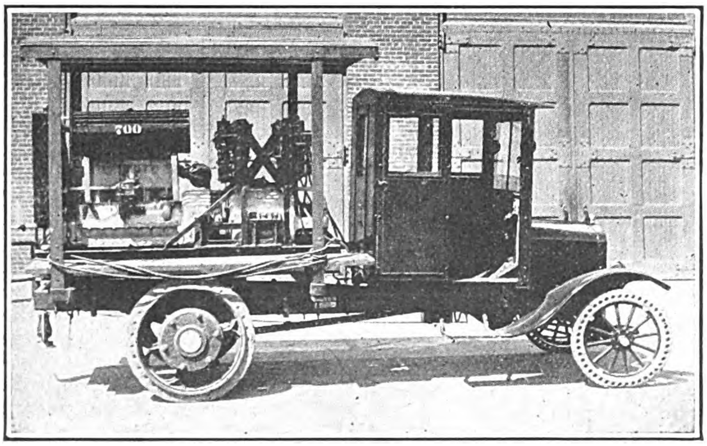
The truck includes a Ford 1-ton chassis, equipped with a Field closed cab and an Olson 2-ton unit, with an Olson No. 8 frame extension, steel wheels, special bearings and 16-leaf rear springs. The front tires are 30x3½ in. wide base Lambert, and in the rear, 34x6 in. Goodyear all-weather tread cushion tires are used. The accessories include a Stewart speedometer, Handy governor, electric lights and electric starter. The welding unit is a Wilson Welder & Metals Company's two-arc gasoline-driven engine.

This truck carries a crew consisting of two welding operators and a driver-helper. The latter, when the truck is not in motion, prepares and cleans the track joints for the operators, tends the welding equipment, serves the operators with welding wire and does any other miscellaneous work required with an outfit of this character.

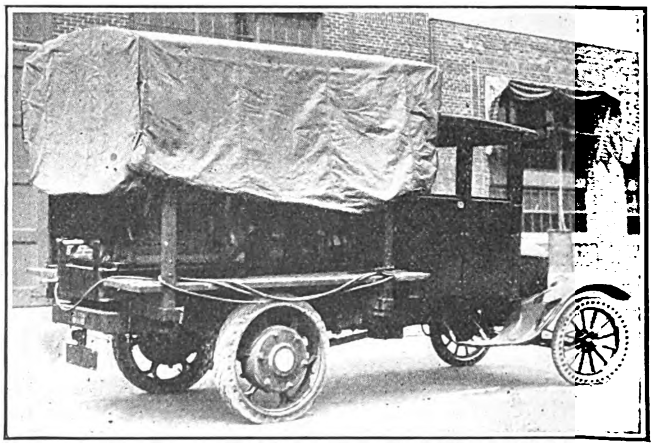
It is anticipated that an extra light-weight reciprocating grinder (if such an article can be procured) will be added to the truck in order that the welding and essential grinding may be done by the same crew, thereby eliminating the expense and inefficiency incident to the welding being done by one crew and the grinding by another.

The electrical department is also developing a bond-testing car, such as is in use on other properties, for determining the electrical condition of rail joints. At present, joints are tested by means of a portable meter, it requiring approximately one year to test all the joints on the system. It is estimated that a bond-testing car can do the same amount of work in approximately one month. With the bond-testing car, a graphical record of the conductivity of each joint is automatically procured, and the location of defective joints spotted on the pavement by means of a paint gun attached to the car.

As a further check on welded track



Detroit Welding Truck with Canopy Up



Detroit Welding Truck with Canopy Down

joints both before and after the same are placed in service, the electrical department is investigating the field application of magnetic analysis, making use of either the defectoscope or the magnetoscope. Both of these instruments are described in the May, 1924, issue of the *Scientific American*. Welds which may pass a visual inspection may be defective. It is believed that any instrument which will determine, without testing to destruction, the condition of a weld will certainly pay for itself many times over. If either or both of these instruments can be used for the purpose cited, it is contemplated to place them on the bond-testing car.

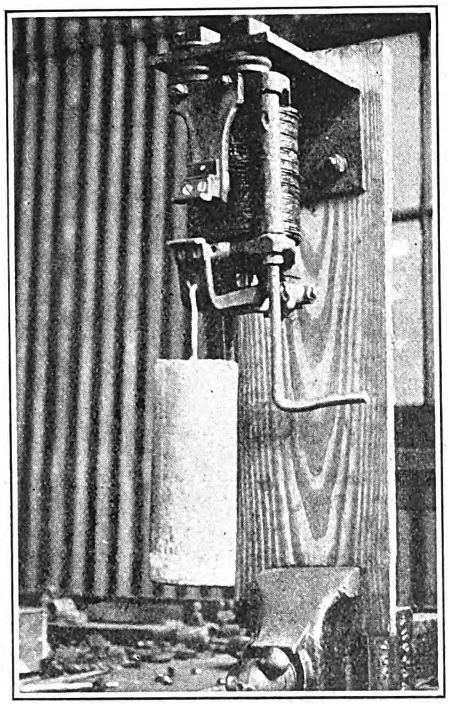
The checking of rail grinding at track joints is another matter being given consideration, with particular reference to the use of an automatic indicator which will take the place of the usual straight edge. The latter instrument has its limitations, particularly in paved streets, because to determine the exact conditions it is almost necessary for the person using it to stand on his head. The automatic indicator will make unnecessary any such gymnastic convolutions and will, at the same time, give a true reflection of the conditions.

Practical Method for Testing Magnet Coils

MAGNET coils used in railway control apparatus are given a physical test in the Decatur shops of the Illinois Traction System to determine their fitness for service. This amounts to testing the coil under service conditions to determine if its pull is sufficient to operate the control mechanism. Such a test is used in preference to the electrical test because it is more simple and can be made more rapidly.

The coil is mounted in the usual bracket with the hinged armature attached. The bracket is bolted to an iron member which is mounted on a board held vertically in a bench vise during the test.

With the coil in position a 24-lb. weight is hung on the contact tip end of the armature. A specified current is sent through the coil and if the weight is raised so that the lower contact is brought up against the stationary contact the coil is considered all right for service. Otherwise it is marked B.O. and is rewound.



Testing Magnet Coils in the Decatur Shops of the Illinois Traction System. The Magnet Is Expected to Raise a 24-Lb. Weight

To facilitate the placing of a coil in the bracket the usual retaining nuts on the connecting bolts have been replaced by nuts having an extension with a handle at the end. These, as well as other details of the arrangement, are shown in the accompanying illustration. Since the use of this device was inaugurated the company has experienced no failures attributable to faulty testing of magnet coils.

Framing Parts in Stock Speeds Repairs

IN THE shops of the Omaha & Council Bluffs Street Railway a complete stock of framing parts is carried to speed up the work of repairing damaged cars. These parts include front vestibule framing, posts, sash, doors and other pieces most frequently damaged in service.

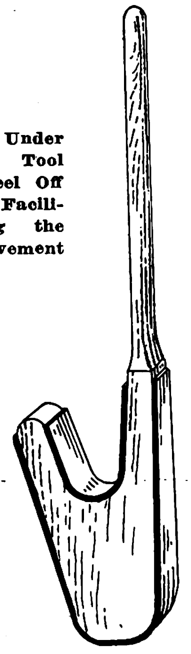
The practice for a number of years has been to keep the number of different designs of cars to a minimum, so as to reduce the number of different types of these repair parts that have to be carried.

All parts are finished and primed before being put into stock. In this way the amount of time necessary to make a repair on a damaged car is kept to a minimum. Convenient storage racks are arranged so that the stocks of repair parts are stored in an orderly manner, making them easily accessible when required.

The reduction in the time that a car must be held in the shop for making repairs, results in a material saving by keeping cars in service instead of in the repair shop. In addition, the cost of manufacturing repair parts is reduced because they are made in comparatively large lots, instead of being made up as special jobs in the wood mill each time a car comes in for repair.

Handy Tool for Moving Wheels and Axles

IN MOVING wheels and axles from place to place in the railway repair shop of the Georgia Railway & Power Company, Atlanta, Ga., it is often necessary to turn a sharp corner in changing the direction of movement. A simple handle has been devised to facilitate the turning movement. This consists of a J-shaped piece of wood about 5 ft. in length, with the hook about 24 in. long. Around the bottom a piece of $\frac{3}{16}$-in. iron has been bolted on to provide a substantial wearing surface, and a similar piece has been placed on the inside. The thickness through the base is slightly greater than the diameter of the wheels which are being moved.



When Inserted Under an Axle This Tool Raises the Wheel Off the Ground and Facilitates Changing the Direction of Movement

In using this tool the procedure is to insert it on a slant under the axle and then to straighten up the handle to a vertical position. This raises the one end of the axle so that the wheel is clear of the floor and holds it stationary. Then by pushing on the other end of the axle the set of wheels may be turned through any desired angle.

Lift Facilitates Compressor Removal

ANOTHER use to which air is put in the shops of the Illinois Traction System at Decatur is that of aiding in the removal and replacement of car air compressors. Adjacent to the compressor repair room is a track which leads to the rear of the shop grounds, and it is from a position on this track directly opposite the door opening to the compressor room that the air compressors are removed from the cars.

A short section of the rail nearest the compressor repair room has been arranged so that it can be removed after the car is in position. A platform, which normally rests under the rail, and which carries a small truck made especially for this purpose is raised to receive the compressor. After the compressor has been removed, the platform is lowered so it is even with the lower end of the ramp which leads to the pump room. The truck with the compressor on it is pulled by hand up this ramp, being guided by rails of angle construction. The compressor is removed by means of a chain hoist. A replacement compressor is placed on the truck and the process is reversed.

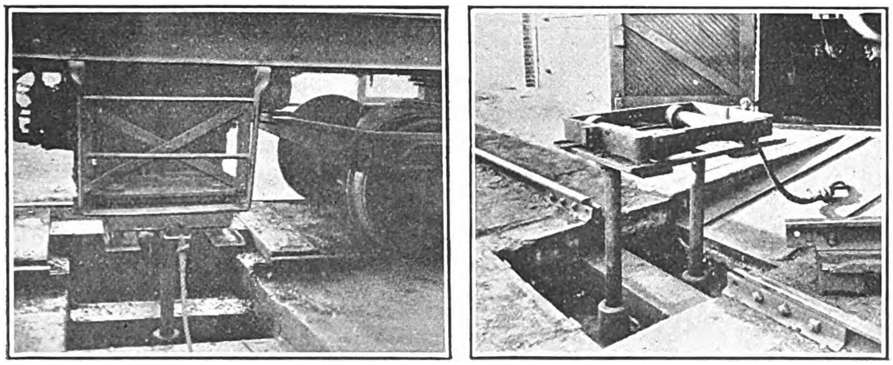
The construction of the apparatus presents a neat appearance of permanent design, being of concrete and steel throughout. Two 10-in. by 12-in. brake cylinders have been bolted together to form the two cylinders of the lift. These are set in the ground at such a depth that the platform will, when lowered into a shallow pit, be below the base of the track rail. The cylinders are spaced an equal distance on each side of the rail, approximately 24 in. center to center. Suitable underground air pipe connections have been made between the cylinders and the pump room where the control valves are located.

The short section of rail, which is approximately 3 ft. long, is supported at the ends by the concrete wall surrounding the pit and also by means of a short piece of timber, attached to the rail, which rests upon a concrete beam located directly under the rail. The wood timber or tie has been cut away on the underside to allow room for the platform when it is lowered. The base of the rail has been cut away at each end of the short section, the web fitting between fish plates fastened to the adjoining section of fixed rail. A single hole, through the fish plate and web of the rail, permits a bolt to be inserted to insure a secure fastening of the removable piece of track when elevating platform is not in use.

The platform, mounted on the ends of the piston rods of the cylinders, is made up of two steel members 6 in. wide by 1 in. thick and 24 in. long. One of these has been mounted on the end of each piston rod while the two have been connected at each end by means of a channel member which serves as a guide and track for the small truck.

The truck is of low frame, heavy construction, the side sills being bolted together at the ends to form the end sills. Small wide tread wheels, inside mounted on heavy axles, do not rise above the top of the side frame. This truck is 24 in. wide and 30 in. long. At one end a handle has been provided to which a rope is attached to facilitate pulling. Angles have been embedded in a concrete ramp which has a rise of approximately 5 in. and serves to guide the truck as it is being pulled into the compressor room.

With shop air pressure of approximately 100 lb. this device has a lifting power of 15,000 lb.



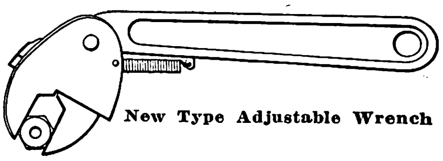
Left—Air Compressors Are Removed from Cars at Decatur Shops of Illinois Traction System by Means of an Air-Operated Lift Having a Capacity of Approximately 15,000 Lb. Right—Two 10-In. x 12-In. Cylinders Bolted Together Form the Lift. Small Truck Carries Compressor Into Pump Shop

New Equipment Available

Automatic Adjustable Wrench

A NEW type of wrench shown in the accompanying illustration is being marketed by the Speednut Wrench Corporation, Chicago, Ill. The wrench proper consist of three forged steel parts, which include the two jaws and the handle. A spring is furnished to aid in keeping the jaws in constant adjustment. The wrench, however, works without the spring, which is designed so that it can be easily detached or attached as required.

The wrenches are made in two sizes; the 8-in. size takes nuts from $\frac{5}{16}$ in. to $\frac{3}{4}$ in. and the 6-in. size nuts ranging from $\frac{1}{8}$ to $\frac{7}{16}$ in. Both sizes are arranged with ratchet for opening and closing the jaws. This wrench construction provides for a tight fit regardless of the worn condition of a nut.



New Type Adjustable Wrench

New Machine Tool Controllers

A NEW line of magnetic machine tool controllers has been placed on the market by the General Electric Company, Schenectady, N. Y. They employ the counter-emf. method of acceleration and are applicable to both reversing and non-reversing, constant and adjustable speed drives. They have been developed primarily for application to direct-current motors in sizes ranging up to and including 15 hp.

The controller provides two accelerating points; the starting resistor is automatically short-circuited in one step upon proper acceleration of the motor. This is accomplished by an accelerating contactor whose closing is governed by the counter-emf. of the motor.

A complete redesign has been made of the same company's larger types of magnetic machine tool and general purpose controllers.

The News of the Industry

Applications for Bus Permits Renewed in Buffalo

Another definite step has been taken by the International Bus Corporation, a subsidiary of the International Railway, and the VanDyke Motor Car Company to establish bus service in Buffalo, N. Y. Their previous applications were rejected by the City Council. After the filing of the new requests Mayor Schwab set July 18 as the date for a public hearing for permits to operate in Delaware Avenue and Delavan Avenue.

The International Bus Corporation would establish a fleet of double and single-deck buses to operate on a 10-cent fare with a 3-cent charge for transfers to a connecting trolley line and a 6-cent charge for a transfer from a trolley to a bus line. The trolley fare is 7 cents or four tokens for 25 cents. Under the proposal of this company the city would be empowered to take over the lines on July 1, 1934, or on July 1 in any year thereafter on six months' notice at the value of the physical property.

The VanDyke company proposes to operate on five city routes covering widely separated parts of the city. It agrees to pay the city 3 per cent of its gross receipts and to operate thirty buses each with a carrying capacity of sixty passengers on a 10-cent fare with free transfers to connecting bus lines.

The consent of the Public Service Commission must be obtained in addition to that of the City Council if either line is to operate.

Of interest in this connection is the opinion of Corporation Counsel Frederick C. Rupp handed down at the request of the City Council in which he holds the city cannot operate municipal bus lines in the streets or on parkways that are approaches to parks. Notwithstanding the opinion, City Commissioner Frank C. Perkins, the Socialist member of the board, insists that the city buy and operate fifty buses at a cost of $300,000 or more to be used as the basis of a larger fleet of municipal buses to serve all sections of the city. The resolution of Commissioner Perkins was defeated, but it is expected that it will be considered at some future time by the City Council.

Restraining Order Issued Against Atlantic City Union

An order has been issued by Vice-Chancellor Ingersoll prohibiting striking motormen and conductors of the Atlantic City & Shore Railway, Atlantic City, N. J., "from interfering in any way" with the operation of cars. The order prevents the strikers from picketing street corners, endeavoring either verbally or by cards and signs to persuade persons not to board the trolleys, and interfering with those operating the cars. For some time now the company has been operating cars on normal schedule, but the strikers have picketed every corner, displaying cards and signs, calling attention to the strike and suggesting that the trolleys be boycotted. Mayor Bader has placed an official ban on a move by strikers to disrupt railway service by running free buses.

Mayor Dever Talks Transit

Chicago Executive Sees Need for Co-ordination of Elevated, Subway, Surface and Bus Lines

Immediate action on the many Council resolutions urging construction of subways in Chicago forthwith will be demanded in another resolution to be presented to the City Council at its meeting on July 15, according to a statement made by Alderman Thomas J. Fowler, upon his return from New York City.

The New York subway has been the particular interest of the many city officials, including Mayor Dever, who have been attending the Democratic convention. Within two days two different correspondents, one of the Chicago *Tribune* and another of the Chicago *Journal*, quoted the Mayor as having said that in his opinion street cars were "practically obsolete."

Then, two days later, the *Tribune* had wired an extensive interview with the Mayor. Mr. Dever dictated the statement, which he declared was the first time he had definitely talked about Chicago's transportation problem. Just now Chicago's Aldermen are trying to reconcile the second interview with the first. The *Tribune* quoted the Mayor as follows:

> No one who has given much thought to Chicago's transportation problem will argue that we may be able to dispense with the surface lines in the near future. The fact is the bus furnishes us with a new and desirable unit of service and is a factor which should not be lost sight of when we are dealing with the traction problem.
>
> Fundamentally a sound solution of the traction question must provide for rapid transit service through the Loop and radiating to all sections of the city. This necessarily includes the building of subways and the use of them in conjunction with the elevated lines, and, in some measure, by the surface lines. The proper development of a new rapid transit system will, in my judgment, include the building of subways and the use thereof by the elevated lines and the surface lines in such manner and to such a degree as good engineering may dictate. But it will also include the wide and increasing use of the bus.
>
> May I repeat that I do not believe that the bus is adapted to eliminate our surface lines, which are now carrying approximately 80 per cent of the total passenger traffic of our city? The surface lines are a very important factor in our local transportation service and they will continue to be so for years.
>
> When the four units of service—elevated lines, subways, surface lines and buses—are properly correlated and unified Chicago will then have a system adequate to its needs.
>
> In proposals made by the city to purchase the Surface Lines we are trying to keep all these facts in mind. Our purpose is to acquire these properties at a fair price. That is to say, at such a price as will enable us, when the city takes them over, to operate them with a reasonable hope that good service may be given to the people and the lines unified and extended, thereby taking the traction question out of our local politics.
>
> Let us not befool ourselves. Roughly, the Surface Lines in Chicago today carry 800,000,000 passengers a year. The motor buses and the elevated carry 200,000,000 a year. Hence the folly of saying—which I have never said—that the Surface Lines can soon be eliminated from congested areas. But it is also true that only in their wide transformation and their thorough unification do they contain a useful and convenient future for us. Also we must always keep in mind the high desirability of the bus as a unit of service.

Planning Interurban Extension

Schedules for two through limited interurban passenger trains a day each way between Indianapolis and South Bend, Ind., are being worked out by the Winona Service Company in conjunction with the Union Traction Company and the Chicago, South Bend & Northern Indiana Railway. These trains would stop only at county seats. At the same time plans are under way for a further development of the interurban freight business. It is not proposed to run passenger cars through from Louisville to South Bend. There would be close connections and a change at Indianapolis. The proposed limited trains from Indianapolis to South Bend would run over the Union Traction lines to Peru, over the Winona Service lines from Peru to Goshen and over the Chicago, South Bend & Northern Indiana from Goshen to South Bend. This plan has been developed since Harry Reid, president of the Interstate, and James P. Goodrich, former Governor of Indiana, acquired the Winona line.

Hearing Ends on Plea for Fare Increase in Niagara Falls

Hearings have been closed by Public Service Commissioner Pooley on the application of the International Railway, Buffalo, N. Y., to abandon its Sugar Street line in Niagara Falls and to increase the fare there from 5 to 7 cents, with four tokens for 25 cents, the same rate as charged by the International Railway in Buffalo. The commissioner indicated he would recommend abandonment of the Sugar Street line, but would not favor a fare increase in Niagara Falls at this time. Testimony was introduced by the railway to show it sustained an annual loss of $34,000 by operating the Sugar Street line. The commissioner indicated that if a higher rate of fare was granted the International in Niagara Falls he would be inclined to deny the abandonment petition on the ground that other lines in the city could carry the losses sustained through the operation of the Sugar Street route.

Slight Advance in Eastern Massachusetts Pay

An agreement which carries a slight advance in wages for 1924 has been entered into between the Eastern Massachusetts Street Railway and the carmen's union. The advance is so slight, however, as to be almost negligible. The basic rates of 58 cents an hour for the men on two-man cars and 63 cents an hour for the operators of one-man cars will remain undisturbed, but the change will come in the computation of compensation for excess time. The excess time payment will be figured on the basis of the pay the men receive instead of on the basic rate for two-man car operators, as formerly.

Nine hours will constitute a day's work, to be completed within a spread of eleven hours, as at present, and when the men have to work into the twelfth hour in order to finish a nine-hour day they will receive extra compensation of 20 per cent of the straight pay for the extra hour. Inasmuch as the one-man car operators receive 63 cents an hour their extra pay will be figured on the 63 cents basis instead of the 58 cents basis which was used under the old agreement. Operators of two-man cars remain on the same pay basis as before, but only a small percentage of the company's cars today are two-man cars.

Negotiations for a new agreement have been in progress since last May. They were delayed somewhat by the fact that a bill was before the Massachusetts Legislature to establish a shorter day for the carmen. The Legislature did not pass the proposed legislation and negotiations were resumed.

Wage Agreement at Three-Cent Advance at Montreal

The employees of the Montreal Tramways, Montreal, Que., unanimously accepted the offer of the company on June 17 for a wage agreement which will be effective for a period of three years. The decision affects 3,500 men. The proposal submitted by the company to the men provides for a general increase of 3 cents an hour to the present rate and an additional 5 cents an hour for Sunday work and holidays. These proposals were contingent upon the signing of an agreement for a period of three years from July 1, 1924. It was expected on July 4 that an agreement on this basis would be signed in a few days.

The present rates for trainmen are: First year, 39½ cents an hour; second year, 44 cents an hour; after two years, maximum rate of 48 cents an hour. Certain classes engaged in freight and other special services are paid at the rate of 5 cents an hour additional. The proposed increase applies to all employees, conductors, motormen, carhouse men and shopmen. It was agreed that regulations regarding working conditions should be discussed and arranged following the ratification of the three-year agreement.

For several years the men at Montreal have been interested in having a pension fund established. After several months work the management submitted a plan providing for life insurance up to $2,000, sickness and injury benefits of half-time for a period of twenty-six weeks and old age pension of $50 a month at the age of sixty-five years, after twenty years of service. A vote was taken on this by the members of the union and as the majority of those in attendance were men of comparatively short terms of service with the company the proposal was voted down.

Six-Day Week Voted by Boston Men

Preparatory to the formal arbitration of wages and working conditions the carmen in the employ of the Boston Elevated Railway have voted to introduce a six-day week on the system. The union voted on this issue after a series of conferences between the officers of the union and trustees of the company. The vote was taken on this question:

> Do you favor changing to a six-day work week, with the knowledge that the question of wages is to be arbitrated?

The vote in the affirmative was 2,857 to 590.

Wage Agreement on Michigan Electric Railway Renewed

Agreements were signed on July 2 with the various employees' associations by which the Michigan Electric Railway, Jackson, Mich., is to pay the same wage to conductors, motormen and other car operators that was in effect on the properties previous to June 1, 1924. This is a two-year agreement. Under the new agreement the rates in cents per hour are to be as follows:

INTERURBAN CONDUCTORS AND MOTORMEN	
First six months of continuous service	49½
Thereafter	54½
OPERATORS OF ONE-MAN CITY CARS	
First year of continuous service	49½
Thereafter	52½
CONDUCTORS AND MOTORMEN OF TWO-MAN CITY CARS	
First year of continuous service	44½
Thereafter	47½

Five cents additional an hour will be paid for all work in excess of regular scheduled runs.

With respect to the rates for interurban conductors and motormen on the Michigan Railroad and the Grand Rapids, Holland & Chicago Railway the same rates will be in effect for them as on the Michigan Electric Railway.

Recess Committees to Consider Railway Problems

Two legislative recess committees have been appointed under authority of the Massachusetts Legislature of 1923-24. One is charged with the duty of studying the various problems relating to the control, supervision and regulation of motor vehicles, which takes in jitneys. The other is to consider the methods of financing additions, extensions and improvements of the Boston Elevated and also the question of terminating the public control of the Elevated.

City Insists Upon Service Guarantee

The announced intention of the Janesville Traction Company, Janesville, Wis., to replace service on Washington Street with bus operation as a measure of economy, reached a climax on July 1 when the company sought to make the announcement a reality. This it was prevented from doing by the paving company now engaged in improving the street. The railway is confronted with the problem of taking out its rails, continuing the line by agreeing to stand the cost of paving or establishing bus service. Meanwhile the city demands a written guarantee regarding the character of the new service. A conference between city and railway officials, held to try to reach an agreement, resulted in a deadlock. The matter was then carried to the Railroad Commission.

Members of Crew Involved in Indiana Wreck Are Indicted

Frank J. Nolen, motorman on the Indiana Service Corporation's special car, one of the cars in the wreck at Roanoke, Ind., on May 19, in which six persons were killed, has been arrested on indictments charging involuntary manslaughter, returned at Huntington, Ind. A similar indictment against Leonard Gushwa, conductor on the special, will be served, it was said. The indictment charges that the crew on the special was guilty of negligence because of failure to obey a standing order to keep the track clear for the Wabash Valley Flyer, the other car which figured in the wreck.

New Franchise Sought in Sioux City

The Sioux City Service Company, Sioux City, Ia., has requested the City Council to call a special election for the purpose of submitting a twenty-five year franchise to the voters covering the company's railway lines. The attitude of the company as expressed through W. J. Bertke, vice-president and general manager, is that there is a real demand for railway extensions, and the railway, as a vital public utility, should be encouraged to place itself upon a financial basis sufficiently strong to meet the demand.

In connection with the matter of financing Mr. Bertke has explained that when the Sioux City Gas & Electric Company took over the Sioux City Service Company in November, 1922, it was necessary to sell an additional $1,000,000 of bonds of the Sioux City Gas & Electric Company to pay off the floating debt of the Service company and to provide funds for its immediate requirements. At that time the bankers interested were unwilling to purchase securities of the Service company in the face of poor earnings from railway operation and the fact that franchises were about to expire.

Mr. Bertke believes that a new franchise for the use of the streets for railway purposes should be granted to the Sioux City Service Company for twenty-five years, the statutory limit.

Suggestions Invited in Baltimore

The United Railways & Electric Company, Baltimore, Md., has asked the public to co-operate with it in improving the service. The invitation to make suggestions has been extended by means of large notices displayed in the cars. "Give Us that Idea," the notice is headed, large red type being used. The notice says:

> If you have a suggestion which you think would improve the service of the Street Railway System will you please write it down, sign your name and mail it to H. B. Potter, service department, United Railways & Electric Company, 1005 Continental Building.

Supervisors Direct Strangers at Convention

During the recent national convention of the Kiwanis Clubs in Denver, the Denver Tramway furnished some of its oldest and best informed supervisors to the committee in charge of the entertainment of visiting delegates. The supervisors were dressed in the regulation Tramway uniform, and were equipped with badges informing strangers that they would be glad to furnish any desired information regarding Denver. They were stationed in information booths in the Union Passenger Station, at General Registration Headquarters, in the lobbies of some of the principal hotels and at other strategic locations.

In addition all trainmen in service on the cars of the company were equipped with badges bearing the words "Ask Me" in large letters. This helped to indicate to the visitors and residents of the city as well that the company was more than willing to share in making the convention a success.

Interborough Extends Wage Agreement

The Interborough Rapid Transit Company, New York, N. Y., after numerous conferences with representatives of the Brotherhood of Interborough Employees, has agreed to continue the existing wage contract for another year, commencing July 1. Frank Hedley, president and general manager, has arranged to continue the conferences so as to consider minor adjustments. Matters are proceeding amicably.

Chicago Rerouting Plan Appears to Be Endangered

The city of Chicago's elaborate rerouting plan, worked out with the cooperation of Maj. R. F. Kelker of the City Council's transportation committee and the Chicago Surface Lines, appears to be endangered at an important point through the necessity of obtaining frontage consent for the construction of 400 ft. of single line track.

An appeal to the board of directors of the Chicago & Western Indiana Railroad, owners of the property past which the track is to be constructed is to be made by the city.

The proposed 400 ft. of track is essential to the rerouting of the Archer, Ashland and Racine lines and incidentally, of course, the whole plan is involved. In the rerouting plan, the cars coming north are to turn from State Street via Polk Street to Dearborn Street. The link from Dearborn to State has not been constructed.

Legally, the company or the city has no redress in the event of a definite refusal. The railroad owns all the frontage on one side of the street and sufficient on the other side to give it a clear majority.

Detroit Wage Matter Still Before Courts

Important developments have transpired in the wage dispute between the street car men's union and the Detroit Department of Street Railway. Among them is included the granting by the Michigan Supreme Court of a motion of Clarence E. Wilcox on behalf of the Street Railway Commission for a review of Judge Richter's decision which would compel the Detroit Street Railway to arbitrate the wage demands with the employees. On the other hand, union officials have tried to stop the city's appeal to the higher court, through conferences with acting Mayor Joseph A. Martin. Although no details were given out as to what transpired at either of the conferences with the acting Mayor, the union officials are said to have sought to withdraw.

The street railway commissioners have have been determined in their stand that they would not arbitrate with the union under any consideration and that there would be no arbitration with the union even though a new agreement for a basis of arbitration be sought, at least not until such action is ordered by the higher court. It was reiterated that the men have their own association within their ranks which is considered as conclusive proof that the men can secure justice and fair play.

Mr. Wilcox in contesting the mandamus writ ordered by the Circuit Judge argued that the union and not the employees of the department brought the mandamus proceedings; that neither of the two petitioners for the mandamus is a Detroit Street Railway employe; that Michigan laws do not require arbitration; that the arbitration provision of the charter of the City of Detroit violates the provisions of the Federal Constitution because of its indefinite term of procedure.

Preceding the conferences between union officials and acting Mayor Martin it was announced that the Detroit United Railway platform men had renewed their pay pact with the company for one year with no change of schedule. The agreement is between the railway and Division 26 of the Amalgamated Association. The wage scale was announced as follows: 61 cents an hour for beginners; 64 cents an hour after three months and 66 cents an hour after one year with 5 cents an hour extra in all cases for operators of one-man cars. The one change in the agreement it was announced, provides specifically that the business agent shall be an employee of the railway.

The wage scale which the men are now asking from the city on the municipal lines would give the men 72, 76 and 80 cents an hour. Officials of the Municipal system see no reason why the city should pay a higher rate than prevails on interurban lines operating in the city, where for twenty years the same wage scale has prevailed both.

News Notes

New Bus Line Running in Baltimore.—A new bus line connecting the northeastern and southeastern sections of Baltimore has been put into operation by the United Railways & Electric Company. The line was ordered established by the Maryland Public Service Commission at the same time the company was granted an increase in fare from 7 to 7½ cents. The same fare as is charged on the cars is in effect and transfers are issued. The buses are of the 24-passenger type.

Nebraska Road Increases Fares.—The State Railway Commission of Nebraska has consented to a test of a new rate on the Omaha & Southern Interurban Railway between Omaha and Fort Crook that is an increase of 3¾ cents over the present 15-cent fare. The railway had started an injunction suit to restrain the commission while it charged more than the passenger fare of 2 cents a mile provided by state law. The steam railroads have been charging 3.6 cents for several years under a federal court order, but the interurban was still doing business on the 2-cent basis. The company operates in three zones. The road is only 7.8 miles long.

Buses for Private Hire.—Two twenty-seven passenger buses to be used for private hire work have been delivered to the Eastern Massachusetts Street Railway, Boston. They are of the street-car type mounted on White chassis.

Safety Contests at New Orleans.—The membership of the five carhouses embracing the railway system of the New Orleans Public Service Inc., engaged in a friendly contest during June to see which of the lines could operate during the month with the fewest number of mishaps and accidents. The membership of the Prytania carhouse made the best record. In consequence the conductors and motormen of the lines operated there are wearing on the lapels of their coats strips of silk ribbon bearing the inscription "Winner." The captains of the various lines operated from the Prytania carhouse were presented handsome floral gifts by the officers of the company and by Paul H. Maloney, Commissioner of Public Utilities. The winning carhouse also was awarded a pennant which it will display there during the time that the similar contest is underway for July.

More Bus Rights Sought by Public Service.—The Public Service Railway, Newark, N. J., has applied to the Board of Public Utility Commissioners for permission to replace the Crosstown and Fifth-Broadway lines, Camden, N. J., with a bus line. The corporation has also asked for a formal permit for the new Fairview line, operating in Camden. The commission has granted permission to the railway to abandon trolley service on the North Cramer Hill line, Camden, and to use buses exclusively in serving that territory. There was no objection on the part of the city to the abandonment.

Railway Objects to One-Way Street.—The Louisville Railway was one of the number of concerns represented at a hearing before the City Council on July 1, regarding an ordinance for making Fourth Street a one-way street for traffic. Samuel Riddle, vice-president of the railway, opposed the plan. He argued for better regulation of traffic. He said that of the 67,000,000 passengers hauled by the company in 1923, 10,000,000 were hauled on Fourth Street. One way traffic on Fourth Street would make it necessary to build two or three blocks of track, and put in costly turns, etc. The one-way plan is backed by Fifth Street realty interests anxious to increase travel to Fifth Street to the benefit of their realty holdings.

Discloses Bus Plan.—The Third Avenue Railway System's plan for bus service in Yonkers, N. Y., will be presented to the Common Council of that city on July 22. The plan is said to propose the substitution of buses for trolleys on three routes in the vicinity of Yonkers, the establishment of a "U" bus route in the city and a suburban line to Bryn Mawr station. A 10-cent fare would be charged with free transfers to and from trolleys. Getty Square is proposed as a terminus for all the bus routes that might be installed.

Buses Replace Trolley on Five-Mile Route.—Buses will soon displace the trolley line operated by the Montoursville Passenger Railway on a 5.5-mile route between Montoursville and Williamsport, Pa. One of three buses to be used on the route has been delivered. Service will begin with the arrival of the two others. Operation will be under the direction of the Lycoming Auto Transit Company, successor to the trolley company, which, by permission of the County Court, has surrendered its charter.

Bill for Six-Day Week Lost.—The bill introduced by John M. Wynn of Shreveport, Caddo Parish, La., providing for a six-day week for all conductors and motormen has failed to pass the Louisiana House, and on motion to reconsider was indefinitely postponed.

Arrest "Bus Queen."—Helen Schultz, "America's Bus Queen," proprietor of the Red Ball Transportation Company, Mason City, Iowa, was arrested recently on information filed by Frank Hanlon, manager of the Mason City & Clear Lake Railroad, on a charge of operating buses without a license. Miss Schultz was running five extra buses to carry a large crowd of holiday-makers from Mason City to Lake resorts. She and eight of her drivers, arrested with her, each provided a $200 bond and were released to appear for hearing on July 11. Miss Schultz contended that she was operating within the statute even though she had been denied permission to operate between Mason City and Clear Lake. Her contention was that she did have a permit for operation from Mason City to Algona.

Bus Line Suggested for Portland.—An offer to start and maintain a bus line from the central portion of Portland, Ore., to and from St. Johns was made by A. E. Jones, president of the St. Johns Community Club, at a recent conference with Franklin T. Griffith, president of the Portland Electric Power Company. In making the offer he stated that in his opinion an 8-cent fare would yield a profit on the amount invested. President Griffith has taken the matter under advisement, it is reported.

Foreigner Impressed with Chicago Operation.—Among the visitors to electric railway properties in this country, is G. A. Hobler, chief engineer of the New South Wales Government Tramways, Australia. Mr. Hobler recently inspected the property of the Chicago Rapid Transit Company. He is interested in manganese rail as it compared in service with open hearth rail. He was impressed with the number of trains operated around the Chicago loop and with the speed attained in handling them.

Bus Grant for San Diego Railway.—A ten-year franchise for the operation of buses on the streets of San Diego, Cal., has been granted the San Diego Electric Railway by the Common Council of that city. The franchise became effective on July 10. It provides for a tax of 2 per cent on the annual receipts from the operation of buses. Indemnity insurance of $5,000 covering the injury or death of one person by a bus, of $10,000 for more than one person and $1,000 for injury of the property of a third party is also provided. Fares, routes and schedules are subject to authorization of the Common Council and can be altered at any time by that body. A majority vote of the electors of the city may also rescind or modify the franchise.

Asks Bus Grant in Boise.—A twenty-year bus franchise has been asked of the Boise, Idaho, Common Council by the Boise Street Car Company for one route in that city starting at the Union Pacific station and extending to Eighth and Idaho Streets. Hourly service from 7 a.m. to 10 p.m. on a maximum fare of 10 cents is proposed.

Ten-Cent Zone Fare Authorized in Maine.—The Public Utilities Commission of Maine on July 2 rendered a decision permitting the Central Maine Power Company to establish a zone fare of 10 cents, with the provision that eleven tickets, each valid for a single fare or some ride, may be purchased for $1, half fare tickets for school children and other special rates being based on a 10-cent fare, on its railway between Warren and Camden, a distance of 21.47 miles. The present zone fare is 7 cents with school tickets on the basis of one-half the regular fare.

One-Man Cars on Jersey City-Newark Line.—One-man cars will be used on the Jersey City-Newark line, of the Public Service Railway operating over the turnpike. The new service will probably be started on July 20.

City Insists Buffalo Company Pave.—Unless the International Railway, Buffalo, acts at once to repair its tracks on more than six local lines and renew the paving between the tracks and one foot on each side, the City Council has threatened to declare the company's franchise on these streets null and void. The improvements would cost upwards of $300,000. The company contends it has not sufficient funds with which to make the necessary improvements and repairs.

Bus Permit Denied in Syracuse.—Passage of an ordinance designed to permit the operation of buses in Syracuse, N. Y., on the Scottholm route by the Syracuse Co-ordinated Bus Line, Inc., subsidiary of the New York State Railways, was defeated in the Common Council on June 30, by one vote. A similar ordinance applying to a route on James Street will be considered in the near future. The railway subsidiary proposes operation on a 7-cent fare with a free transfer privilege. The application of James W. Dillon, an independent operator, for a permit to operate buses over four routes in the city, among them the Scottholm and James Street routes, on a 5-cent fare, is also pending.

Traffic Control System in Rochester.—An automatic control system for the regulation of traffic is being installed on Main Street, Rochester. The traffic will be controlled by means of a system of colored lights, regulated from towers at strategic points. Virtually every trolley line in Rochester traverses or crosses Main Street and the new system is expected to lessen traffic congestion. The New York State Railways co-operated with the city in erecting the electric control towers.

Seven-Cent Fare in Niagara Falls, Ont.—The Canadian National Railways, a government owned system in Canada, increased the fare on the local lines in Niagara Falls, Ont., from 5 to 7 cents, on July 1. The fare on owl cars from 2:30 until 5:30 a.m. is now 15 cents. A special rate for school children has been put into effect giving them a 4-cent fare, with seven tickets for 25 cents. Mayor Newman has protested to officials of the railway against the alleged hasty action in putting the new fare into effect.

Interurban to Use One Man in Off-Peak Hours.—The Erie County Traction Company, which operates from the city line at Buffalo, N. Y., to Gardenville, Orchard Park and Ebenezer, has started one-man service between 9 a.m. and 3 p.m. The company operates five cars and employs twenty-six platform men. It has been losing money. The one-man service during off-peak hours is regarded as essential to cut down expenses. The company formerly was known as the Buffalo Southern Railway.

Fare Hearing Postponed.—The hearing on the petition of the Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., for permission to increase its fares, set for July 9, has been postponed to July 16 at Albany.

More One-Man Cars in Rochester.—The New York State Railways, Rochester Lines, began one-man car service on July 1 on the Goodman-Emerson line, the second route in the city over which one-man cars are now operated. A new schedule calling for more frequent service marked the installation of the new type of equipment. The cars used in the one-man service were rebuilt in the shops here.

Financial and Corporate

Bondholders Buy Road

Seventy-Mile System in New York City Sold—Reorganization Plan Approved by Transit Commission

A purchasers' committee from the New York Railways reorganization committee at noon on July 7 bid $4,086,035 in all for ten parcels of franchises and real estate offered by Nathaniel A. Elsberg as special master appointed in the New York Railways receivership proceedings. Joseph P. Cotton made the bids on each parcel for the committee and Mr. Elsberg announced that, subject to the approval of the United States District Court, they were accepted, there being no other bidders.

Among the franchises and other railroad properties sold were those of various subsidiaries of the New York Railways, including the South Ferry Railroad, the Lexington Avenue & Pavonia Ferry Railroad, the Central Crosstown Railroad, the Chambers & Grand Street Ferry Railroad, the Metropolitan Crosstown Railroad, the Metropolitan Street Railway and the Columbus & Ninth Avenue Railway.

The real estate disposed of consisted of many parcels, all in New York City.

The company operates 75 miles of surface lines in New York City, principally in lower Manhattan. The terms of the plan under which it is intended the reorganization shall be carried out provide for a reduction in total capital liabilities from $91,366,445 to $40,163,622. The details were reviewed in the ELECTRIC RAILWAY JOURNAL for May 17, page 793.

OUTLINE OF COMMISSION'S OPINION

On the recommendation of General John F. O'Ryan, the Transit Commission on July 8 approved the plan of reorganization of the New York Railways submitted to it by the reorganization committee. There will be public representation upon the directorate of the new company. This was recommended by the Transit Commission, although the commission did not possess the power to direct the inclusion of public directors in the board. The number of public directors of the new company is a detail yet to be arranged and will depend upon the manner of constituting the whole directorate.

General O'Ryan, in an opinion approved by the commission, discusses the importance of keeping the present system together as proposed in the reorganization plan, points out that the proposed capitalization of the new company does not exceed the fair value of the property and refers to the certainty that the company will be able to meet its fixed charges.

General O'Ryan says that the principal question is whether the proposed amount of capitalization exceeds the fair value of the property involved. He then reviews the fact that this new capitalization, including all new bonds, undisturbed underlying bonds, and 275,030 shares of no-par value stock, rated at $5 a share, aggregates $40,163,622, instead of the capitalization of $91,366,445 of the New York Railways and its present subsidiaries.

In connection with his discussion of this matter the commissioner says that a number of valuations were put in evidence or are available. These were valuations of the property of the New York Railways and of the properties of the subsidiary companies. It is explained that the question was raised as to the propriety of taking the value of the property owned by the subsidiary companies, which is not to be acquired by the new company, rather than the value of the stock in such companies, which represents the property intended to be acquired; but the commission deemed it unnecessary to express an opinion upon that at this time. It says that the actual original cost was not ascertainable for want of data, but estimates of the original cost were available. Estimates of the cost to reproduce at present-day prices and also at pre-war prices were introduced. In brief they follow:

PRESENTED BY PETITIONERS	
Cost to reproduce at present-day prices	$83,718,000
Cost to reproduce at present-day prices, less cost to recondition	81,718,000
Cost to reproduce at present-day prices, less straight line depreciation	65,546,300
Cost to reproduce at pre-war prices	48,552,200
Cost to reproduce at pre-war prices, less cost to recondition	46,552,200
Original cost	44,910,000
Original cost, less cost to recondition	42,910,000
FIGURES FROM COMMISSION'S BUREAU OF VALUATION REPORT	
Cost to reproduce at present-day prices	$70,723,800
Cost to reproduce at present-day prices, less depreciation	49,788,800
Cost to reproduce at pre-war prices	48,552,200
Cost to reproduce at pre-war prices, less cost to recondition	46,552,200
Original cost	32,580,000

The normal earning power of the system as constituted at present was estimated at $1,200,000 per annum. It was further estimated that with certain suggested changes, requiring no added capital expenditure, the net earnings would be increased to $1,600,000 per annum, and, with an expenditure of $3,000,000 for new cars, to $2,000,000 per annum. The annual fixed charges would be between $967,500 and $1,000,000.

The commission says that the objections raised by Mr. O'Shea, the stockholder, and on behalf of the Columbus & Ninth Avenue bondholders, cannot be considered, as they involve matters not within the power of the commission.

Job E. Hedges, receiver of the railway since March, 1919, handed his resignation of Federal Judge Mayer on July 10 with a request that he be relieved of his duties. Hugh J. Sheeran, his assistant, will be in charge until the receivership is lifted.

The plan of reorganization has been approved by the court.

Kewanee Purchase and Rehabilitation Financed

Spencer Trask & Company, New York, offered for subscription on July 9 at 95 and accrued interest, yielding more than 6.40 per cent, $1,200,000 of first mortgage 6 per cent gold bonds, Series A of the Kewanee Public Service Company, Kewanee, Ill. The proceeds of the issue will be used by the company to take over the properties of the Consolidated Light & Power Company in Kewanee, Neponset, Sheffield and Galva, to take over the municipal plant built by the city of Kewanee and to acquire the street railway and interurban properties.

As explained in the ELECTRIC RAILWAY JOURNAL for June 28, page 1030, the Kewanee Public Service Company will own and operate the electric light and power, gas and street railway business in Kewanee, the gas business in Galva, and will do electric light and power business in Sheffield and Neponset. The company, through its subsidiary, the Kewanee & Galva Railway, will also operate a short interurban line connecting Kewanee and Galva. Among other things the successful consummation of the purchase plan by B. F. Lyons, vice-president and general manager of the Beloit Water, Gas & Electric Company, means the resumption of local railway service in Kewanee, discontinued some months ago, and the rehabilitation of the interurban railway connecting Galva and Kewanee.

The voters of Kewanee on June 14 granted the Kewanee Public Service Company a franchise to operate the electric and gas utilities in Kewanee for a period of twenty-five years. The railway franchise, granted at the same time, extends for a period of twenty years, the longest term obtainable under the Illinois law. The Kewanee & Galva Railway is organized under the Illinois Railroad Law and its franchise extends for a period of fifty years. Other franchise are considered to be satisfactory. The rehabilitated properties will be under the direction of Mr. Lyons.

40,000 Fewer Riders in Toledo in May than in February

A severe drop in patronge brought about a deficit of $32,719 to the fare stabilizing fund of the Community Traction Company, Toledo, at the end of May. Acting Commissioner E. L. Graumlich so reported to the board of control at its recent monthly meeting. As a result a balance of only $41,859 is left in the stabilizing fund. Riding in June showed a still further slump so that it appears likely the fund will soon be practically exhausted. The daily average number of revenue passengers in May was only 148,708. This compared with 182,092 in February.

Service was cut slightly to take care of adjustments in schedules. The industrial slump is said to be largely responsible for most of the decrease although the widespread use of the private automobiles in good weather has contributed to decreased riding. Patronage on the bus lines operated separately from the railway has also shown a like slump.

A new ordinance applying to main thoroughfares which makes it necessary for automobiles to stop before crossing a street on which there are car tracks has had the effect of reducing accidents in which autos and street cars were involved.

Unfavorable Conditions Reduce Patronage in Winnipeg

The thirty-first annual report of the Winnipeg Electric Railway, Winnipeg, Man., shows that the gross earnings for the year 1923 decreased $114,816 compared with 1922 and that the operating expenses decreased $60,823. The net income for the year was $64,975 less than that of 1922. After the payment of all fixed charges and making the usual provision for depreciation the company showed a net income of $669,360. From this amount there was deducted the dividends paid on preferred stock, amounting to $210,000, and also an additional allowance for depreciation amounting to $156,003. This left $303,348 to be transferred to the surplus account.

According to the report of the president and the directors, one of the most marked features of the year's operation was the contraction in gross earnings which resulted from changed economic conditions and the unusual weather. The temperature averaged much higher than usual, and largely to this fact is attributed a decrease of more than 2,000,000 in the number of people carried on the Winnipeg railway system.

During 1923 the company made substantial additions and improvements to its property. There were two extensions to the track of the railway system and a considerable portion of old track was rehabilitated. The rolling stock was increased by four new buses and a new bus route was opened up in the north end of the city. Considerable work was done also to increase the capacity of the various substations. The accompanying table shows the income account for the year ended Dec. 31, 1923.

INCOME ACCOUNT OF WINNIPEG ELECTRIC RAILWAY
For the Year ended Dec. 31, 1923

Gross earnings from operations			$5,280,407
Operating expenses, before charging depreciation			3,465,892
Net operating revenue			$1,814,515
Miscellaneous income			127,706
Gross income			$1,942,221
Deduct:			
Interest charges on debenture stock and bonds		$663,480	
Extinguishment of discount on securities		16,208	
City percentage and car license		168,192	
Taxes		162,470	
Miscellaneous non-operating expenses		2,975	
Other income deductions		58,496	
			1,071,821
Net income before charging depreciation			$870,400
Deduct:			
Depreciation			201,050
Net income transferred to surplus			$669,350
Surplus brought forward from 1922 as adjusted			$2,301,176
Net income transferred		$669,350	
Dividends on 7% cumulative preferred stock	$210,000		
Additional depreciation	156,002		
		366,002	
			303,347
			$2,604,523
Sinking fund appropriation			55,320
Surplus carried forward			$2,549,203

Twenty-One-Mile Illinois Road Sold

The East St. Louis, Columbia & Waterloo Railway, a 21-mile interurban electric railway connecting St. Louis with Columbia and Waterloo, Ill., has been sold to a St. Louis syndicate headed by Charles H. Lemp, vice-president of the Liberty Central Trust Company. The purchase price is put at $335,000 cash and "other valuable considerations."

The road does both a freight and passenger business. It enters St. Louis at the Eads Bridge through a leasing arrangement with the East St. Louis & Suburban Railway, the tracks of which it uses through East St. Louis and over the Eads Bridge. The road was owned by the Merchants & Manufacturers Investment Company, of which E. H. Conrades is president. The same interests own the stock of Donk Brothers Coal Company and the Troy & Eastern Railway, a steam coal road.

The East St. Louis, Columbia & Waterloo Railway is an Illinois corporation. The new owners are said to have purchased it as an investment.

Committee Reports Iowa Property in Fair Condition

The members of the committee representing the first mortgage bondholders of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., recently inspected the property. E. V. Kane, chairman of the committee, in a circular dated June 15, reported on the conclusions of that trip. He stated that the line was in a fair physical condition with the exception of a 20-mile stretch from Waterloo to Waverly. General business conditions in the territory served were still quiet with a slowly improving tendency.

The current earnings from freight traffic on the Waterloo line reflected the improving trend of general business but the small gain has been overbalanced by the continued decline in passenger traffic due to bus competition and the general use of the automobile. The statement of operations for 1923 versus 1922, showed a balance in 1923 of $29,900 against a balance of $67,029 in 1922. There was an increase in operating expenses also, which according to the report was due largely to the fact that maintenance of the road had been deferred in previous years to be taken care of in 1923. Further, the committee stated that it believed that any substantial improvement in the affairs of the company must come from increased freight revenue.

Again a large amount of accumulative unpaid taxes, inherited from the old management, had imposed a heavy burden upon the company as these obligations were being liquidated in monthly installments out of current earnings.

First mortgage bonds to the par value of $5,114,000 have been deposited with the committee. This amount is approximately 90 per cent of the total issue outstanding.

Detroit Dividend Action Expected July 21

Elliott G. Stephenson, president of the Detroit United Railway, has called a shareholders' meeting for July 21 to authorize the new $10,000,000 bond issue. He has promised that the shareholders' question regarding dividends will be answered then. The Canadian *Financial Post* says that the sinking fund provisions of the new bond issue are such that an accumulation of earnings will have to be built up and this can only be done, it is considered in Toronto, by passing the dividend.

The letter of the president to the shareholders goes into the reasons for the new financing very thoroughly. The sum and substance of it is that the company must relieve the city of Detroit of the mortgage on the interurban lines of the company and this can only be done through the issuance of new bonds covered by notes. At the same time to complete the whole job at once an 8 per cent first mortgage issue is being redeemed, provision is being made for other issues that are falling due, working capital is being enhanced and money is being provided for new extensions. The new financing is being arranged on rather favorable terms, the 6 per cent five-year notes having been offered to the public on a 6.20 per cent basis.

The *Post* says that looking ahead one can see prospects of remarkable improvement in the company's affairs in the next few years, when a great deal of solid strength will have been built into the system by investment of new capital, by reinvestment of capital through sinking fund operations and by retirement of mortgages.

New York Interurban Would Abandon Branch

The Olean, Bradford & Salamanca Railway has petitioned the Public Service Commission for permission to discontinue the operation of its Little Valley division, remove its tracks and dispose of the right-of-way. The branch line runs between Salamanca and Little Valley, the county seat of Cattaraugus County. It is 9 miles in length.

The petition shows that the Little-

Valley branch was built by the Western New York & Pennsylvania Traction Company about 1907 and that it has been in continuous operation since. Much loss of patronge has resulted to the division by the construction of a concrete highway between Salamanca and Little River, the petition claims, so that for some years past the line has been operated at a loss. The gross passenger revenue last year was only $9,620, the petition says.

Another reason advanced by the company for desiring to abandon the division is the increasing costs for power. When the line was constructed the Western New York & Pennsylvania Traction Company developed its own power from gas from fields in and around Ceres, N. Y. which the company owned. The production of these fields has dwindled to such an extent that it is not now possible to use gas, and power is purchased. This has added to the cost of operation.

American Electric Power Deal Concluded—New Directors

Nine new directors were elected on June 27 at a reorganization meeting of the American Electric Power Company, Philadelphia. They are: Sidney Z. Mitchell, chairman of the board and president of the Electric Bond & Share Company; George Breed, chairman of the American Gas & Electric Company; George M. Tidd, president of the latter company; Frank B. Ball, vice-president and secretary of the American Gas & Electric Company; F. W. Drager, treasurer of the same company; H. S. Reynold, vice-president of the Appalachian Power Company; C. N. Mason, president of the New River Power Company; C. P. Hamilton, president of the General Electric Securities Corporation, and W. Graham Clayton, chief engineer of the American Electric Power Company.

Six of the former directors who continue upon the board are: Van Horn Ely, Walter H. Lippincott, E. Clarence Miller and Charles L. S. Tingley, Philadelphia; Thomas W. Wilson, Wilmington, Del., and Alexander C. Robinson, Pittsburgh.

Mr. Tidd has been elected first vice-president, succeeding John Gribbel. Mr. Ely remains as president, and other officers also continue under the new ownership.

Approximately 95 per cent of the common stock of the American Electric Power Company was deposited under the offer of the American Gas & Electric Company and the Appalachian Power Company. The Bank of North America & Trust Company has been notified to pay $62.50 for any additional stock, which might be turned in, although the time limit of the offer expired on June 27.

As explained previously in the ELECTRIC RAILWAY JOURNAL, the American Electric Power Company is the successor under reorganization to the American Railways. Included among its railway properties are the Scranton Railway, Altoona & Logan Valley Electric Railway, Chicago & Joliet Electric Railway, Ohio Valley Electric Railway and the Wilmington & Philadelphia Traction Company.

Terms of St. Louis Bus Purchase Opposed

The committee representing the bondholders of the St. Louis Transit Company have declined to accept the terms of John Hertz, Chicago, of $2,400,000 for the local St. Louis bus lines. Members of the committee representing the bondholders of that company are said to have taken the position that the purchase of the property, which is being operated solely on a permit from the Board of Public Service, is too hazardous and that the price asked is too high. However, it is stated that the decision of the committee is not irrevocable and the hope is still entertained that the sale may be perfected.

Failure of the reorganization committee of the United Railways to reach an understanding with the suburban bondholders is said to have affected the decision of the Transit committee on the bus line purchase. J. K. Newman, a member of the reorganization committee, had proposed that the holders of the $6,500,000 of Suburban bonds outstanding accept $2,000,000 cash and $4,500,000 in securities of the reorganized company for their holdings. The Suburban holders have been inclined to insist on payment in full or the return of the Suburban properties.

Three Portsmouth Lines Abandoned

The Virginia Corporation Commission has authorized the Virginia Railway & Power Company to abandon three of its lines in Portsmouth. The company had operated the lines at a loss for some time, but it did not act to discontinue them until after the city had granted jitney lines the right to compete with the traction system. The attempt will be made to serve the people of Portsmouth in the abandoned territory by rerouting the jitney lines.

Byllesby Makes Offer for California Railway & Power Stock

H. M. Byllesby & Company, Chicago, Ill., have made an offer of $65 a share for the prior preference stock of the California Railway & Power Company, which owns all the capital stock, except directors' qualifying shares, of the Sierra & San Francisco Power Company.

As just indicated, the California Railway & Power Company is a holding company. It is controlled through stock ownership by the United Railways Investment Company. Its authorized capital stock includes $5,000,000 prior preference stock, of which $2,300,000 is now outstanding. By securing a certain amount of this prior preference stock, Byllesby & Company, it is understood, will be in a position to complete purchase plans for the Sierra & San Francisco Power Company. The latter company, which has $20,000,000 capital stock and $20,000,000 funded debt, is at present leased to the Pacific Gas & Electric Company. The California Railway & Power Company also owns certain equity shares of the Market Street Railway, San Francisco.

It is the opinion of Byllesby & Company that the Sierra & San Francisco Power Company may be operated profitably if combined with properties adjacent to it, such as, for instance, certain Byllesby properties. In this connection they say they are interested in purchasing a certain number of shares of the prior preference stock in order eventually to obtain a controlling interest in the Sierra & San Francisco Power Company.

Railway in Astoria, Ore., Abandons Service

Buses replaced the electric cars in Astoria, Ore., on June 29 and now afford the only means of public transportation in that city. The railway system, which has been in operation more than forty years, under the direction of the Pacific Power & Light Company, ceased functioning on that date. A fleet of twenty-five-passenger Mack buses is now in use there, operated by the Astoria Transit Company.

As long ago as last December it was indicated that the railway at Astoria would probably be abandoned. The system is one of a little more than 5 miles. A year and a half ago an area of thirty-five city blocks was wiped out by fire and the railway and the power and light lines of the company were damaged to the extent of about $175,000. More than fourteen blocks of railway track was destroyed. It had been estimated that the work of rehabilitating the railway would cost $150,000. As the railway was a losing proposition the company notified the local City Commission of its intention of abandoning operation.

Bills Owed to Municipalities Paid in Full by Kansas City Railways

The Kansas City Railways paid in full on July 2 all the bills and claims of Kansas City, Mo., and Kansas City, Kan., against it. The Missouri city received $141,950 and the one on the Kansas side $29,000. This indebtedness was incurred by the company before it passed into the hands of receivers on Sept. 9, 1920.

Kansas City, Mo., formerly claimed a total of $175,850, but an agreed reduction in the inter-city viaduct rental and counter claims for street repairs put in by the railway brought the amount down. The amount finally agreed upon was $22,000 larger than that offered by the company early this year to the retiring city administration.

Bankers Offer Illinois Power & Light Preferred

Blyth, Witter & Company, New York, N. Y., offered for subscription on July 10 at $95 a share plus accrued dividend, yielding 7.37 per cent, $5,000,000 of 7 per cent cumulative preferred stock of the Illinois Power & Light Corporation, Chicago. It was explained that $2,600,000 of the issue had been placed privately. The Illinois Power & Light Corporation owns and operates or controls electric power and light, gas, heat and city railway properties in a large number of the most populous and prosperous municipalities in Illinois. The corporation also controls, through ownership of the entire capital stock, Illinois Traction, Inc., which owns an extensive and profitable system of trunk line electric railroads in Illinois, and other utilities of which the most important are the Des Moines & Central Iowa Electric Company and the Kansas Public Service Company.

Property at El Paso, Tex., Expands.—The El Paso Electric Railway has purchased the plant of the Las Cruces Electric Light & Ice Company. The purchase price of the plant, including the cost of installations to be made, is said to total $275,000. The El Paso Electric Railway does both a railway and lighting business. Control of the company is vested in the El Paso Electric Company. Stone & Webster, Inc., are executive managers.

Atlanta Company Does More Financing.—Authority to issue $3,000,000 of thirty-year 6 per cent general mortgage gold bonds, maturing April 1, 1954, has been asked of the Georgia Public Service Commission by the Georgia Railway & Power Company, Atlanta. The proceeds are to be used for development of water power facilities in the vicinity of Tugalo, Tallulah and Burton dams, where the company has for years been carrying forward its program of hydro-electric development. On July 1 Estabrook & Company, New York, and Putnam & Company, Hartford, Conn., offered for subscription at 95, yielding 7.37 per cent, $2,500,000 of 7 per cent cumulative first preferred stock of the company series of 1924.

Wants to Purchase Line.—The Indiana Service Corporation, Fort Wayne, Ind., has filed a petition with the Public Service Commission asking for authority to purchase 95 per cent of the capital stock of the Ft. Wayne & Northwestern Railway. The property, which it is proposed to purchase, includes a traction line from Ft. Wayne to Garrett and Kendallville, Ind. The petition said the purchase price for the capital stock would be $448,000.

Petition for Permission for Abandonment Dismissed.—Justice Joseph Aspinall of the Supreme Court, sitting in Brooklyn, has dismissed the motion made by counsel for General Lincoln C. Andrews, receiver for the New York & Queens County Railway, for permission to abandon the lines and forfeit their franchises. The court ruled, however, that this dismissal does not prejudice a later presentation of the motion, if conditions should warrant such a course. It appeared during the hearing that the receiver desires to keep the motion open, so that it may again be presented if the City of New York should in any way compel a reduction of the 6-cent fare now being collected on the lines of the company under an order from the New York Transit Commission.

Line Goes Out of Business.—A recent court decree terminated the operation of the Sunbury, Lewisburg & Milton Electric Railway, Sunbury, Pa. The company was organized thirteen years ago, but only 1½ miles of the track was built. This line was used principally by shopmen of the Pennsylvania Railroad.

Interurban Would Abandon Short Line.—Application has been made to the Maryland Public Service Commission, Baltimore, by the Washington Interurban Railroad, controlled by the Washington Railway & Electric Company, for permission to abandon 1.57 miles of rail service between Bladensburg and East Riverdale, Md., until a new highway is completed between these points. Upon completion of the highway the company wants to substitute bus service. The commission will hold a hearing on the subject on July 23.

Receivership May Be Lifted in August.—Under the plans for its reorganization two separate companies will take over the properties of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., which has been operated by a receiver for several years. As a first step in the reorganization the Buffalo & Erie Railway has been incorporated to operate in Erie and Chautauqua Counties with headquarters at Erie, Pa. It will take over the interurban division between Erie, Pa., and Buffalo, N. Y., while the Erie Railway will take over and operate the local lines in the city of Erie, Pa. It is expected that the receivership will be lifted early in August. As noted in the ELECTRIC RAILWAY JOURNAL for July 5, page 33, the capital stock of the Buffalo & Erie Railway consists of 7,005 shares of preferred at $100 per share and 30,000 shares of common stock of no par value.

Receiver for Massachusetts Road.—The Milford, Attleboro & Woonsocket Street Railway, Milford, Mass., has been placed in the hands of Clark V. Wood, president of the company, as receiver, by Judge Wait in the Massachusetts Supreme Court. The company has a stock liability of $315,000, all to the New England Investment & Securities Company. It has paid no dividend since 1914. It has a floating indebtedness of $59,198. Mr. Wood has been instructed by the court to prepare an inventory of the property within sixty days. About 30 miles of track are operated by the company. The road connects Woonsocket, R. I., with Blackstone, Milford, Franklin, Plainville, Bellingham, Hopedale, Mendon and Wrentham in Massachusetts.

Reduction in Capital Stock Authorized.—The Lafayette Street Railway, Inc., Lafayette, Ind., has petitioned the Indiana Public Service Commission for authority to reduce its authorized capital stock from $200,000 to $100,000. At present only $80,000 of the authorized capital has been issued.

Book Reviews

Principles of Railway Transportation

By Eliot Jones, Ph.D., professor of economics, Leland Stanford University. 607 pages. Published by the Macmillan Company, New York, 1924.

While this book is designed primarily to serve the needs of teachers of elementary railroad transportation, it is stated that it is a reference book that will appeal to the general reader who desires an unbiased understanding of the fundamentals of the railroad situation. A great deal of the book is taken up with railroad history. Not only does this include the early history of the railroads, but a history of legislation prior to the World War, a very complete chronicle of events during the war, and the principal developments since that time, including a discussion of the operation of the Esch-Cummins act of 1920.

Arc Welding Handbook

By C. J. Holslag, Chief Engineer, Electric Arc Cutting & Welding Company. Published by the McGraw-Hill Book Company, Inc. New York, N. Y. 1924. $2.

This book provides a simple and practical manual of instruction in arc welding. The various methods and equipment in general use are described and the individual processes are taken up step by step in a simple manner so that the beginner can understand both the equipment and the welding process. A number of questions are asked at the end of each chapter for assistance in case the book is used as a text.

Chapters, are given on various details of welding, such as bead forming, spread welding, padding, lap, butt, tank and boiler welding. The book also contains recommendations for setting up the equipment of various types of electric welding apparatus and descriptions of useful welding methods. Information is included for men in a supervisory capacity, so that the owner, manager, foreman and others may have specific information in regard to their welding problems.

New York, New Haven & Hartford Railroad Electrification

Published by Westinghouse Electric & Manufacturing Company with the co-operation of officers of the New York, New Haven & Hartford Railroad, June, 1924. 43 pages, 8½x11.

This attractively arranged booklet contains a description of the electrification of the New Haven Railroad between Grand Central Terminal in New York and the Cedar Hill freight terminal east of New Haven. In addition there is a brief account of the minor electrical installations of the railroad, the first of which, the Nantasket Beach branch, dates back to 1895. This is stated to be the first example of electric power applied to steam railroad operation in this country.

The book includes technical descriptions of the track and overhead system, power generation and distribution, the signal system, locomotives and multiple-unit cars, equipment maintenance practices and facilities, service and results of operation. This electrification, it is stated, has 590 track-miles supplied by the 11,000-volt, single-phase overhead trolley system and includes the largest electrified yard in the world. The equipment includes the most extensive single homogeneous signal system in the world. The book is an excellent record of recent progress.

Personal Items

Ross Schram in Charge

Former Assistant General Manager at Detroit Placed in Full Charge of 400-Mile Municipal System

Much of the success that has attended the operation of the municipal railway in Detroit is attributed by the Street Railway Commission to the vigor and enthusiasm of Ross Schram, who has just succeeded William B. Mayo as general manager of the Detroit Department of Street Railways. Mr. Schram's first activity in public life in Detroit dates from the time he was named as secretary to Mayor-elect James Couzens in 1918, just preceding the controversy between the Mayor and the Detroit United Railway. When the start was made in 1919, on the construction of the first of the municipal lines as the nucleus of Detroit's present system, Mr. Schram was made secretary of the Street Railway Commission. The duties of that position he performed in addition to being the Mayor's secretary.

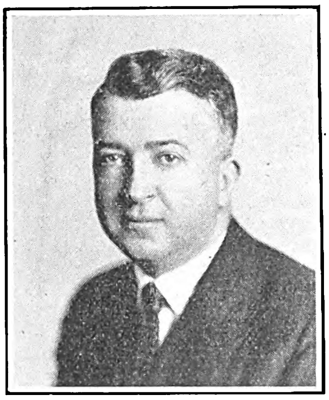
MAYOR'S POLICIES CARRIED OUT

Mr. Schram was familiar with the policies of Mr. Couzens and knew the program the former Mayor had mapped out, and when he was named assistant general manager of the D. S. R. on Dec. 23, 1921, as aid to the late Joseph S. Goodwin, then general manager, Mr. Schram became still more active in street railway affairs. Mr. Goodwin concerned himself largely with the details of practical street railway operation while Mr. Schram was instrumental in carrying out the Couzens policies when the railway system expanded to a point where the former Mayor could not devote the necessary time to street railway affairs.

Upon the death of Mr. Goodwin, Mr. Mayo resigned his place on the Street Railway Commission to become general manager of the railway and Mr. Schram continued as assistant general manager. Mr. Mayo has many outside interests, notably with the Ford company, and it was his idea that Mr. Schram should be put in charge as general manager as Mr. Schram had really been acting as chief executive but without the full credit and responsibility and without the pay of the position.

It has often been said that the occasion produces the man. This has certainly been true in the Detroit case. In a way Mr. Schram was hurtled into one responsibility after another at Detroit. The advisability or inadvisability of municipal ownership entirely aside from the question, Mr. Schram's record of accomplishments appears destined to stand the test of time. And after all is said and done there lies the criterion of greatness. Mr. Mayo's own recommendation of Mr. Schram is in itself a glowing tribute to the ability of the new manager, for Mr. Mayo, a man of great talent and wide experience, in the best possible position of all to judge the matter, has said in effect that Mr. Schram's record entitled him to full credit and full responsibility.

It is well to consider just what that means. It means the direction of 378 miles of city railway with nearly 1,500 cars, a big responsibility for a man only thirty-six years old. It is also well to consider the past. Since the city took over the local lines they have been largely rebuilt physically. Some of the other accomplishments include the addition of more than 500 cars, representing an increase in rolling stock of approximately 45 per cent, and the construction of nearly 50 miles of new line. Operating first on a 5-cent fare and later on a 6-cent fare, the municipal system has maintained itself and met all payments on the Detroit United Railway purchase price, approximately 25 per cent of which is now paid off. It is true that Mr. Schram has been aided in the work at Detroit by some of the best engineering and management talent in the country, but, after all, the credit of accomplishment is largely his.



Ross Schram

Mr. Schram was born in Battle Creek, Mich., in September, 1888. He became connected with Detroit affairs as municipal representative for the Detroit *News*. This was after his graduation from the Detroit University School. Later he entered the automobile field and was connected with the Charles H. Fuller Company, advertising agents, Chicago, handling the Overland, and with the J. Walter Thompson Company, New York, handling the Ford account. He was also associated with the Packard Motor Car Company as editor of the Packard house organ. For two years he was an automobile dealer in Ottawa, Ont.

Chicago Surface Lines Promotions Announced

Recent changes in personnel announced by the Chicago Surface Lines are as follows:

F. L. Kriete promoted to general attorney. He will also have charge of the department of accident investigation. Mr. Kriete succeeds John R. Guilliams, recently appointed general counsel in charge of the legal department of the company.

E. H. Altemeier promoted from assistant division superintendent to division superintendent in charge of second division.

Floyd J. Frank promoted to assistant division superintendent in charge of fifth division.

E. L. Brookman promoted to assistant division superintendent in charge of tenth division.

George T. Connor has been named general superintendent of the Moose Jaw Electric Railway, Moose Jaw, Sask., succeeding the former general superintendent, H. A. McLean. Mr. Connor has resided at Moose Jaw since August, 1911. He was born in Hillsborough, N. B., in February, 1891, and served his apprenticeship in engineering with the Portland Iron & Steel Company, Portland, Me. In 1911 he assisted in laying the bedplate of the first power unit of the Moose Jaw company's power plant and for nine years was in charge of this plant, a pioneer Diesel installation in the West. Since the railway's own plant was shut down and the railway has been purchasing power from the city power plant, Mr. Connor has acted for the company in the capacity of assistant to the superintendent.

Daniel F. Lewis's name was omitted as one of the past presidents of the New York Electric Railway Association in the report of the annual convention of that body in the issue of June 28. This was an oversight. In the report of the meeting the statement was made that the newly elected president of the association, C. E. Morgan of the Brooklyn City Railroad, was the first officer of that company to be elected president since 1882. As a matter of fact, Daniel F. Lewis was elected president of the association in 1890-91, when he was president of the Brooklyn City Railroad.

F. C. Chambers, president and general manager of the Des Moines City Railway, Des Moines, Iowa, was reelected president of the Iowa Electric Railway Association at the annual meeting at Fort Dodge, on June 24 and 25. A portrait and a biography of Mr. Chambers were published in the ELECTRIC RAILWAY JOURNAL for June 21, 1923, on the occasion of his election to head the association.

F. A. Persons has been appointed superintendent of the Greenfield-Turners Falls, Mass., line, which has been taken over by the towns of Greenfield and Montague for operation under the state transportation area act. Early in his career he was in the employ of the Concord, Maynard & Hudson Street Railway, serving in the mechanical, accounting and operating departments. He was made superintendent in 1909. Prior to that he was connected with the Connecticut Valley Street Railway. Greenfield, Mass. In the fall of 1913 Mr. Persons was appointed to the position of superintendent of motive power and equipment of the Massachusetts Consolidated Railways. Greenfield.

Obituary

Benjamin G. Lamme

Benjamin G. Lamme, chief engineer of the Westinghouse Electric & Manufacturing Company and one of the pioneers in developing methods of high tension transmission, died on July 8 at his home at East Liberty, Pa., at the age of 60 years.

Many tributes have been paid to Mr. Lamme, but his characteristics and accomplishments have, perhaps, been most succinctly stated by one of his associates who said in effect that Mr. Lamme was one of the silent leaders of the engineering industry, a man whose genius was expressed in creative effort, whose vision covered a range beyond immediate problems, and whose work is a monument to their memory. Mr. Lamme typified during his life not only the spirit of research and experiment but the spirit of practical achievement.

Mr. Lamme was a prolific inventor, 150 patents standing to his credit. He was largely instrumental in the perfection of many alternating-current devices. Numbered among his early achievements was the design of the famous 5,000-hp. "umbrella-type" generators for use at Niagara Falls. He also designed the generating and motor equipment for the New York, New Haven & Hartford Railroad, following this by electrification work on the Paoli section of the Pennsylvania Railroad and on the Norfolk & Western Railroad. His work on the synchronous converter he regarded as one of his greatest achievements. For years he fought the battle for it almost single-handed. He won out, and this is now the accepted machinery for converting alternating current into direct current.

Mr. Lamme had long held the belief that the success of heavy electric railroading lay in the use of a high-voltage alternating current on a single overhead trolley. The main difficulty lay in finding suitable ways and means for utilizing the single-phase alternating current. After several attempts he succeeded in designing a series commutator type of motor with suitable characteristics, which he described along with the system of power distribution in a famous paper before the American Institute of Electrical Engineers.

Following his graduation from Ohio State University Mr. Lamme entered the employ of the Westinghouse Company in 1889 at $30 a month. Although he had little opportunity to study electricity in college, there being no course in electrical engineering at that time, he became deeply interested in the subject and read all he possibly could about it. Owing to his skill in mathematics he was assigned by the Westinghouse company to the task of studying the natural laws to which electrical phenomena were subject and of finding methods for the calculation of electrical machines in accordance with those laws.

An outstanding trait in Mr. Lamme's character was his interest in young engineering students. For years he made a study of the young technical graduates who entered the Westinghouse Electric organization, analyzing their abilities and characteristics to adapt them to the work to which they were best fitted. He maintained a design school for these men, in which he gave actual instructions, so that today the methods and knowledge of this great engineer have been passed on to the vast Westinghouse engineering body, and will stand as an inheritance to these engineers in years to come.

His tastes were simple and his modesty extreme. He had no flair for publicity and his name was not familiar to the man in the street, but his impress on the plastic industry with whose phenomenal growth his mature life was coeval, was deep and will be lasting.

Mr. Lamme was born on a farm near Springfield, Ohio, on Jan. 12, 1864. He entered Ohio State University in 1883, and was graduated in mechanical engineering in 1888, having been out of school for one year because of his father's death.

B. G. Lamme

Mr. Lamme was a fellow of the American Institute of Electrical Engineers. From the Institute he received the honor of being elected one of the two members from that body on the Naval Consulting Board during the war, and he was also made chairman of the inventions committee on that board. In 1919 he received the Edison medal from the Institute for his engineering achievements. Last year the board of trustees of Ohio State University awarded him the Joseph Sullivant medal in recognition of the value of his work to the world.

Hiram B. Stubblefield

Hiram B. Stubblefield, purchasing agent for the Nashville Railway & Light Company, Nashville, Tenn., died in that city on July 6.

Mr. Stubblefield entered the street railway field in Nashville when the first horse-drawn cars made their appearance. He was then connected with a company operating the Woodland Street line and was so employed when the Broad Street line, the first to be electrified, did away with its horse-drawn vehicles.

With electrification of the roads came consolidation, and Mr. Stubblefield was elected secretary and treasurer of the McGavock & Mount Vernon Railroad, a consolidation. During the '90s, the McGavock & Mount Vernon and a small company operating in South Nashville were bought out by the United Electric Company.

Mr. Stubblefield left the railway business after the purchase and bought, with his brother, a ferry landing in Perry County. Five years later they sold out and bought some phosphate beds in Hickman County, which they continued to operate until ten years ago, when Mr. Stubblefield accepted the position as purchasing agent for the Nashville Railway & Light Company.

Mr. Stubblefield was born at McMinnville, Tenn., on Oct. 6, 1853, and was graduated from Hughes and Mims preparatory school and later received a B. A. degree from Emory and Henry College, Virginia.

C. N. Wilcoxon

C. N. Wilcoxon, former president of the Chicago, Lake Shore & South Bend Railway, South Bend, Ind., died suddenly by his own hand in his home at Michigan City, Ind., on July 7. It has been known that Mr. Wilcoxon was ill for some time and this illness is thought to have caused a depression, which ended in dementia.

Mr. Wilcoxon was born at Muncie, Ind. The early part of his business career was spent in the construction and management of gas and waterworks systems. In 1893 he accepted the position of general manager of the local street car lines at Muncie, Ind., where he remained until 1898, when he went to Decatur, Ill., as general manager of the Decatur Traction Company. During his association with this property the system was rebuilt and put on a substantial, paying basis. In 1901 Mr. Wilcoxon became general superintendent in charge of the operating department of the Western Ohio Railway, Lima, Ohio, where he remained until 1905, when he became general manager of the Cleveland, Southwestern & Columbus Railway. It was while acting in this capacity that he began to urge the various methods for promoting safety which today have become so important a part of transportation practice. Mr. Wilcoxon may be said to be one of the pioneers in the modern safety movement.

In 1909 he resigned his position with the Cleveland, Southwestern & Columbus to become general manager of the Chicago, Lake Shore & South Bend Railway. In 1914 he was also elected a vice-president of the latter company and later in the same year became president. This position he retained until April, 1924, when he resigned on account of ill health.

Mr. Wilcoxon served as president of the Central Electric Railway Association in 1917.

William Piper, for the last twenty years assistant superintendent of the Niagara Gorge Railway, Niagara Falls, N. Y., died on July 5 at his home in Lewiston, N. Y. He was 54 years old. Mr. Piper had been associated with the Niagara Gorge Railway since its organization in 1895. He is survived by his wife, a daughter and two sons.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

American Car & Foundry Earnings Increase

The net earnings of the American Car & Foundry Company, Berwick, Pa., for the year ended April 30, 1924, were $6,304,000, compared with $6,213,000 in the previous year. These earnings, which resulted from the subtraction of charges, Federal taxes and preferred dividends, are equal to $14.01 a share on the $30,000,000 of common stock compared with $13.71 a share a year ago.

	1924	1923
*Profit	$10,786,573	$10,633,562
Renewals, replacements	4,481,606	4,419,951
Net income	$6,304,967	$6,213,611
Preferred dividends	2,100,000	2,100,000
Common dividends	3,600,000	3,600,000
Surplus	$604,967	$513,611
Previous surplus	36,673,499	36,159,888
Total surplus	$37,278,466	$36,673,499

*After federal taxes.

W. H. Woodin, president of the company, said that operations were now between 75 and 80 per cent of capacity and that although buying of equipment had decreased, he anticipated satisfactory conditions when the crops had their analysis.

Barney & Smith Plant Sold Piecemeal

The piecemeal sale of the Barney & Smith Car Company's plant at Dayton, Ohio, has been approved by Judge Edward T. Snediker of the Montgomery County Common Pleas Court. The assets of the company were sold at public auction on June 12 by Master Commissioner Carroll Sprigg. The amount obtained in the sale was approximately $437,306. The court's approval virtually ends protracted litigation. The purchasers assume June taxes and assessments amounting to $38,951, making a sale value of $476,257.

The sale was held following a nation-wide advertising and circularizing campaign. It was in charge of the Gerth Realty Experts, New York, auctioneers, and D. G. Boyd, Dayton, realtor. It was attended by machinery buyers from many sections of the country. The plan to parcel the real estate was conceived by the realtor in charge of the sale, after it became apparent that no manufacturers could be interested in the plant as a whole. The sale was considered a success because of the industrial outlook and the fact that all parcels were bid in at good market prices.

This was the fifth attempt to dispose of the holdings at the instigation of the receiver, Valentine Winters, Dayton banker. The sale was ordered by the court following foreclosure action in behalf of holders of the first mortgage bonds.

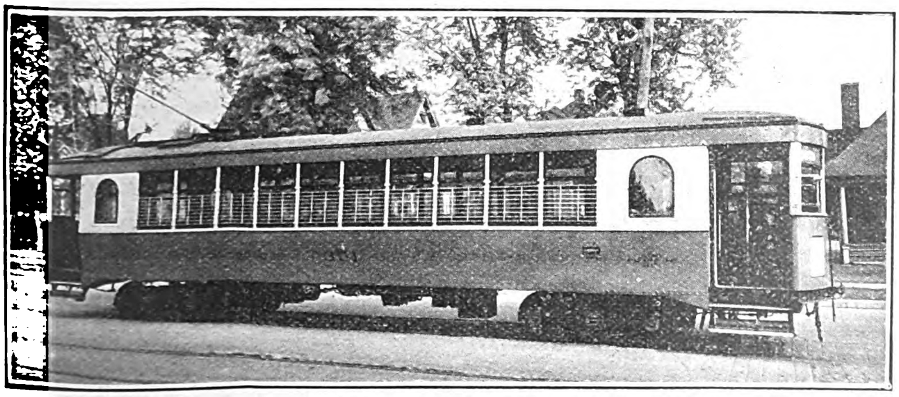
The plant comprises forty-seven acres of land and seventy-six buildings of various sizes. Most of them are said to be in a neglected condition. The plant has been idle for six years and it has been considered to be obsolete as a car-building establishment.

Spray Engineering Sales Organization Strengthened

The Spray Engineering Company, Boston, Mass., has appointed H. Clay Moore southeastern representative, with headquarters in the Healy Building, Atlanta, Ga. His territory will include Georgia, Alabama and Florida. L. H. Parker, president of the Spray company, also announces that a distributing sales organization to handle the pneumatic spraying apparatus of this concern has been formed at Boston under the name of the Spray Painting & Finishing Equipment Sales Company. Headquarters are at 60 High Street. F. H. Hills has been elected president of this subsidiary.

New Cars in Service in Knoxville

Fourteen new cars were placed in service on June 1 by the Knoxville Power & Light Company, Knoxville, Tenn., seven being of the double-truck type shown in the accompanying illustration, and the other seven being single-truck safety cars. The total cost of these cars, which were built by the Cincinnati Car Company, was about $134,000.



Type of Car Recently Placed in Operation in Knoxville, Tenn

New Railway Publications Issued By Westinghouse

The Westinghouse Electric & Manufacturing Company has released several new publications on steam railroad electrification, railway equipment, operating data, electric railway motors and controllers and also a leaflet on freight haulage.

Reprint 176, "Baldwin-Westinghouse Electric Locomotives," is a thirty-two-page publication covering the use of these locomotives for main line service.

Folder 4596, "An Exhibit of Modern Steam and Electric Equipment," consists of illustrations and certain pertinent data relating to the exhibit at the A. I. E. E. convention in Philadelphia, Feb. 4-8.

Folder 4587, "Suburban Transportation by Electricity," gives a summary of the equipment, distribution system and operating data of the Philadelphia-Paoli electrification of the Pennsylvania Railroad.

Eight new pages of operating data on railway maintenance are entitled:

"Assembly and Care of Jumpers and Receptacles."
"What Baking and Dipping Armatures Did for One Operator."
"The Maintenance of Electric Railway Car Wheels."
"Lightning Arresters and Their Application for Railway Equipment Protection."
"Special Armature Bearings to Fit Worn Shafts."
"Protecting Railway Motor Commutators at Front V-Ring."
"Shop Methods of Cleaning Detail Parts of Car Equipment."
"Wrenches and Hand Tools for Overhauling Railway Motors."
"Selection of Waste for Railway Motor Bearings."
"How to Reduce Temperature on Overload Motors."

Leaflet 20,153, "Type K-35 Controller," has also been released. This gives detailed specifications and dimensions of the K-35 KK standard railway controller and a diagram of connections for two controllers and four motors.

Leaflets 20,055-A and 20,148 cover specifications on the 535-A and 514-A railway motors respectively.

"Freight Haulage," Leaflet 20,174, sets forth briefly the benefits to be derived from the establishment of freight service on interurban lines.

In Leaflet 20,154, "External Fans for Non-Ventilated Railway Motors," is described the latest scheme developed for the improvement of the earlier types of non-ventilated railway motors.

Metal, Coal and Material Prices

Metals—New York	July 8, 1924
Copper, electrolytic, cents per lb	12.375
Copper wire base, cents per lb	14.75
Lead, cents per lb	7.00
Zinc, cents per lb	6.15
Tin, Straits, cents per lb	44.00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	2.15
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.70
Central, Ill., screenings, Chicago, net tons	1.675
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.00
Weatherproof wire base, N. Y., cents per lb	17.00
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal	$0.99
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.625
Turpentine (bbl. lots), N. Y., per gal	$0.83

Rolling Stock

Long Island Electric Railway, Jamaica, N. Y., on July 7 suffered the loss of its carhouse at Jamaica and thirty cars in a fire which practically destroyed the plant. The equipment burned included eleven double-truck open cars, fifteen double-truck closed cars and four work cars. The total damage is estimated at $100,000, $15,000 of which represents the loss of the building. Service was continued with the remaining rolling stock and with cars borrowed from other properties. It has not yet been decided by the management just what will be done to secure equipment to replace that destroyed.

Richmond Light & Railroad Company, Staten Island, N. Y., has made available for publication the details regarding the twenty-five one-man two-man cars ordered from the Osgood-Bradley Car Company. The principal specifications are as follows:

Number of cars ordered	25
Name of road,	Richmond Light & Railroad Company
Date order was placed	Feb. 15, 1924
Date of delivery	Complete July 15, 1924
Builder of car body,	Osgood-Bradley Car Company
Type	Light-weight, double-truck one-man, two-man safety car
Seating capacity	44
Total weight	33,800 lb.
Bolster centers, length	21 ft. 4½ in.
Length over all	44 ft.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 4½ in.
Height, rail to trolley base	11 ft. 1½ in
Body, steel.	
Interior trim	Steel, stained cherry color
Roof	Arch
Air brakes,	Westinghouse, with DH-16 compressor
Armature bearings	Plain
Axles	A.E.R.A. standard
Bumpers	Channel anti-climber
Car signal system	Push button
Car trimmings	Bronze
Center and side bearings	Plain
Control	GE Type K with line switch
Curtain fixtures	Morton Mfg. Co.'s crown
Curtain material	Fabrikoid
Destination signs,	Hunter No. 8 illuminated
Door-operating mechanism,	National safety car equipment
Wheelguards	Root
Gears and pinions	General Electric
Hand brakes	Peacock staffless
Heater equipment	Consolidated
Headlights	Ohio Brass, golden ray
Journal bearings	Plain
Journal boxes	Symington
Lightning arresters	General Electric
Motor	Four G.E.-265, inside hung
Registers	Sterling-Meaker
Sanders	Ohio Brass, air type
Sash fixtures	Howard
Seats	Heywood-Wakefield 57-SK
Seating material	Rattan
Step treads	Kass Safety
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass
Trolley wheels	General Electric
Trucks	Osgood-Bradley No. 30-66
Ventilators	Eight single exhaust type
Wheels	Cast iron, 26 in.
Special devices,	Air-operated gong and register ringing device.

Interurban Expects to Begin Bus Service Soon.—The Interstate Public Service Company, Indianapolis, expects to begin operation about Aug. 1 of twelve de luxe type buses on a 20-mile run from Indianapolis to Greenwood, Whiteland and Franklin, Ind. This service, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL, will parallel the interurban line and will take the place largely of the present local service over the interurban. The highway between Indianapolis and Franklin is paved all the way. This is the first bus operation entered into by the Interstate Public Service Company as such, though it has previously entered in a joint arrangement with independent bus operators.

Track and Line

Kansas City Railways, Kansas City, Mo., is putting in a street railway loop at Muehlbach Field for the benefit of the baseball fans. The cost of the work is $40,000. Of this amount the laying of the tracks cost $37,270. The rest of the amount is spent for property rights.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will soon begin building an extension on Center Street from Twenty-seventh Street to Thirty-fifth Street, connecting its Thirty-fifth and Twenty-seventh Streets one-man car lines. A franchise for this extension was recently granted by the Common Council.

Louisville Railway, Louisville, Ky., placed in operation on July 4 a new loop at the entrance to the Louisville Baseball Park of the American Association Club, which has a seating capacity of more than 20,000 people. The company carried a connecting line from Fourth Street through Avery Street to Second Street in order to run cars out Fourth Street headed for the ball park.

Pacific Electric Railway, Los Angeles, Cal., has started construction work on a double track tunnel to be 4,225 ft. long. The new tunnel will provide a more direct route for the Pacific Electric Railway cars from the business district of Los Angeles to Hollywood. The total cost of the project is to be about $3,500,000. Contract for driving the tunnel has been awarded to Twohy Brothers.

Power Houses, Shops and Buildings

Wilmington & Philadelphia Traction Company, Wilmington, Del., suffered damage to its property in a storm on June 25, amounting to approximately $40,000. An old carhouse at Sixth and Hawley Streets, housing forty cars, was demolished. The carhouse, formerly owned by the old Peoples Railway Line, stood next to the new carhouse. It is estimated that it will cost $30,000 to replace.

Pacific Electric Railway, Los Angeles, Cal., announces that due to the large increase in volume of freight and passenger traffic on its southern division lines, it proposes the construction of another automatic substation in the city of Los Angeles, near Twenty-fifth Street and Long Beach Avenue on its Long Beach four-track line. The new substation complete will cost approximately $104,000. Construction of the new station will begin soon. Upon completion of the new substation it will bring the total of the Pacific Electric power transforming stations in Southern California to fifty-three.

Trade Notes

Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa., is in no way connected with the Mitchell Spring Works, Johnstown, Pa., reported recently to have passed to a new company, known as the Mitchell Spring & Manufacturing Company. William McBride, president of the Fort Pitt Company, denies that he is a stockholder in the Mitchell Spring Works or its successor or that any members of the Fort Pitt company are interested in the Mitchell enterprise.

Portland Cement Association, Chicago, Ill., announces the appointment of L. N. Whitcraft as district engineer in charge of the Philadelphia office, 1315 Walnut Street, effective June 1. Mr. Whitcraft has been connected with the Portland Cement Association for eight years as field engineer attached to the New York office. For several years past he has been in charge of association work in New Jersey. Prior to joining the Portland Cement Association staff, he was county road engineer for Somerset County, Maryland, and chief engineer of the hydrated lime bureau of the National Lime Manufacturers' Association.

General Electric Company, Schenectady, N. Y., has announced that K. A. Hills, since January attached to the Davenport sales office of the General Electric Company, has been made manager of that office, covering a territory including a large part of the state of Iowa. Mr. Hills has been an employee of the General Electric Company since May, 1910. S. F. Gates, for fourteen years in charge of the Spokane office, has been appointed manager of the Los Angeles office. Bernhard Olsen, for twelve years employed in the Spokane office, has been appointed manager of that office, succeeding Mr. Gates.

Nic Le Grand, Inc., Rock Island, Ill., has received an order for seven positive safety equipments for the Toledo & Indiana Railroad. These are to go on new cars being built by the Cincinnati Car Company. The Le Grand Company has also received an order for its safety equipment for converted cars for the Wisconsin Public Service Corporation at Green Bay, Wis.

New Advertising Literature

Oxweld Acetylene Company, Long Island City, Chicago and San Francisco, has published a new forty-eight-page catalog illustrating and describing its extensive line of acetylene generators and oxyacetylene welding, cutting, brazing, lead burning, heating and decarbonizing equipment. The book is replete with information useful to the user or prospective user of oxyacetylene apparatus.

Foamite-Childs Corporation, Utica, N. Y., has issued a twenty-page booklet called "Dipping Dangers." The booklet describes among other things the application of Foamite protection to modern industrial fire hazards.

New York, Saturday, July 19, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

Henry W. Blake and **Harry L. Brown**, *Editors*

Volume 64
Number 3

Careful Maintenance Insures Good Electric Car Lighting

CAR lighting usually is a matter of little concern to the management of an electric railway or even to the equipment superintendent. Ordinarily in the design of the car a number of outlets are provided sufficient to give what is supposed to be adequate illumination with the correct size of lamps, and nothing further is done except to replace the lamps when they burn out.

But car illumination is much more than merely replacing lamps as a matter of routine maintenance, as is seen from the article by E. E. Dorting in this week's issue. His study of causes of failures shows that by far the greater number are due to breakage of the filament. While this is to be expected on account of the severe shocks incident to railway service, the average life obtained in subway service is 1,644 hours, against a guarantee of 1,500.

A feature of this study that is of vital importance is that it pays to discard lamps after their illuminating power has been reduced a certain amount. This is, of course, on the assumption that production of light is what the lamps are installed for. Far too often the lamps are allowed to burn to the point of mechanical failure, even though the filament has broken and been welded together a number of times, with a corresponding reduction in illumination, or else the bulb has blackened so that only a fraction of the light can get through. By keeping the illuminating value of the lamps up to standard, a smaller number is needed to produce the desired result.

Illumination is the purpose for which lamps are installed. It has a great value in the merchandising of transportation. So the progressive railway should see to it that the lamps are properly maintained, since, as the author states, "Light, not lamps, determines the economy of car lighting."

Continued Study of Rail Corrugation Will Bring Results

AS A RESULT of years of effort, the medical profession has finally accomplished the almost complete elimination of the once dreaded typhoid fever. The successful outcome of this tedious struggle might well serve as an inspiration for electric railway engineers who are growing weary of some of their problems. One such problem that has been studied for many years and still remains a long way from solution is rail corrugation. Not a few way engineers have voiced the opinion that it is a waste of time to study this subject any more, because previous investigations have not got very far. That is not a very courageous attitude, however. The harder the nut to crack, the greater the achievement of him who does it.

A worth-while contribution to the study of this question is made in this issue by I. E. Church, who has made extensive investigations of rail corrugation on the Pittsburgh Railways. The evidence in this case points to there being an important relation between tightness of gage and corrugation of rail. Some interesting observations concerning the effect of rigidity or flexibility in the structure are also made. Of course there is nothing very novel in these conclusions. But it is not the novel theory that usually turns out to be right. Rather it is the theory which has been tested again and again, and confirmed.

It appears to be quite generally believed now that rail corrugation is the result of any one or a combination of several different causes. Among these are wheel slippage on curves, condition of the rolling stock, irregularities in gage and nature of the track structure. Not all electric railway engineers agree on the relative importance of these different factors, nor do they agree concerning the effects produced by each. But the more we can learn from authoritative sources concerning actual conditions and results in various places, the further we are advanced along the road to an ultimate solution.

Putting Car Lubrication on a Higher Level

THE day is passing when oil for use about an electric railway may be stored in any dark corner where odds and ends of equipment of various sorts are tossed, and where sand or sawdust must be thrown on the floor to soak up the slopped oil. The use of any shed or lean-to for the storage of oils, where there is only a part of a floor, and where rain can flood the place has been found an expensive adjunct. Then, too, the use of an old leaky coffee pot or a tin can for measuring and issuing lubricants has likewise gone into the discard.

Alert mechanical men now realize the importance of having the oil house carefully arranged and know that economy in oil should start at that point. The survey on storage and handling of oils, published elsewhere in this issue of the ELECTRIC RAILWAY JOURNAL, shows that 60 per cent of the electric railway shops included have provided oil storage facilities equipped with modern storage tanks. These oil houses provide places for the immediate transfer of the oils to proper storage tanks as soon as they are delivered. These

This is the issue in July that is devoted essentially to maintenance subjects

tanks can be kept clean and painted at intervals. In general they are plainly labeled to show their contents. The use of measuring pumps for the issue of oil has stopped slopping and waste, as well as mistakes in the amounts drawn off. Concrete floors fitted with drains assist in the work of keeping all the parts clean.

The storage of greases which are too heavy to flow with any degree of rapidity without excessive heating must be in the shipping containers. In general, lubricants of this nature can best be handled by using a clean paddle or spoon, or in cold weather a knife, to remove the necessary quantities to fill smaller containers which can be carried to the parts to be lubricated. For the protection of greases stored in barrels or drums a special removable cover can be used, which will reduce the danger of getting dirt into the interior.

How much of this changed attitude on the part of railway shop men is due to the stand taken by the fire insurance men against carelessness in the handling of inflammable materials it is hard to say. Certainly this factor has been one that has played a great part in the improvement of conditions. Apart from any reduction of insurance premiums, the regulations which now apply are worth all they cost in saving of lubricants and in better lubrication.

Of course, the men engaged in the work of oiling have a dirty job. The improvement in working conditions that has come from the better storage and handling methods tends to attract a better class of men. The importance of the work is being recognized by shop managements, and those men assigned to the work are being chosen accordingly.

All these things are steps forward and should lead to gratifying results. There are, however, some railways that have not yet learned the lesson. If an analysis of lubricating troubles and high oil costs on such properties is made, undoubtedly it will show the importance of cleanliness, and through it a considerable reduction in the cost of lubricants and an increase in their lubricating value by keeping foreign material out.

Study Your Shop Organization

THE most efficient shops are those where the men are kept busy continuously doing the particular class of work to which they are best suited. If a high-class mechanic has to leave his work to assist in moving some heavy piece of equipment, or if he is required to go to the storeroom to obtain some needed material, he not only is doing work which a lower paid employee could do just as well, but his work is interrupted, which reduces his efficiency and in many cases an overcrowded machine tool is allowed to stand idle. The greatest production and efficiency in a railway shop results only when sufficient auxiliary mechanical equipment is provided so that each shopman is kept at work steadily.

Electric railway shops encounter many conditions that make it hard to maintain an efficient working organization. Most roads require all of the rolling stock that they can put on the streets for their morning and evening rush service. Cars due for inspection are thus not placed in the shop until late in the morning and they must be released in time for the evening rush hour. Also, cars that are being overhauled must be put through the shop and returned to service promptly. It requires a considerable amount of serious effort on the part of foremen so to organize their work that men are kept busy who work in the inspection and overhauling of cars. Also on small properties workmen must be shifted from one job to another, since there is an insufficient amount of work of any particular type to keep a man busy continuously.

Efficiency under conditions such as these requires planning and laying out of work ahead, or else the men will be forced to loaf though they may have no inclination to do so.

In these days, when much attention is being paid to modernization, railway managers are giving increased attention to unit costs for repairs. The loss in man-hours is one that requires close attention if it is to be overcome. But it is an item that must receive close study if low repair costs are to be secured.

Material-Handling Devices an Essential Part of Shop Equipment

THAT it is necessary to have efficient material-handling equipment if the greatest efficiency is to be obtained from the shop machinery is well known to all electric railway executives. Nevertheless there are many electric railway shops which are badly lacking in material-handling devices. A notable example of this was disclosed in a recent survey made by the editors of the ELECTRIC RAILWAY JOURNAL on machine tool equipment. Two electric railway shops had recently purchased modern wheel lathes identical in every respect. Yet one railway was obtaining nearly twice the output from its wheel lathe that the other obtained.

An analysis of the reason for this discrepancy in production showed that it was due entirely to the difference in facilities for getting the wheels into and out of the lathe. The railway shop which was handling its wheels most efficiently had two additional tracks installed for moving the wheels to and away from the lathe and had provided modern jib cranes for handling the wheels. In the other shop it had been attempted to use the devices and arrangements which were installed before the purchase of the new lathe, but which were improperly located for the most efficient handling of material. The men operating the two lathes were equal in efficiency at turning the wheels after they were once in position, but the inadequate facilities of the one shop not only reduced the total efficiency of the man while he was working, but he was also led away from the lathe and from his work so that there was a loss of time.

This comparison indicates that a survey of the present material-handling equipment in the shop of any electric railway is desirable, if for nothing more than to determine if the best methods are in use. In many cases such a survey should produce beneficial results and increase production. The installation of new, up-to-date machinery is but one link in the chain of shop efficiency. An increased rate of output from a machine without adequate equipment for handling the material will not give the desired production. Using skilled and high-priced labor for work which should be done by material-handling equipment is expensive. Lower costs and increased production quite likely will result from a careful study of the conditions in nearly any shop.

Oil Storage and Handling Practice

Information Obtained from 57 Electric Railways Shows that Careful Storage of Lubricants Eliminates Waste, Prevents Contamination, Minimizes Fire Hazard and Facilitates Keeping of Records—Increased Use of Buses by Railways Makes Necessary Storage of Gasoline in Quantity

PROPER storage of the various oils used by electric railways is of vital importance on account of the fire hazard involved, which is also reflected in the insurance rate. To determine current practice a survey was conducted by the ELECTRIC RAILWAY JOURNAL covering the storage, handling and reclamation of lubricants, as well as the storage of gasoline, turpentine, alcohol and paint oils. The information was obtained in connection with the survey of lubricating methods of 57 electric railways published in the May 17 issue of this paper.

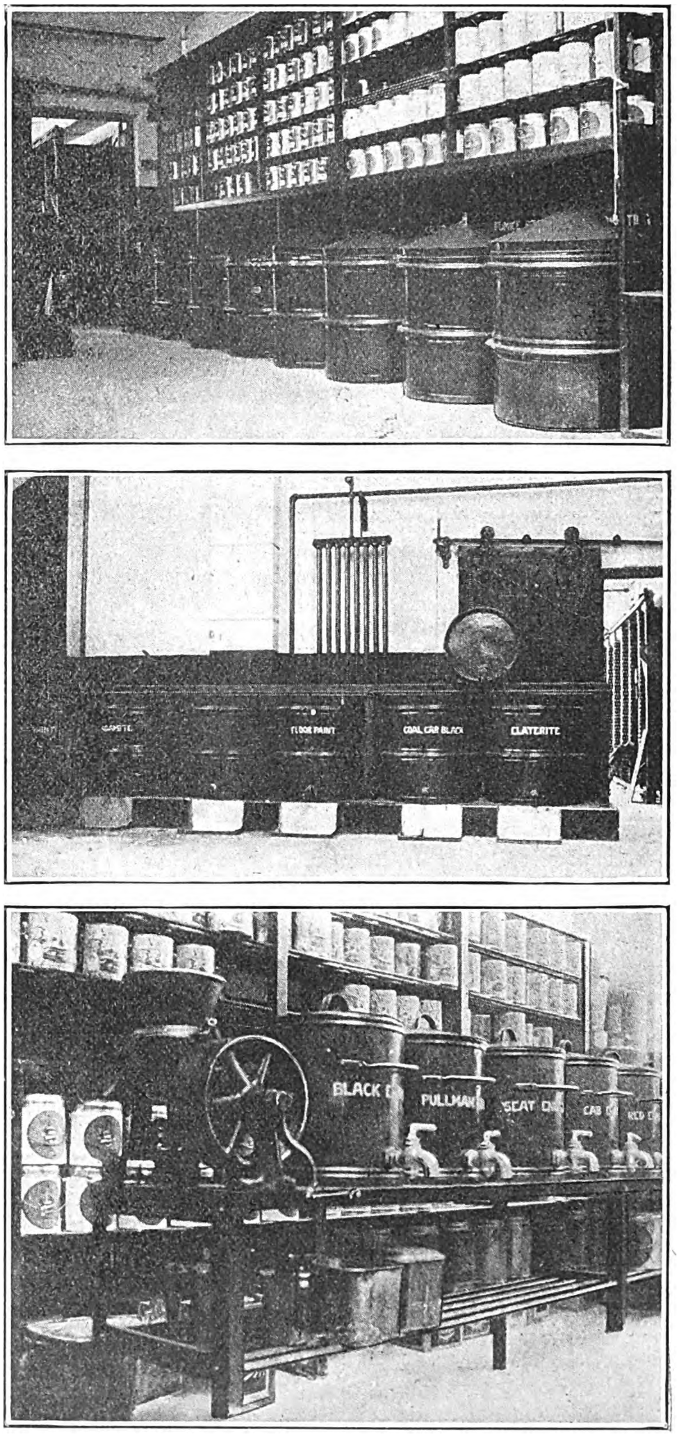
Aside from the fire hazard which accompanies the storage of any lubricant, it is necessary to provide adequate storage and handling facilities in order to insure cleanliness. The most perfect lubricant will fall short of its intended purpose and cause trouble if stored or handled in such a manner as to become contaminated. A dry, fireproof structure or at least a special room set apart for lubricants is a primary requirement. In addition, where the expense is justified, storage tanks with self-measuring pumps, heating coils and adequate equipment for installing and handling the drums and shipping containers should be provided. Such an oil storage may appear somewhat costly, and consequently certain railways which are close to oil supply depots have set aside small sections of the storeroom or carhouse for the storage of lubricants. Usually the oils are kept in the shipping containers in which they are received from the dealer.

OIL HOUSES SHOULD BE FIREPROOF

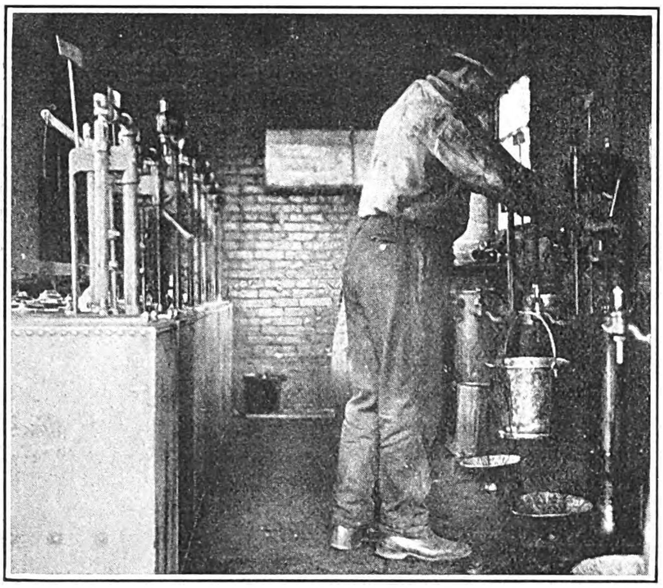
Where an oil house is warranted, it should whenever possible be of fireproof construction throughout. Brick, tile or concrete walls and floors, a tile, metal or slate roof, or a ceiling built on to steel beams or rafters are standard. The floor should be fitted with drains, and every provision taken to insure easy cleaning. Most railways are using comparatively small buildings for oil storage purposes. Information was obtained as to the size of buildings and rooms used for storage and is shown in tabulated form in the accompanying table. The space reported varies from a minimum of 32 sq.ft. to a maximum of 5,000 sq.ft. A total of 21,245 sq.ft. was reported by 35 companies operating 15,438 cars. This is an average of 1.38 sq.ft. of storage space per car.

The Manual of the American Electric Railway Engineering Association contains a design of oil house for use of railway companies operating from 100 to 150 cars. The size of the oil house given in this design is 14 ft. x 21 ft. in size. This is a space of from 2 to 3 sq.ft. per car. Six companies owning 180 to 103 total cars and 144 to 85 passenger cars give dimensions of oil storage houses that average 2.33 sq.ft. per car for all cars and 2.94 sq.ft. per car for passenger cars only. This corresponds very closely with the space recommended by the A.E.R.E.A.

Information received from the railways in this survey indicates that in general a fireproof construction similar to that given in the Engineering Manual is being used. The separate oil houses reported are made of cement or brick with cement floors. Some railways have underground tank storage, particularly where such inflammable forms of oil as gasoline or paint oils are stored.



Three Views in Paint and Oil Storage House of New York Central Railroad at Harmon, N. Y.



Oil House of Washington, Baltimore & Annapolis Electric Railroad at Naval Academy Junction

As to the various methods of storage in the oil house, 24 railways state that they use oil storage tanks, 10 additional railways use both tanks and drums for the storage of their lubricants, and 23 railways store their lubricants entirely in barrels or drums. In any railway the type, number and size of storage tanks that should be installed will depend upon the volume and nature of the lubricants to be stored. Some roads prefer to keep all tankage below the floor level. This enables the main floor to be used for receiving and delivering lubricants. This area can be devoted to delivery pumps and other necessary accessories. On small properties where the quantities used are small, it may be advisable in the interests of economy to keep lubricants in the shipping containers during the entire period of storage rather than to plan to transfer them to tanks.

ADEQUATE FILLING AND MEASURING FACILITIES A PAYING INVESTMENT

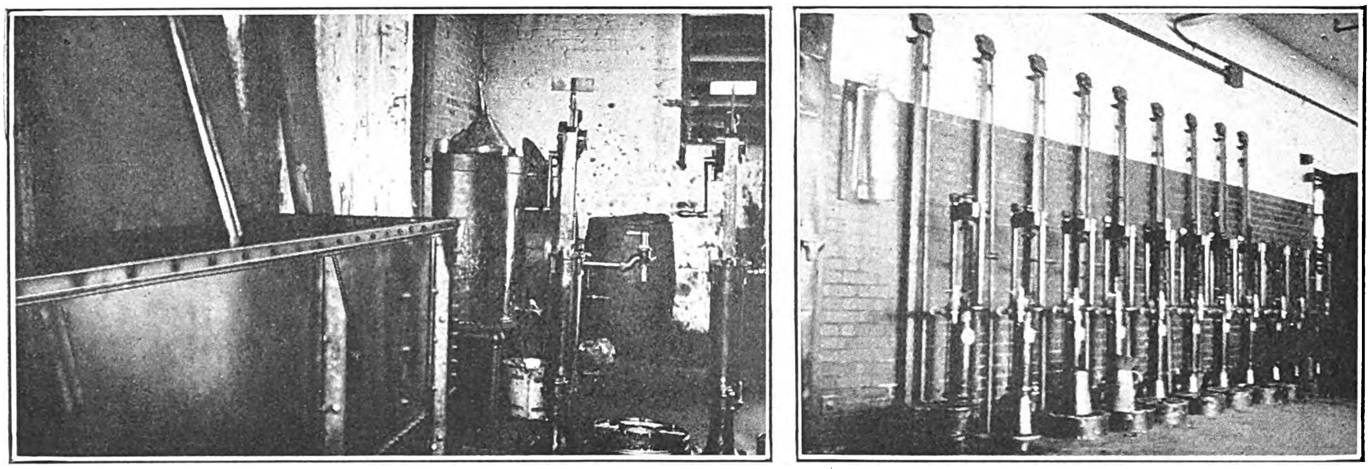
From the results that have been obtained it is evident that adequate containers, filling devices and provisions for measuring the lubricant as it is given out, as by means of self-measuring pumps, are paying investments since much waste of oil is eliminated, time is saved and the fire hazards are reduced. With modern equipment, records of quantities received and supplied are more easily kept and measurements are more reliable. Improved equipment also adds considerably to the morale of the working force by improving the appearance of the oil house and giving the oiler some pride in his job.

FACTORS TO BE CONSIDERED IN OIL HOUSE DESIGN

There are several factors that should be considered in the design of an oil storage house. These include (1) the type of building construction and materials entering into the oil house or oil room; (2) the storage tanks and accessory equipment necessary, such as heating coils, etc.; (3) the necessary material handling equipment for the efficient transfer of lubricating products and their shipping containers; (4) satisfactory equipment for measuring oils in order that a suitable record can be kept; (5) provisions in the arrangement of the equipment desirable where oils are to be distributed to various departments or to several shops; (6) the extent to which semi-solid lubricants are used by the railway, and (7) the method of keeping records and managing the oil house for efficient operation.

The value of orderly oil-house operation and properly kept records of daily, weekly and monthly oil consumption cannot be overestimated. The effect on the morale of the shop employees and the economies in the consumption of lubricant that can be obtained will be surprising, when employees must follow a definite procedure in obtaining their necessary oil supplies, with an accurate record kept of their consumption. Information obtained in the survey included some details of the oiling organization of different railways and the various systems used for recording and keeping track of withdrawals. Most railways have men definitely assigned to the oiling work, as by this method the men become more expert in packing the various bearings and their care, and understand better the necessity for keeping the oil clean and the bearings properly lubricated. Some foremen have found it advantageous to tabulate various detailed lubricating data. These records displayed in the carhouse for the information of the oilers enable them to locate a particular motor or compressor which is using more oil than the average. An investigation can then be made to determine the cause and so prevent serious trouble.

The storage and general supply of lubricants usually is handled by the storage department. Of the 57 railways included in this survey, 51 gave definite infor-



At Left—Oil House and Saturation Tank of Louisville Railway. At Right—Storage for Turpentine, Oil and Alcohol in New Everett Shops of Boston Elevated Railway mation in regard to their method of withdrawing and checking oil. Of these 51 railways, 42 stated that oil is issued from the general storeroom on requisition. The most general method is to withdraw the oil as required, lubricating materials being handled in the same manner as other railway supplies. This method is used by 28 roads, and 14 others stated that definite amounts are withdrawn at intervals. Of these latter 14 roads, three allowed withdrawals in barrel lots, two reported withdrawals by 5-gal. lots, and three roads stated that a day's supply is withdrawn at a time. Four roads reported that oil is issued as needed, but that storeroom orders are only given by the master mechanic or foreman at regular intervals and for the quantity as shown by the measuring pumps.

Orders for withdrawals are usually signed by the foreman in charge of the carhouse or by the master mechanic. These are recorded and tabulated. It is quite general practice to have monthly statements made showing the material on hand the first of each month, the material received and the material used during the month. Eighteen railways state that definite monthly checks are taken, according to this method. The oil checking sheets are usually made by the company's auditor, and duplicate records are sent to the carhouse foreman in addition to the various officials who are interested.

On some roads the oil house is in charge of a separate man. In such cases requisitions are usually issued on the storeroom, and a copy of the requisition is retained by the oil-house foreman when oil is withdrawn. On fifteen railways oil is taken care of by carhouse foremen or shop departments and is not handled by the storage department.

The quantities of various lubricants used are followed up very closely by representatives of the oil companies who visit the railway properties, and the electric railways are materially assisted by these representatives for the helpful methods which they introduce and the expert advice which they give. These men have the confidence of the various oilers and the men intimately connected with the work and co-operate enthusiastically toward securing improvements for better lubricating methods.

ONLY 40 PER CENT OF RAILWAYS RECLAIM OIL

From the replies received in this survey it is evident that many railways are not giving the attention to reclaiming lubricating oils that the subject warrants. Of the 57 railways from which information was received, 34 railways, or 60 per cent of the total, replied that they do not reclaim lubricating oils and 23 railways do reclaim oils. Four of the companies which at present have no method of reclaiming oils contemplate installing some sort of a system.

Information was also obtained as to the use made of reclaimed oils. Of the 23 railways that do reclaim lubricating oils seven use the reclaimed oil for lubricating truck parts such as center plates, side bearings and for various brake parts and door slides. Six additional railways reported the use of reclaimed oil for journal bearings. Three use the reclaimed oil in air compressors and two others use the reclaimed oil for lubricating shop tools. One railway uses reclaimed oil for freight cars, for trolley bases and door engines, for automobiles, for track and general oiling, and one road uses reclaimed oil in the same manner as new oil.

TABLE I—STORAGE SPACE PROVIDED FOR LUBRICANTS ON 35 ELECTRIC RAILWAYS

Cars Owned		Storage Space Provided for Lubricants		
Total	Passenger	Dimensions, Ft.	Area Sq.Ft.	Sq.Ft. per Car
18	16	12 x 16	192	10.67
36	30	4 x 8	32	0.89
36	24	14 x 20	280	7.78
79	39	50 x 100	5,000	63.29
93	87	10 x 20	200	2.15
103	85	9 x 28	252	2.45
122	91	10 x 15 and 12 x 16	342	2.80
151	126	12 x 12	144	0.95
166	114	12 x 18 and 20 x 30	816	4.91
172	152	17 x 17	289	1.68
180	144	12 x 20	240	1.33
183	164	6 x 12	72	0.39
205	191	14 x 20	280	1.36
210	80	12 x 16	192	0.91
214	209	20 x 20	400	1.87
223	200	10 x 20	200	0.90
234	220	13 x 23	299	1.28
253	175	21 x 31	651	2.57
254	242	14 x 14	196	0.77
266	249	10 x 40	400	1.50
288	230	10 x 20	200	0.70
326	231	5 each 10 x 12	600	1.84
327	140	12 x 30	360	1.10
350	274	25 x 40	1,000	2.86
358	214	15 x 15	225	0.62
384	178	16 x 30	480	1.26
409	229	20 x 60	1,200	2.93
435	223	18 x 45 and 19 x 61	1,969	4.52
464	407	10 x 20 and 20 x 30	800	1.72
510	400	10 x 20	200	0.39
547	414	9 x 12 and 9 x 14	234	4.28
930	738	20 x 30	600	0.64
1,469	1,246	2 floors 20 x 40	800	0.54
1,850	1,709	4 each 10 x 15	600	0.32
3,592	3,106	30 x 50	1,500	0.42
15,438	12,377		21,245	1.38

Due to the increased number of gasoline-driven service trucks by electric railways, and the fact that many electric railway companies are now operating buses, the proper storage of gasoline is an additional problem. In this survey information was obtained as to the number of service trucks, tower wagons, dump trucks, buses and other gasoline-driven equipment used by electric railways, as well as the quantities of gasoline used and methods of supplying the gasoline. A total of 951 service trucks, 280 buses, 73 tower wagons, 60 automobiles and 52 dump trucks are operated by 51 railways. There were but six railways out of the 57 included in this survey that did not have some kind of gasoline-driven equipment. Replies from 50 roads regarding the quantities of gasoline used showed a total weekly consumption of 67,231 gal., or an average of 1,345 gal. per property. Of these 50 railways, 40 have their own garages, from which gasoline is supplied. Six companies stated that they obtain their supplies from filling stations and five additional railways obtain their supplies from both their own garages and filling stations.

The equipment and methods of storing gasoline follow the same general lines as are used for the storage of turpentine, alcohol and paint oils by electric railways. Of the various methods used in storing these, as given in replies from 53 railways, 22 roads reported that they store the oils in the original drums; nine roads reported the use of both drums and fireproof tanks, and eight additional roads use fireproof tanks alone. Nine roads reported that very little oil of this nature is stored, and that this is usually in small cans. Five additional railways reported that they store oils in both drums and tanks.

Information obtained as to the various quantities of alcohol, turpentine and paint oils that are stored was obtained from 26 companies. Of these, 11 reported the storage of small quantities ranging from 5 to 50 gal. Eight additional companies reported storage in lots of from 50 to 250 gal.; three reported quantities of 450 to 850 gal., and four of the larger properties reported storage of from 1,100 to 5,500 gal.

Light, Not Lamps, Determines Economy of Car Lighting

Analysis Shows Light to Be the Thing Purchased in Car Lighting—Old Lamps Should Be Discarded—Lamps and Power for Lighting Cars Cost Interborough Rapid Transit Company $125,964 per Year

By E. E. Dorting
Lighting Engineer Interborough Rapid Transit Company, New York

AT THE present time in this country there are approximately 1,250,000 outlets in electric car service in which the lighting can only be arranged by connecting five lamps in series. The lamps for this class of lighting are known as Mazda "B" street railway lamps and require the utmost skill in manufacture due to the close selection which is necessary for series burning. Lamp manufacturers have divided this group of railway lamps into four sizes, namely, 23, 36, 56 and 94 watt, and supply any of these wattages for five in series on 525, 550, 575, 600, 625 and 650 volts. Of these four types the demand by consumers averages about 40 per cent of the 23-watt, 40 per cent of the 36-watt, 15 per cent of the 56-watt and 5 per cent of the 94-watt sizes. The following table gives a complete description of these lamps:

STREET RAILWAY MAZDA B LAMPS

Nominal Watts	Bulb*	Rated Initial Lumens	Rated Initial Lumens per Watt	Mean Lumens per Cent of Initial	Hours Life	Amp.	Standard Package	List Prices
23	S17	†224	9.6	87	1,500	0.214	120	$0.30
36	S19	†382	10.1	85	1,500	0.342	120	.30
56	S21	†603	10.3	81	1,500	0.519	120	.35
94	S24½	†1,032	10.4	74	1,500	0.863	50	.90

* All these lamps have standard medium screw base.
† The lumens given cover only lamps for five in series used on 575 volts. The lumens for other lamps are in proportion to the volts.

From this table it will be noted that the average life as guaranteed by the manufacturer is 1,500 hours. This of course is determined by running life tests on the various sizes and then applying the proper initial lumens per watt rating. In this connection it is interesting to know that in the past five years, due to improvements in manufacture, for the same life (1,500 hours) the initial lumens per watt rating have been increased 15 per cent, thereby giving more light for the same power consumption. Of course this life testing is done under ideal conditions with the lamps receiving no shock or vibration. However, the life of a lamp, which has been placed at 1,500 hours for railway lamps, is an arbitrary figure. It is not used as a basis for determining a rebate, if the lamp does not give that length of service. In subway car lighting the results in service showed an average life of 1,644 hours.

Regardless of what type the lamps may be or the class of lighting for which they may be used—residential, industrial, railway, etc.—the average length of service per lamp should be governed by the cost of that lamp, the cost per kilowatt-hour of energy, and the fixed cost per socket per thousand burning hours.

For example, let us assume that the cost per kilowatt-hour delivered from the third rails in electric car lighting is 2 cents, the lamp a 36-watt size costing 22 cents net, and the fixed cost per socket per thousand burning hours 0.015 cents. By calculation we find that the average life per lamp should be about 1,900 hours. On the other hand the life per lamp should be much longer for cheaper power and vice versa for more expensive power. Up to the present time this life per lamp as determined by calculation can only be controlled in service by a lamp which will withstand the severe shock and constant vibration. In this respect probably the 56 and 94-watt types are strong enough, but their application to car lighting is confined strictly to center deck arrangement, on account of the fewer outlets per car due to the high individual wattage rating of same. This does not give a good uniform distribution of light throughout the entire car. In addition the characteristic curves of the 56 and 94-watt lamps for lumen maintenance throughout life are very unsatisfactory on account of bulb blackening.

In the following table the actual cost of lighting is illustrated, because after all it is light that we are buying. Again using a 2 cents per kilowatt-hour lighting cost and referring to the table headed "Street Railway Mazda 'B' Lamps" the following is determined:

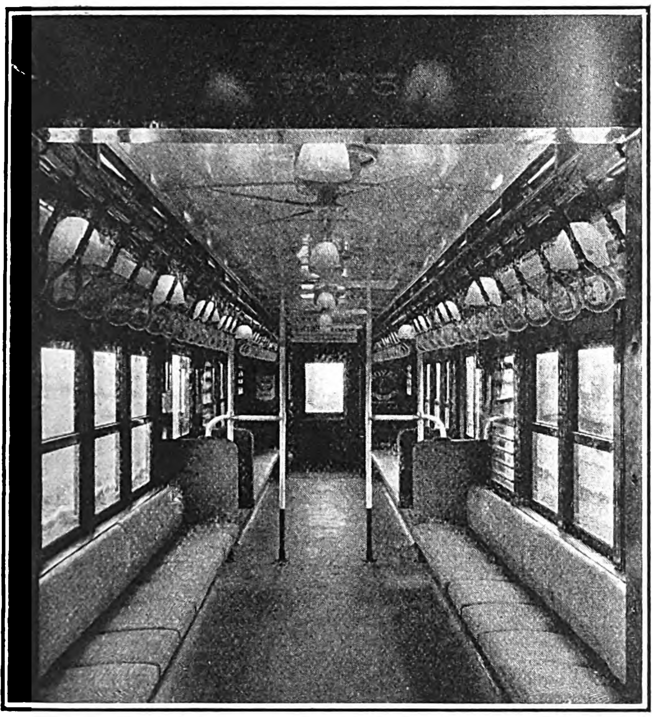
COST OF LIGHTING PER LAMP

Nominal Watts	Initial Lumens	Mean Lumens, per Cent of Initial	Hours Life	Energy Consumed, Kw.-Hr.	Total Energy Cost	Lamp Cost	Total Cost	Total Initial Lumens	Mean Lumens	Cents per 10,000 Lumen-Hours
23	224	87	1,500	34.5	$0.69	$0.21	$0.90	286,000	254,540	3.11
36	382	85	1,500	54.0	1.08	0.21	1.29	573,000	498,510	2.25
56	603	81	1,500	84.0	1.68	0.245	1.925	904,500	750,735	2.12
94	1,032	74	1,500	141.0	2.82	0.63	3.45	1,548,000	1,145,520	2.23

Note: Above data calculated for nominal watts rating or assuming the d.c. circuit averages 575 volts. Lamp cost based on 30 per cent discount from the list price.

From these figures, one deduces that the 23-watt size is the most costly based on manufacturer's data, and that the 56-watt lamp is slightly more economical than the 36 or 94-watt types. However, this company has standardized on the 36-watt type and after keeping accurate records of life in service together with the results obtained in the way of proper light distribution throughout the car, we have been convinced that this is the most practical lamp due to the high lumen maintenance during life.

The service life record was obtained by running a ten-car test train over the systems, both elevated and



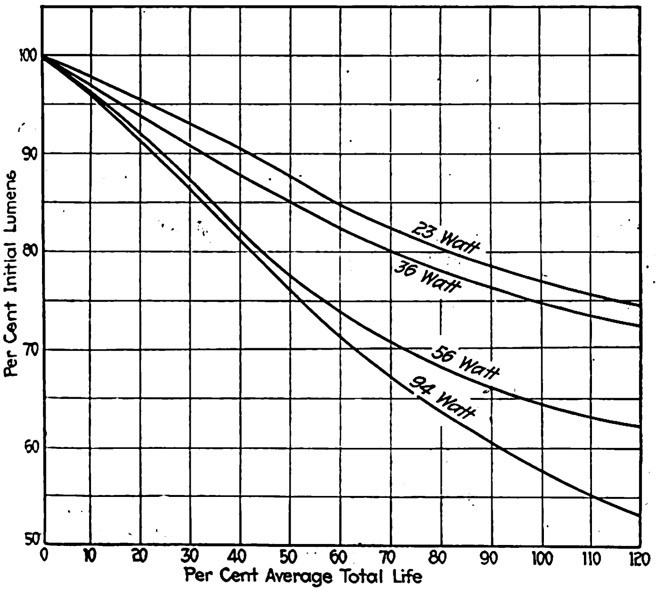
Twenty-five 36-Watt Lamps with Shades Furnish Illumination for a Subway Car of the Interborough Rapid Transit Company

subway, and noting the conditions of the lamps that failed due to various causes. The following table shows the cause of failure of the two groups of lamps:

INSPECTION OF DEAD LAMPS TO DETERMINE CAUSE OF FAILURE

Failure	Elevated Cars Per Cent		Subway Cars Per Cent
Broken filament (fair life)	17.5		33.0
Broken filament (short life)	42.0		53.0
Burnt out (fair life)	17.5		13.0
Burnt out (short life)	3.5		....
Broken tip (filament unbroken)	10.2		....
Broken hook	3.5		1.0
Loose base	5.8		....
Total lamps inspected, elevated cars	86	Subway cars	100

Another record of lamp failure on subway cars clearly shows that broken filament is the cause of 80 per cent of the removals, while only 6 per cent are removed because of burned out filament. Even with this high ratio of broken filaments the average life of the 171 lamps observed was 1,592 hours.



Performance Curves of Mazda B Railway Lamps Burning Five in Series

INSPECTION OF 171 LAMPS IN SUBWAY CARS TO DETERMINE CAUSE OF FAILURE

Cause of Removal	Number of Lamps	Per Cent
Broken filament	138	80.0
Burnt out	10	6.0
Loose base	2	1.3
Interlocks	10	6.0
Broken bulb and rod	2	1.3
Broken button rod	2	1.3
Broken tip	6	3.5
Air leaks	1	0.6
Total	171	100.0

Average life in service of these lamps = 1,592 hours.

Considering these same 171 lamps from a light efficiency angle it was found that the average lumens at failure was about 70 per cent of the initial lumens. This indicates that the average lumen maintenance was 87 per cent during life, which checks the curve for 36-watt lamps.

Another inspection of the test lamps disclosed the fact that 94 lamps had from one to nine interlocks, that is, shortened filaments due to the welding of broken strands. However, of this number only in ten cases had interlocks caused the failure. The average number of interlocks per lamp was nearly two, while for lamps with 70 per cent and 60 per cent of the initial lumens, the average interlocks was 2.5.

INSPECTION OF 171 36-WATT LAMPS

For bulb condition

Condition of bulb (blackening)	Indeterminate	A	B	C	D
Number of lamps	1	103	42	22	3

where A = 80 per cent, B = 70 per cent, C = 60 per cent and D = 50 per cent of the transmission of clear glass.

For interlocks

Number of interlocks	Indeterminate	0	1	2	3	4	5	6	7	8	9
Number of lamps	35	42	27	29	12	9	4	7	3	2	1

Average number of interlocks per lamp = 1.95
Average number of interlocks in B and C class bulb condition = 2.5

That buying light is an important factor in the operation of the rolling stock of Manhattan Elevated and subway cars of the Interborough Rapid Transit Company is shown in the following tabulation:

MAZDA "B" RAILWAY LAMPS CONSUMED AND COST OF LIGHTING CARS ONLY

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK CITY, YEAR 1923

Month	Number of Lamps Replaced Subway	Manhattan "L"
January	12,900	9,845
February	12,700	7,445
March	13,200	9,710
April	18,000	6,215
May	10,600	5,111
June	15,400	3,900
July	15,800	2,190
August	15,100	6,240
September	12,400	5,300
October	10,700	6,360
November	12,000	6,400
December	15,600	5,660
Total	164,400	74,376
Average per month	13,700	6,198
Total active cars average	1,957	1,925
Number of outlets	50,832 (26 per car)	48,125 (25 per car)
Number of lamps, 1923	164,400	74,376
Lamps per outlet per year	3.23	1.54
Average burning hours per outlet per year	5,300	2,190
Hours life per lamp	1,644	1,422
Total cost of lamps per year	$33,338	$15,128
	(19.84 cents net and 0.50 cents etching)	
Actual watts per outlet	35	33
Total kilowatt-hours 1923	9,438,611	3,477,993
Cost kilowatt-hours, coal and water	$56,631	$20,867
	($0.006 per kw.-hr.)	
	Summary	
Cost of energy	$33,338	$15,128
Cost of power	56,631	20,867
Total	$89,969	$35,995
Grand total	$125,964	

Although $125,964 is a significant figure, lighting of the cars is only a portion of the total lighting cost on this property, which for a year averages approximately $350,000 for power and $150,000 for lamps.

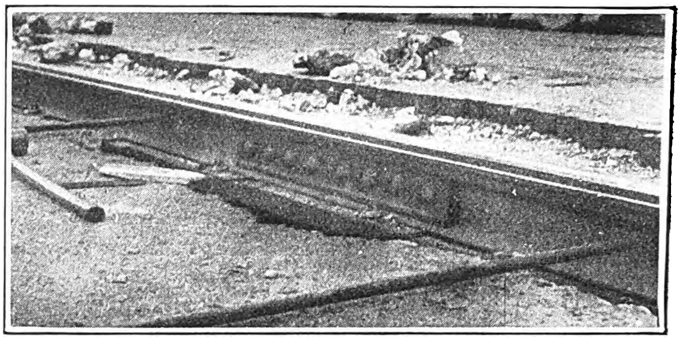
In the subway and "L" cars there are 100,000 36-watt lamps. This type of lamp fulfills the requirements for side lighting and is more economical than the 23-watt lamp, the other possible choice for this type of illumination. However, the 36-watt does not stand the shocks and vibrations as well as the higher wattage lamps.

While the argument may be advanced that 56 and 94-watt lamps are mechanically strong enough to withstand the shock, it will be found that due to the excessive bulb blackening characteristic of these higher wattage vacuum lamps they are more expensive to operate. It would be better to remove the lamp after 60 per cent of its life had been spent than to continue to burn it to 100 per cent life and receive less and less illumination per watt-hour consumed. This is true on any large diameter filament used in a vacuum lamp. With an investment of 24½ cents in the 56-watt and 63 cents in the 94-watt the upkeep or power cost (assuming 2 cents per kw.-hr.) over the last 40 per cent of its life amounts to more than twice the cost of a new lamp. It is evident that during the latter half of the lamp's life the efficiency drops off rapidly. The accompanying chart shows this. Notice how closely the 23 and 36-watt curves run together, with the 56-watt lamp curve falling off decidedly more, and that for the 94-watt lamp, from 50 per cent life on to burnout, dropping even more sharply than the 56-watt size.

Replacing Rail on Old Track Foundations

Wood Block Fillers Cut to Make Flangeway and Permit Use of Low T-Rail—Planks Support 7-In. Girder Rail, Replacing 9-In. Rail Previously Used.

THE excellent condition of some old creosoted wood ties and concrete track foundation recently led the Memphis Street Railway, Memphis, Tenn., to adopt two unusual expedients in order to preserve ties and foundation when replacing the old rail with new rail of a different height. In one case the original rail was so low that it was difficult to install new rail level with the pavement. In another case the removal of high rail left a space to be filled.

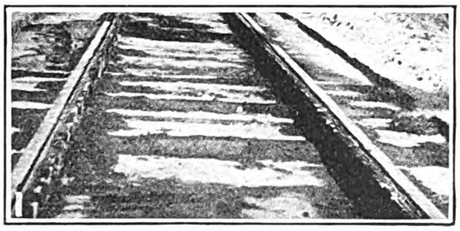


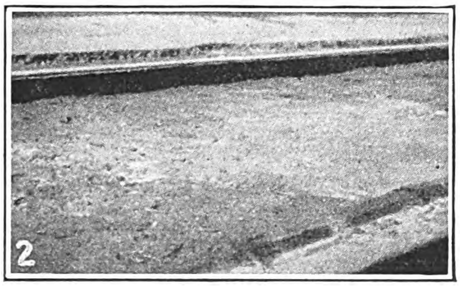
Planks Under the Rail Permit the Substitution of 7-In. for 9-In. Rail without Disturbance to the Track Foundation

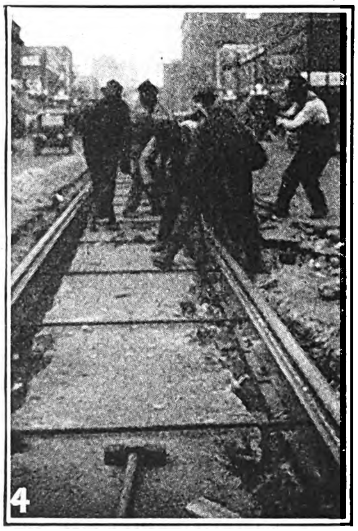
When the railway began the reconstruction of a track which had been originally built with 70-lb. 4¾-in. T-rail it was found that the creosoted ties laid in 1910 were still in good condition. Because the available space between the top of the ties and the surface of the pavement was too small, it was impossible to use 7-in. grooved girder rail, which is now the company's standard. As an alternative it was decided to use 5-in. 80-lb. T-rail and cut wood blocks to form flangeways.

These blocks were cut at the mill to such a shape that one edge fits snugly under the head of the rail and the top of the block is about level with the tread of the rail, making a flangeway of approximately the same dimensions as in the standard A.E.R.E.A. 7-in. grooved girder rail. Concrete base with an asphalt surface was then laid. In doing this work the railway found it important to pour the concrete soon after laying the wood blocks, so that traffic would not break their edges.

On Main Street, when it became necessary a short time ago to replace the old 9-in. tram rail, it was again desired to preserve the old track foundation and the still serviceable creosoted ties laid in 1905. The method adopted was to lay 2-in. creosoted pine planks lengthwise under the rail. In this way the new 7-in. rail was laid on the same ties which had formerly carried the 9-in. rail and the tread was brought to approximately the same level. Tie plates were used over each tie between the rail and the plank and two screw spikes run through from the rail into the tie. The paving used is the same as that with the T-rail, concrete with an asphalt surface.







No. 1. Wood Blocks Laid Alongside 5-In. T-Rail in Memphis to Form a Flangeway. No. 2. The Edges of the Blocks Are Beveled to Fit Under the Rail Head. No. 3. The Finished Job Has Nearly the Same Appearance as with Grooved Girder Rail No. 4. Holes for Screw Spikes Are Bored with a Long-Handled Bit

How Rail Corrugation Has Been Eliminated in Pittsburgh

Investigations Were Made of the Circumstances Under Which in the Past Corrugation Developed and a Track Structure Was Designed to Prevent Its Recurrence

By I. E. Church
Assistant Superintendent of Carhouses, Pittsburgh Railways

As A RESULT of careful studies of rail corrugation, considerable data have been collected by the Pittsburgh Railways from which probable explanations of the cause of this phenomenon have been deduced. Of greater importance, however, is the fact that study of the conditions under which in the past corrugations have developed has led to the design of a standard type of track structure which is practically free from trouble of this sort.

The Pittsburgh Railways was a particularly good field in which to make these investigations, because so many different rail sections and types of track structure are in use. For many years track construction was practically uniform. Then within the space of a comparatively few years nearly everything relating to the track in paved streets was changed. A heavier, higher rail was adopted. From 6-in. and 7-in. rail, a change was made to 9-in., and about the same time a change from bessemer to open hearth rails. Thermit and electric welded joints replaced bolted joints. Brick or stone pavement laid in sand was superseded by concrete. This made an excellent street for automobiles, but resulted in much more serious trouble from corrugation. With the old structure corrugations developed to some extent, principally on curves and approaches to bridges, but on a much smaller scale than with the new structure where miles of straight track from one to three years old showed corrugations.

On many railways corrugations did not become bothersome until concrete was used extensively in track construction. It was natural, therefore, that the solid type of foundation and pavement should be blamed for corrugated track, but this cannot be proved. In Pittsburgh there are corrugated rails where no concrete is used and also solid track construction with rails in as good shape as ever. Where concrete is used, however, more care must be exercised in construction, particularly as regards foundation, alignment and gage.

With the old 7-in., 70-lb. tram rail it was almost impossible to keep the track from getting wide. So while it was generally conceded that there should be ¼ in. to ½ in. between wheel and track gage, it became the habit to tighten up the gage, the theory being that "it will get wide soon enough."

With the use of 7-in., 122-lb. and 9-in., 134-lb. Trilby rail this same practice was followed. This, with the concrete construction now in general use, holds the track to gage for several years. In some cases it seems that the track must have tightened, due probably to the expansion and contraction of the rail.

On the Pittsburgh Railways we have no record of any corrugation occurring previous to 1915. Up to that time our standard was the tram girder rail, mostly 7-in. rail, although considerable 9-in. rail was used between 1910 and 1915. The foundation, the method of paving and the rail joints were different from the present standard. We have, however, some tram rail left over from previous construction that has been laid more recently in accordance with modern methods of construction.

It was stated by men long on the system that the old tram rail never corrugated. An inspection made by the writer of rail 20 years old nevertheless showed corrugations 4 in. to 8 in. long that were hardly noticeable in service, although 0.015 in. deep. Some of this track when reinforced and brought to standard gage developed shorter corrugations 1½ in. to 3 in. long which were very noticeable. Another significant fact was that the 9-in. tram rail showed more of a tendency to corrugate than did the 7-in. rail.

Coming to the newer rail, which is of the Trilby 7-in., 122-lb. and 9-in., 134-lb. section, we found great

Location	Date of Construction	Gage	Corrugations
Forbes St., Court House to Brady St	Prior to 1915	⅛ in. to ¼ in. wide	Scarce.
Forbes St., Craft Ave. to Murray Ave	1915, 1917, 1918, 1922	⅛ in. tight to ⅛ in. wide	Throughout.
Fifth Ave., Sixth Ave. to Craig St	Prior to 1915	⅛ in. to ⅜ in. wide	Few except on curves.
Fifth Ave., Craig St. to Highland St	1915, 1918, 1919	Standard to ⅛ in. tight	Throughout.
Penn Ave., 11th St. to Main St.*	Prior to 1915, relined 1921	Standard to ¼ in. wide	Very few.
Penn Ave., Main St. to Negley Ave	1916–1917	Standard to ⅛ in. tight	Wherever tight.
Penn Ave., Negley Ave. to Highland St	1915–1916	Standard to ⅛ in. tight	Wherever tight.
Frankstown Ave., Lincoln to Oakwood	1919–1920	⅛ in. to ¼ in. tight	Very bad.
Frankstown Ave., Oakwood to Tioga	1920	⅛ in. to ¼ in. tight	Very bad.
North Side-Brighton Road, outbound		Standard	Infrequent.
North Side-Brighton Road, inbound		¼ in. wide	None.
North Ave., Monetay, Jarvella and Jackson		Standard to ⅛ in. tight	Slight on standard section; bad on tight section.
East Ohio St., Heinz to City Line	1920	⅛ in. to ¼ in. tight	Scarce.
Eighth Ave., Ann to Amity	1920	Standard to ⅛ in. tight	Slight.
Eighth Ave., Hays Jct. to 7th Ave.†	1920	⅛ in. to ¼ in. wide	None.
Fifth Ave., 2nd Ave. to Ann St		Standard	None.
West Carson St., Point Bridge to Main St		Standard	Slightly throughout.
West Carson St., Main St. to Corliss Tunnel		⅛ in. wide	None.
Island Ave., Corliss Tunnel to McKees Rocks		⅛ in. wide	Slight in a few spots.
Chartiers Ave., Crafton outbound†		⅛ in. to ¼ in. wide	None.
Chartiers Ave., Crafton inbound†		Standard	Very slight in spots.
Chartiers Ave., McKees Rocks†	1917	Standard to ¼ in. wide	Very slight on standard sections

Note—Rail is 9-in., 134-lb. section except where otherwise specified. * 125-lb. rail. † 7-in., 122-lb. rail.

variation in the matter of corrugation. One section half a mile long laid in 1915 showed no corrugations, while another half-mile section on the same street laid in 1920 was considerably corrugated. On the first section, about one-third of the joints were thermit welded, the others being bolted, while all the joints on the second section were thermit welded. There was no other constructional difference except that the first section was about ⅛ in. wide of gage while the second section was about ⅛ in. tight of gage. This gave us an idea. A check was then made of the gage at various places where the rails were corrugated and at other points where no corrugation was visible. A brief summary of our experience appeared in the ELECTRIC RAILWAY JOURNAL for Feb. 16, 1924, page 256. Details are given in the accompanying table.

It will be seen that the intensity of corrugation follows closely the condition of tight gage. In fact, about 90 per cent of our track in which serious corrugations have developed is standard gage or less than standard. In this connection it is interesting to note a report recently made by one of our supervisors.

"On Butler Street between 34th and 48th Streets, there are no signs of any corrugations. The gage is 5 ft. 2½ in. or slightly wider; at no point is it tight. Between 48th and 52nd Streets the gage is irregular, running from 5 ft. 2½ in. to 5 ft. 2 5/16 in. In all places where gage is correct or only 1/16 in. tight there are but few corrugations and these very slight, but in places where it is more than 1/16 in. tight, corrugations are frequent and their depth is greater the tighter the gage. Between 52nd and 62nd Streets, the track in most cases is about ¼ in. tight, and in this stretch the corrugations are worse than on any other section of Butler Street. Even in this stretch at points where gage is correct or only 1/16 in. tight there are no corrugations.

"On Forbes Street between Oakland and Craig Streets, conditions are the same as on Butler Street. The track here in places is ¼ in. tight and in other places it approaches correct gage, and in all cases the rule seems to be, the tighter the gage the heavier and more frequent are the corrugations. On Forbes Street between Atwood and Halket Streets the track is tight, gage being between 1/16 in. and ⅛ in. narrow. The corrugations are not nearly so bad here as in the stretch between Craig and Oakland Streets.

"Fifth Avenue between Craig and Highland has an irregular gage, most of it being from ⅛ in. to ¼ in. tight. The corrugations were bad in this stretch. In many cases they are returning after being ground out, and in most such cases the gage measures tighter than where they are not returning.

"On Liberty Avenue between Center and Millvale Avenues, where corrugations are showing up, the gage is from 1/16 in. to 3/16 in. tight. The stretch on Wood Street between Tioga and Hill Streets, which was corrugated badly but last year was resurfaced, regaged and corrugations ground out, shows no signs of corrugations returning. We resurfaced, regaged and ground out the corrugations on a stretch of 600 ft. of badly corrugated track on Forbes Street between Semple and Halket Streets, and no corrugations have

"On Highland Avenue between Stanton and Bryant Streets small corrugations had appeared in many places, but with the exception of a large radius curve near Bryant Street the corrugations have now disappeared.

"From this inspection I concluded that tight gage is the principal contributing factor causing corrugations. I think the reason they show up to such an extent in our newer work is that the rails are so imbedded in concrete that in case of tight track the wheels cannot move rails out to sufficient gage clearance. The wheels are therefore alternately rising and falling, and exerting differing pressure on the head of the rail. The stress on the flanges of the wheels in tight track may also cause excessive vibrations, which would not be the case provided the rails were sufficiently far apart. Probably in old type work where concrete was not used, even if track was laid tight, the wheels would quickly force them out to sufficient gage, and even if corrugations appeared while the gage was tight, they were rolled out after the rails had loosened up or been forced out to wider gage."

Another factor that has proved to be a cause of corrugation is poor or wet foundation. By digging up the track in a number of places where corrugations were bad, we found the ties from ½ in. to 1½ in. below the base of the rail. This left the rail unsupported at these points so it would sink during the passage of a car over it. The claim was made that the corrugations came first and the vibration due to them loosened the rail and pounded the foundation loose. This was hard to disprove, but a good argument to the contrary was that after grinding the corrugations out of such a track, they reappeared at the low points very soon.

A test was made to demonstrate this point by interchanging pieces of rail on two widely separated pieces of track, one corrugated and the other not corrugated. The loose track was resurfaced and the corrugations ground out about a year ago. Up to the present time no corrugations have reappeared. The section of corrugated rail gradually lost its roughness, until now it is as smooth as the rail adjacent to it.

PRESENT STANDARD TRACK STRUCTURE DOES NOT CORRUGATE

With our present type of construction, where a good heavy bed of ballast is laid under heavy wooden ties which support the rail, we are thoroughly convinced that we can build track that will not corrugate. Having come to this conclusion, we have lost interest in the theoretical question as to what action takes place causing rails to corrugate.

All rail is now laid on heavy wooden ties as the best known method of securing a resilient support to absorb vibrations caused by the normal action of the cars running over them. Track is so laid that nowhere is it less than ¼ in. wider than the wheel gage of the cars. It can be even wider if the guard will permit. The foundation for the ballast is solid and well drained. Ballast is well packed under the ties and confined sufficiently to prevent it from being pounded out of place. Special care is exercised in getting the track true as to level and alignment when concrete pavement is used.

In order to get rid of the corrugations we already had, we realigned and resurfaced the worst sections and ground the rail smooth with a reciprocating grinder. The corrugations on track so treated show no signs of returning. Track not so badly corrugated was simply ground without resurfacing. On part of this track corrugations returned to some extent. After operating the reciprocating grinder a few months, it became apparent that we needed about six similar machines, or must develop some faster method of grinding. It was therefore decided to fit up a car with four sets of the same grinding bricks as used on the reciprocating grinder. At first this car was used during the day, running with the traffic over certain sections. It was found, however, that better results could be obtained by several trips back and forth over a short stretch of about 1,000 ft., and this could be best done at night when traffic was much lighter.

The car is a retired single-truck unit that happened to be particularly suited to the installation of this grinding equipment. The girders for holding the brick boxes were made part of the truck frame. Each brick box, containing four bricks 2½ in. x 4 in., is hung from a 6-in. x 10-in. air cylinder which is attached to the car by means of braces fastened to the side sills. Thus the car body acts as a weight to hold the bricks on the rails, with the air in the cylinder and the car body springs as cushions to take care of unevenness. The air cylinders are controlled by a three-way valve at the hand of the motorman so the bricks can be instantly raised or lowered as stretches of corrugated or uncorrugated track are approached. This is also very handy in crossing over special work or going around sharp curves. There is a total pressure of about 10,000 lb. on the 16 bricks and it was found necessary to install two 100-hp. motors to propel the car. This car was found particularly useful on grades and curves where the reciprocating grinder could not be used.

A water tank is mounted inside the car with pipes supplying water to the rail ahead of the grinding bricks. A hose with a hydrant adapter is carried on the car so the tank can be filled from the city hydrants as is needed.

The cost of grinding with the reciprocating grinder averages about 15 cents per foot, exclusive of the power taken by the motor. The cost of grinding with the car averages about 7 cents per foot, including the power taken from the line. The speed of grinding averages about five times as fast as the reciprocating grinder. In other words, the car does the work of five reciprocating grinders at one-half the cost, besides causing much less interruption to traffic.

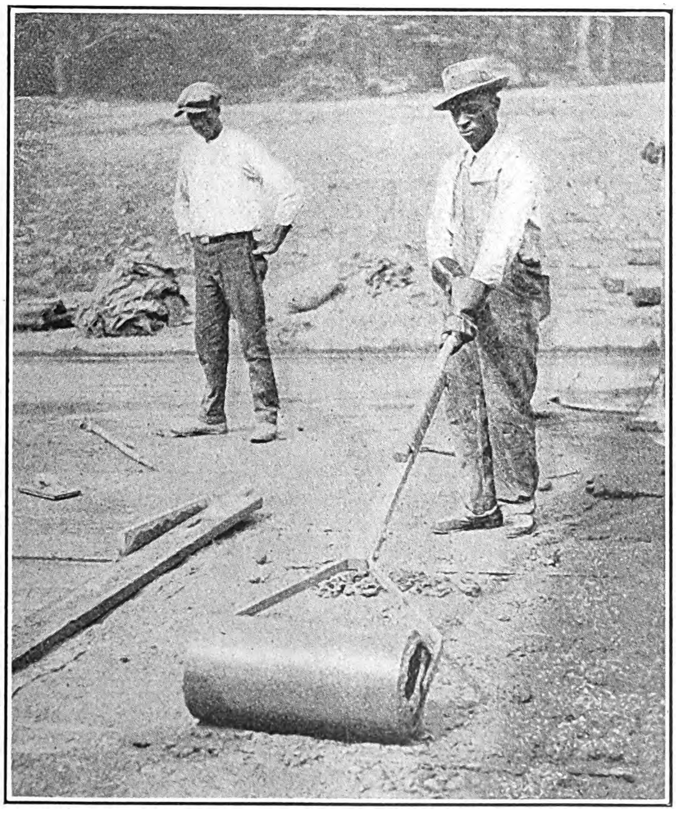
With this car and the reciprocating grinder, we have got ahead of the corrugations on our system. We are using this car now to take out slightly corrugated spots. Used in this way, the corrugations can be removed from a stretch of several thousand feet of single track in one night.

Better Concrete Results from Field Tests

How the Capital Traction Company Has Improved the Quality of Concrete Pavement in Washington by Careful Measurement of the Quantities of Materials Used—Track Structure Consists of T-Rails on Rock-Ballasted Chestnut Ties

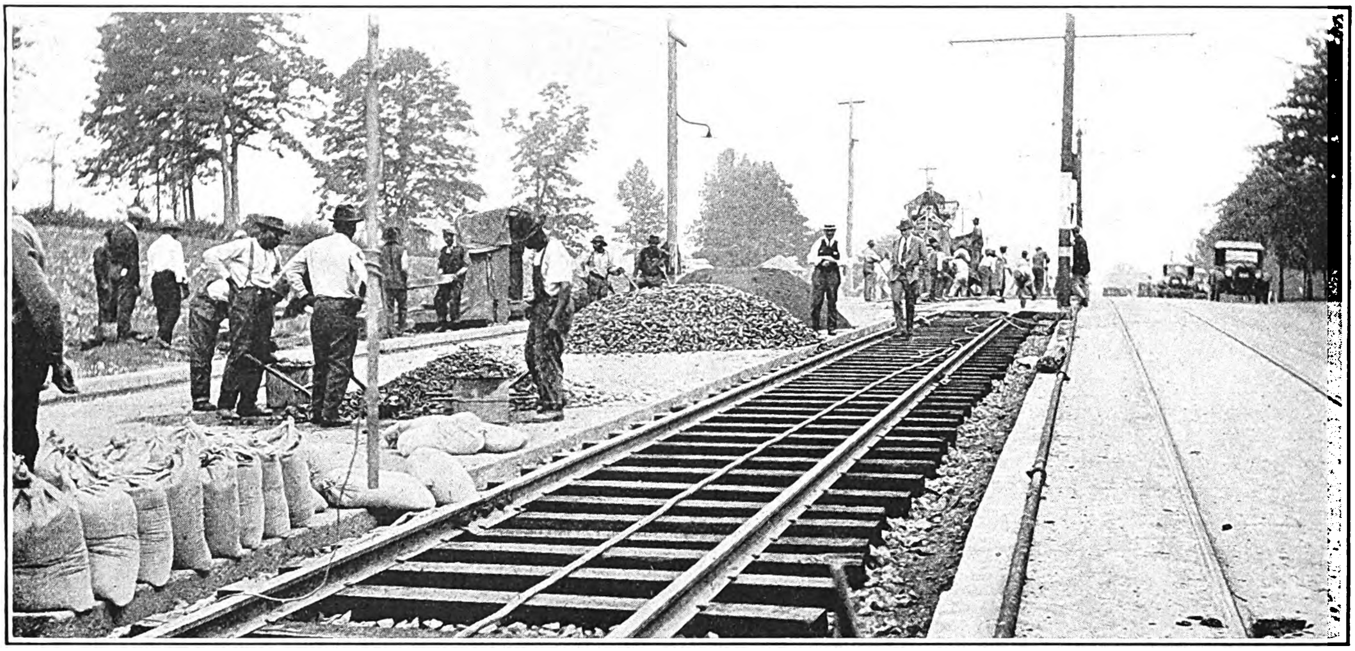
Due to the general resurfacing of Connecticut Avenue, Washington, D. C., about a year ago, it was necessary for the Capital Traction Company to resurface between its tracks and pave with concrete to conform to the work being done by the city. On this job the slump test for the continued inspection of the concrete mix was used for the first time by the company. The results of the first year of service of this pavement have been so satisfactory that unless some better method is developed for regulating the consistency of concrete, R. H. Dalgleish, chief engineer, intends to use this test on all future work.

The construction used on this street consists of 5-in. T-rail on chestnut ties supported by rock ballast, pneumatically tamped. Above the ballast is a layer of concrete extending from the bottom of the ties to the top of the rail. Special care was taken to leave a groove inside the rail sufficiently wide and deep to permit passage of the largest wheel flanges. A cross-section of this track structure is shown in an accompanying sketch.


A 15-Lb. Roller Was Used to Bring the Mortar to the Surface

Particular attention was paid in mixing the concrete to insure the use of proper proportions of the various materials. Small boxes, such as shown in an accompanying illustration, were used for measuring the aggregate. The proportions of the mixture, which were 1:1.9:3.8, were carefully watched by inspectors. The aggregate used for the greater part of this job was coarse sand with crushed bluestone running up to 4 in. in size. Some gravel was used, however, because the railway was unable to get a sufficient quantity of stone.

Concrete was poured from the mixer to position in the track structure by a metal chute. It was then tamped around the ties and rail by hand and finished by rolling with a 15-lb. roller. This weight has been found by the railway to be just heavy enough to bring the mortar to the top of the mixture and produce a smooth finish. The surface was



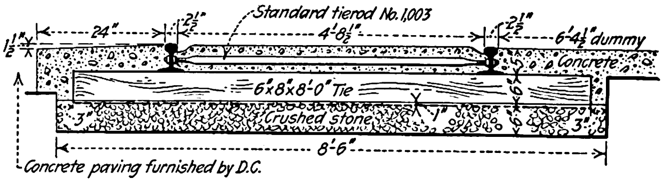
Track on Connecticut Avenue, Washington, D. C., Tamped and Ready for the Concrete to Be Poured

Final Finishing of the Surface Was Done by Dragging It with a Piece of ¾-In. Hose

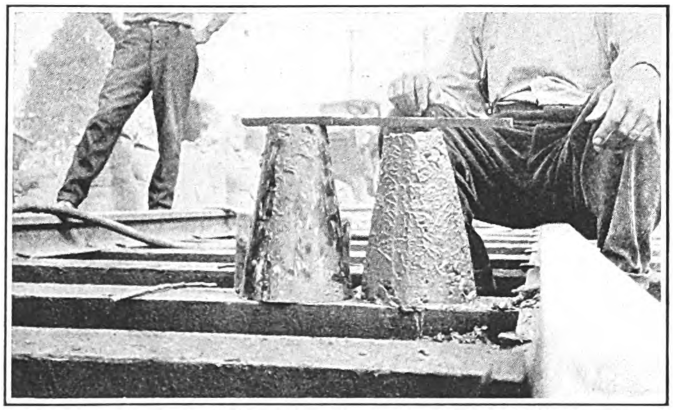
then troweled and finished by dragging a piece of ¾-in. hose along the top.

As the amount of water in mixing concrete is such an important factor in determining its ultimate strength, it was thought to be absolutely essential on this job that the proper consistency be definitely determined and that the mixture be kept uniform. Foremen of concrete gangs often are inclined to use more water than necessary. This is done in order that the surface can be made smooth more readily than when the water content is kept low. Wet concrete is also more easily poured and tamped. Some work was done in Washington in the recent past in which concrete was poured and then rolled in order to get a compressed mass. This process, however, merely squeezed out the water, and if the mixture had been made with less water in the first place, equally good results would have been obtained without the necessity for rolling.

By using concrete mixture with a low water content, and regulating its consistency by field tests, the railway has obtained a structure with double the compression strength of that built by the city alongside the track. The slump test was the method adopted for keeping the amount of water uniform. The standard cone specified by the Portland Cement Association was used. Concrete was poured into the cone and tamped with a ⅜-in. round rod in order to eliminate voids. The cone



Standard Concrete Roadbed Construction Used on Connecticut Avenue



Making Slump Tests of Concrete on the Connecticut Avenue Resurfacing Job

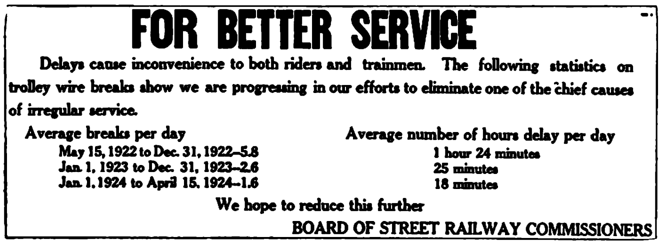
The Concrete Mixture Has a Low Water Content, but Flows Easily was then removed immediately and the concrete allowed to stand for 3 minutes before being measured. The allowable limit of slump was 2 in., and in no case during the work was the limit exceeded. As a matter of fact slumps of ⅜ in. to ¾ in. were the rule. The use of the slump test required considerable care, but the results accomplished were so satisfactory that the railway is enthusiastic over this form of field test.

During the process of this work cars were operated on single track using surface crossovers. After the concrete was poured it was kept wet for ten days by sprinkling with a hose, and traffic was not allowed on the resurfaced track until the last batch of concrete had set for that length of time. This was thought to be sufficient time to prevent any cracking of the concrete along the rails.

Trolley Breaks Cut Over 70 per Cent

Investigations in Detroit Into Means of Flexible Suspension Continue—Drop Forgings Still Used for Overhead Material—Electric Switches Have Been Changed to the Power On Type

THE car card reproduced on this page was carried in a conspicuous place on the cars of the Department of Street Railways during May. Graphically, the same records are shown in greater detail and for a longer period in the accompanying table and the chart on this page. Both give results of extended study into the causes and remedies of breakdowns in the overhead system. Parts of this story were published in the issues of this paper for May 19, 1923 (page 845) and Sept. 15, 1923 (pages 411 and 431). Developments since those dates form the basis of the present article.



FOR BETTER SERVICE

Delays cause inconvenience to both riders and trainmen. The following statistics on trolley wire breaks show we are progressing in our efforts to eliminate one of the chief causes of irregular service.

Average breaks per day	Average number of hours delay per day
May 15, 1922 to Dec. 31, 1922–5.8	1 hour 24 minutes
Jan. 1, 1923 to Dec. 31, 1923–2.6	25 minutes
Jan. 1, 1924 to April 15, 1924–1.6	18 minutes

We hope to reduce this further

BOARD OF STREET RAILWAY COMMISSIONERS

This Car Card Gives Very Significant Facts of How Trolley Breaks Were Reduced in Detroit

CONDITIONS ON THE OVERHEAD STRUCTURE

The track of the Detroit Department of Street Railways is made up of two parts, namely, (1) 62.74 single-track miles, built by the city of Detroit between April 1, 1920, and June 30, 1923, and (2) 311.12 single-track miles acquired by purchase of the Detroit United Railway during 1921 and 1922. Thus, the total street railway single-track mileage in the department as of June 30, 1923, is 373.86 miles.

NUMBER OF TROLLEY BREAKS, DEPARTMENT OF STREET RAILWAYS, DETROIT

Period	Total Trolley Breaks	Average per Day	Total Delay to Cars	Average Daily Delay to Cars
May 15-22 to Dec. 31-22	1,335	5.8	239 hrs.	1 hr. 24 min.
Jan. 1-23 to Dec. 31-23	950	2.6	153 hrs.	25 min.
Jan. 1-24 to Mar. 31-24	147	1.6	28 hrs.	18 min.

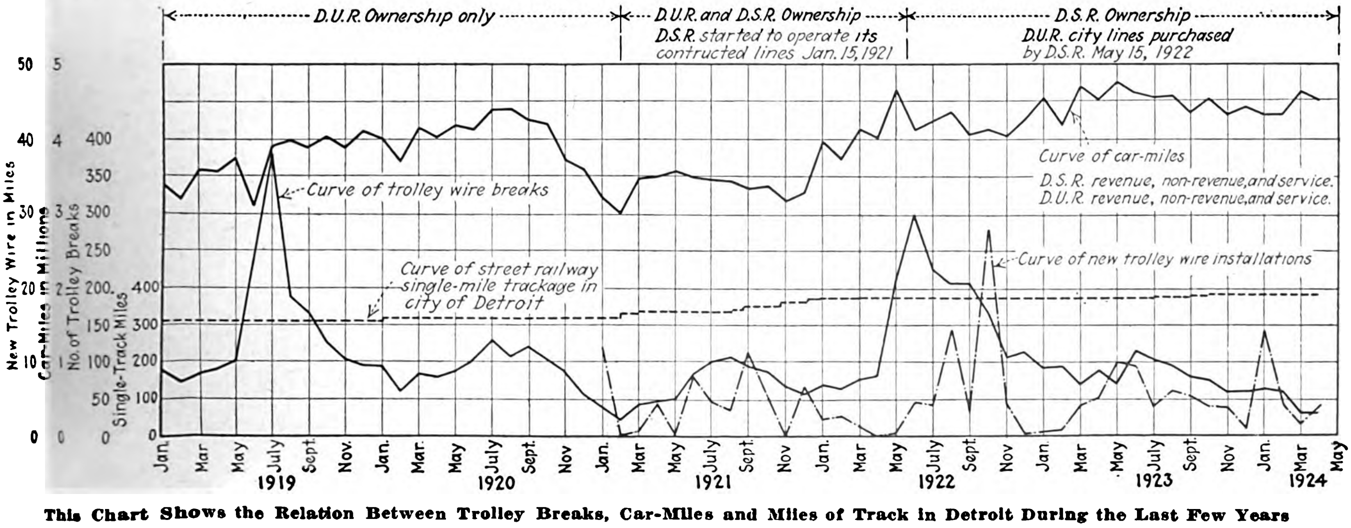
The overhead construction on Division 1 is, of course, largely new, and the lines in this division in general do not carry as heavy traffic as the lines in Division 2. On this division records are available as to wheel movement, trolley breaks, etc. The overhead construction on Division 2 is considerably older, except as parts have been renewed since the purchase of the system by the city, and the records of wire installation, wheel movement, causes of failure, etc., are not available prior to May 15, 1922, when the property was acquired.

An accompanying table shows the most common causes of trolley breaks on the two divisions.

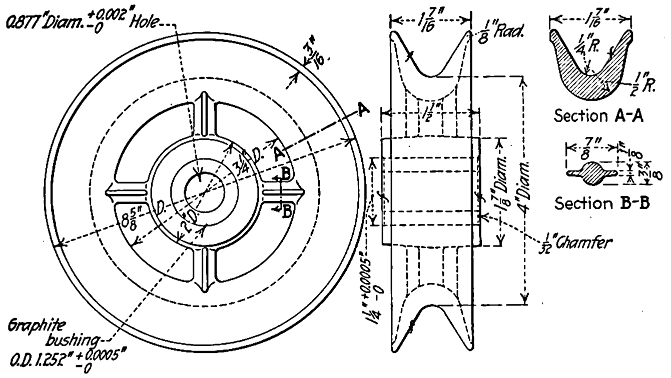
These data were compiled last year from 311 breaks, covering about 3½ months operation.

A NEW SPECIFICATION FOR HARD-DRAWN TROLLEY WIRE HAS BEEN DEVELOPED

With the exception of about 2 miles of No. 00 Phono-electric wire and 25 miles of No. 00 iron wire on Division No. 2, and about 11 miles of No. 00 Phono-electric wire on Division No. 1, the trolley wire of the system is No. 00 round, hard-drawn copper. Up to about the first of this year all new trolley wire was



This Chart Shows the Relation Between Trolley Breaks, Car-Miles and Miles of Track in Detroit During the Last Few Years purchased under the American Electric Railway Engineering Association specification Dw 3b. Two objections were found, however, with this specification. The first was with the minimum and maximum tensile strength in pounds per square inch called for in the specification. This for the 133,200 circ.mil area used on the system was minimum 51,600, maximum 56,000 lb. To get this maximum tensile strength manufacturers sometimes found it necessary to anneal the wire between passes. In consequence, in the new specifications, the maximum tensile strength is omitted entirely. At the same time the minimum tensile strength for the No. 00 wire was raised from 51,600 to 54,500 as laboratory experiments showed that this new minimum could be met.



Trolley Wheel Now Standard in Detroit

The other principal change made in the specification was to specify a maximum elongation. The standard specification calls for an elongation of 2.80 per cent in 10 in. The department's revised specification calls for this elongation as a minimum, with a maximum elongation of 4 per cent.

INVESTIGATIONS IN FLEXIBLE SUSPENSION ARE BEING CONTINUED

CAUSES OF TROLLEY BREAKS, DEPARTMENT OF STREETRAIL WAYS, DETROIT

	Division No. 1	Division No. 2
1. Worn wire	11 per cent	41 per cent
2. Flaws in wire (*a*)	16 per cent	1 per cent
3. Crystallization of wire	29 per cent	40 per cent
4. Wild poles	30 per cent	4 per cent
5. Broken line hardware (*b*)	5 per cent	4 per cent
6. Burnt down (*c*)	4 per cent	7 per cent
7. Broken poles or spans	0 per cent	1 per cent
8. Unknown cause	5 per cent	2 per cent

(*a*) Such as factory splice breaks, spots burnt by arcing, etc.
(*b*) Broken ears, splicers, etc.
(*c*) Burnt down by direct ground contacts.

Experiments with flexible suspension of the trolley wire at hangers still continue. In the article which appeared in the May 19, 1923, issue of the ELECTRIC RAILWAY JOURNAL, already mentioned, the use of a spring hanger was described. Recent experiments have been with cushioning ears, the cushioning effect being obtained through a layer of felt or lead. This strip is about $\frac{1}{16}$ in. thick and is laid in the center of the groove of the ear before the sides of the ear are clinched over the trolley wire. The purpose is to reduce the blow from impact and consequent arcing when the trolley wheel jumps while passing under an ear. Tests have not been conducted long enough to determine which of these materials is better or whether either is of help. In the meantime 100 spring hangers of the kind described in the issue of May 19, 1923, have been installed, a number under steam railroad bridges, where the hangers are rigidly attached to the trolley trough and do not get the benefit of the flexibility of a span wire.

Examination of trolley breaks at ears shows that the wire is most apt to break at the center of the ear, and it is hoped that with the development described proper reduction in these troubles will be obtained. With the exception of a small number of 15-in. ears, a 12-in. ear with an average weight of 14 oz. is used on all straight construction.

All test material in the overhead line, whether hangers, frogs, strains or crossings, is painted red. The reason for this is that if any of it is removed by an emergency crew, owing to failure or any other cause, the crew will make a record of when and where the overhead part was removed and turn this record into the electrical engineering department so that its files will be complete.

The department is still using drop forgings instead of malleable iron for certain of its miscellaneous overhead parts, such as pull-overs, bull rings, strain plates, etc., which are subject to heavy strain and blows, as

A Good Piece of Overhead Wiring at Double-Track Crossing and Curves, Detroit described on pages 411 and 431 of the issue of Sept. 15, 1923. It has been found that these materials last much longer, especially in cold weather. The order for pullovers of this kind was supplied by the Drew Electric & Manufacturing Company. The drop-forged steel is protected by galvanizing or sherardizing, according to the American Electric Railway Engineering Association standard specification Df 2b.

Good results are also being obtained with the adjustable pressed-steel overhead frog, mentioned in the issue of May 19, 1923. The arms of this frog are automatically adjustable from 8 deg. to 20 deg., so that they can take their natural angle when the overhead construction is being erected. Frogs of this kind have been up for two years and are still in good condition.

An important merit of this design is that the same frog is suitable for a variety of branch-offs. In consequence, the stock in the storehouse and that which has to be carried on the emergency trucks is very much less. This reduces the weight which has to be carried on the truck.

The department is also trying out an air-break section insulator, with a condenser on the top to extinguish the arc automatically. This section insulator is being developed by the General Electric Company. The ordinary type of section insulator was adequate for city cars, but the heavy interurban cars operating over the system often drew an arc across the insulator, damaging or destroying it.

MAINTENANCE OF OVERHEAD PARTS

Worn-out overhead frogs and section insulators and other overhead parts capable of being reclaimed by welding are being repaired in this way. The welding division does this work on rainy days when outside work is impracticable. The practice is for all parts of this kind to be examined during odd hours by the emergency crews, as they are familiar with this type of equipment and know what can be salvaged. The rest of the material is then turned over to scrap.

TROLLEY WHEELS

The standard trolley wheel used in Detroit is shown in an accompanying illustration. The composition is:

Copper	90 per cent
Tin	8 per cent
Zinc	2 per cent

Enough phosphorus is added to bring the Brinell hardness up to approximately 90.

A graphite bushing with case-hardened pin is used instead of a hollow pin filled with grease, and the department believes that the present practice of using a very little oil on the contact springs has been an important factor in increasing the life of this wheel. Two years ago the average life of trolley wheels on the city system was 2,500 miles. Now it is averaging 15,000 miles. Inspectors are instructed to place a few drops of oil on the contact springs every four or five days. To discourage over-oiling they are provided with small oil cans with the smallest possible spouts.

Of course, the improvements in alignment of the overhead construction and a partial elimination of steel wire have also had a great deal to do with increasing the life of the wheels.

ELECTRIC TRACK SWITCHES

Typical Single-Track Overhead Wiring at Curve

Although part of the track, the electric track switch is so closely related to the overhead construction, because of its use of a contactor, that a reference to the practice of the department in connection with the operation of track switches is appropriate in an article on overhead construction. All switches are now being changed to the "power on" type, or the kind in which the motorman passes under the contactor with power on when he wants the switch thrown and with power off when he does not want the switch thrown. Originally, some of the switches were of the "power on and power off" class, or those in which the operator uses power when going under the contactor if he wants to take the curve to the right, and does not use power when he wants to take the curve to the left. The change in type of switch used to the "power on" type is being made for two reasons.

The first is that tests have shown that with the "power on" type, the number of power applications is only about one-half that of the other type. The second is because the "power on" switch has been found to reduce derailments. With a 50-ft. car the contactor has to be back at least 55 ft. from the switch, and if two cars are running close together, especially if the first car is a safety car, it is not impossible for the second car to pass under the contactor before the first car has passed through the switch. If the switch is thrown while the first car is still on it, a derailment will occur.

It is thought that the trouble resulting from the close following of one car by another is less likely with the "power on" switch than with the "power on and power off" switch. With the former, the motorman is trained to look at the switch point and so wait for the other car to clear it before passing under the contactor. With the latter kind, where power on means the switch will go to the left and power off that the switch will go to the right, he becomes so accustomed to operating the controller so that the switch point will go in the direction he wishes that he may not take care to see that the preceding car is clear of the switch.

As the switch manufacturers make both kinds, and either kind, after installation, can easily be changed to the other kind, the matter of standardization is a simple one.

The Readers' Forum

Survey Shows Street Railways Sound

BUCHANAN & LAYNG CORPORATION

NEW YORK CITY, July 14, 1924.

To the Editors:

The letter of July 7, written by G. H. Davis to the editors of ELECTRIC RAILWAY JOURNAL, calls for some comment. My article was written in the first place to show that the street railway industry is growing even in the face of competition, and in the second place to set a standard of revenue riders per capita and revenue riders per car-mile so that each operating official could study his traffic conditions, having the data at hand for a large number of cities. These two questions should encourage a study of the underlying principles of the business.

Mr. Davis's communication reads in part as follows:

> The review of street railway traffic statistics for the period 1920 to 1923 inclusive in some of the cities in the United States having in excess of 100,000 population, written by J. F. Layng and published in your issue of June 28, shows in general a population increase with a decrease in revenue passengers carried. Of the 46 cities whose figures for 1920 and 1923 are listed, 33 show decreases in revenue passengers, and of the 19 cities between 100,000 and 250,000 population all but three show decreases in revenue passengers between 1920 and 1923. This decline in rail traffic is principally due to the operation of privately owned automobiles, and no one can now predict the end.

In Mr. Davis's conclusions he apparently does not consider the following facts:

1. Notwithstanding that the automotive vehicles had increased from 468,000 registered in 1910 to more than 15,000,000 in 1923 each city that was listed shows conclusively a large increase in the total number of passengers carried in 1923 over 1910 and also an increase in revenue riders per car-mile and per capita in 1923 over 1910 in the great majority of the cities.

2. United States Census traffic figures as quoted in my article confirm this conclusion.

3. The traffic figures B. C. Cobb used in his speech at the Midyear Dinner of the American Electric Railway Association. These figures, which were made from the A. E. R. A. records, show that the passengers carried by the electric railways of the United States were as follows:

1917	14,506,000,000
1918	14,243,000,000
1919	14,915,000,000
1920	15,540,000,000
1921	14,574,000,000
1922	15,337,000,000
1923	15,989,000,000

4. All the data presented in the various issues of the ELECTRIC RAILWAY JOURNAL and other publications showing where improvements have been made in the industry.

5. All the data and facts showing the progress and growth of the industry as presented by the president and officers of the American Electric Railway Association.

In any forecast of the future of the transportation industry consideration should be given to the following:

1. The year 1920 was a peak traffic year. This was caused by abnormal after-war conditions, especially in some cities and manufacturing centers. Therefore it is natural for such variations in traffic as have occurred, but, as shown by A. E. R. A. figures, the 1923 total traffic was greater than for 1920.

2. Mr. Davis states: "Fewer advances have been made in this business during the twenty years just ended than have occurred in almost any of our other basic industries." There are few electric roads in this country that have not adopted modern cars, modern types of track construction and improved service and operating methods in the period mentioned.

3. The lash of competition is developing the industry. It is making real progress toward a sound financial future, as is evidenced by the recent attitude of the press and investment bankers.

4. If the electric railway has such a doleful future as Mr. Davis predicts, then it will be impossible to finance the co-ordinated transportation plan that he outlines. I am convinced that the real basis of such a combine will be the present rail lines.

5. The country cannot continue to absorb automobiles indefinitely at the rate at which they were produced during 1923. The streets of the cities will some time have a traffic saturation point, and delays and inconvenience will then retard the extension of the use of automotive vehicles.

6. In many cases the private automobile, the bus and the taxicab perform a service that is not within the province of the street car. In performing this service in sparsely settled districts the community is built up and the street car system is the gainer in the end. Therefore if the street car has a steadily growing business, it should not be the cause of alarm if another relatively higher cost de luxe service is helping to build the community.

7. Mr. Davis entirely overlooks the relative cost of bus and taxicab service as compared with the cost of electric railway service. The public is interested in low fares for mass transportation and Mr. Davis does not undertake to say that en masse passengers can be transported by buses as economically as by rail cars, but leaves the general impression from his article that the bus should supersede the trolley for a large portion of mass transportation.

I believe that buses can be profitably used as feeders and to supplement rail car service to advantage in a number of instances where the traffic does not warrant capital investment for rail service. All records to date show that the yearly passengers of the entire industry are on the increase. On the financial side for the past few years the improvement is shown by the fact that traction securities have moved upward and are now looked on with more friendly eyes by shrewd investors and each year since 1919 there have been fewer properties in receivership. JOHN F. LAYNG.

The United Railways & Electric Company, Baltimore, Md., gave another radio party on June 16, broadcasting from Station WCAO. The program included some solo work and fine selections from the United Railways band and male chorus. All listeners-in who wrote to the company received a supply of literature published by the company giving the history of the street railways in Baltimore with some pictures contrasting the new and the old type of equipment. A very convenient directory of the street cars and blue bus lines was also sent out to the radio fans. The replies indicated that the radio audience numbered about 10,000 in the community.

Equipment Maintenance Notes

Southern Properties Reduce Pull-Ins

THE comparative statement of car pull-ins on the railways connected with the Electric Railway Association of Equipment Men, Southern Properties, for the first five months of 1924 shows the good work this organization is accomplishing. Figures for eight months of operation ended Aug. 31, 1923, were published in the ELECTRIC RAILWAY JOURNAL for Oct. 13, 1923. For May, 1924, and for the year to date, every railway reporting shows a higher average mileage per chargeable pull-in than the same company did in August, 1923, excepting only the Memphis Street Railway, which showed a slightly lower average for the single month. As was the case last August, New Orleans holds first place by a wide margin in the matter of mileage per chargeable pull-in, with Nashville in second place, which was occupied by Memphis previously.

Interesting figures on maintenance cost per 1,000 car-miles are also published by this association. These figures, however, include only the month of April, 1924, because it takes somewhat longer to compile the data than in the case of the pull-in record. For the year to date, the railways in Memphis, New Orleans, Birmingham, Little Rock and Nashville show lower maintenance cost than for the same period in 1923, while those in Atlanta, Knoxville and Mobile are slightly higher. Detailed figures for maintenance cost and mileage per pull-in are given.

COMPARATIVE STATEMENT OF CAR PULL-INS

	Average Miles per Chargeable Pull-In	Total Average Miles per Pull-In
New Orleans:		
May	133,581	46,062
Year to date	110,653	29,440
Little Rock:		
May	19,199	16,246
Year to date	21,797	17,364
Nashville:		
May	57,313	30,567
Year to date	28,920	16,254
Memphis:		
May	15,967	13,639
Year to date	20,853	16,033
Knoxville:		
May	32,816	15,146
Year to date	17,826	11,360
Birmingham:		
May	14,869	11,450
Year to date	13,555	10,675
Atlanta:		
May	15,498	10,114
Year to date	12,093	8,684
Mobile:		
May	18,881	13,487
Year to date	19,345	6,189
Dallas:		
May	15,716	3,809
Year to date	3,924	2,733
Chattanooga:		
May	4,392	2,969

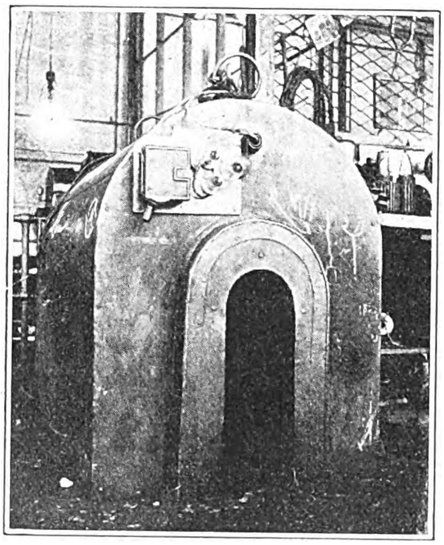
MAINTENANCE COST PER 1,000 CAR-MILES

	Supt. of Equip.	Pass. and Comb. Cars	Serv-ice Equip.	Elect. Equip. of Cars	Shop Equip. and Tools	Shop Ex-penses	Misc. Equip.	Total Main-tenance
Atlanta:								
April, 1924	0.79	14.21	0.14	6.38	0.07	0.85	0.01	22.58
Year to date, 1924	0.71	12.10	0.23	6.07	0.13	0.95	0.04	20.26
April, 1923	0.87	13.06	0.17	4.66	....	0.79	0.07	19.62
Year to date, 1923	0.89	11.29	0.24	4.76	0.04	1.03	0.17	18.43
Memphis:								
April, 1924	0.98	13.35	0.42	5.86	0.07	1.05	....	21.73
Year to date, 1924	1.12	12.83	0.23	4.72	0.05	1.38	....	20.35
April, 1923	0.87	14.39	0.33	4.69	0.27	0.79	....	21.34
Year to date, 1923	0.97	14.04	0.35	4.31	0.20	1.07	....	20.95
New Orleans:								
April, 1924	0.70	15.04	0.79	4.96	0.25	1.56	0.07	23.42
Year to date, 1924	1.26	14.65	0.59	4.37	0.24	1.40	0.08	22.59
Year, 1923	2.74	17.60	0.59	12.44	0.48	1.08	0.97	35.90
Year to date, 1923	2.71	17.40	0.69	12.01	0.56	0.96	1.00	35.33
Birmingham:								
April, 1924	1.40	16.30	0.10	9.70	0.20	1.40	....	29.10
Year to date, 1924	1.21	13.21	0.18	7.88	0.25	1.14	....	23.86
April, 1923	1.50	15.00	1.00	7.10	0.30	1.60	....	26.50
Year to date, 1923	1.40	14.50	1.00	7.00	0.20	1.20	....	26.00
Little Rock:								
April, 1924	1.92	12.67	0.62	6.34	1.26	0.34	....	23.15
Year to date, 1924	1.91	13.45	0.34	7.12	1.64	0.37	....	24.83
April, 1923	1.95	13.79	0.11	9.85	0.36	1.33	....	27.39
Year to date, 1923	1.95	12.52	0.16	9.73	0.39	1.33	....	26.08
Knoxville:								
April, 1924	2.00	17.96	0.10	9.60	0.48	0.95	....	31.09
Year to date, 1924	1.96	17.45	0.36	8.28	0.16	0.30	....	28.60
April, 1923	1.96	15.73	0.23	9.89	0.11	0.38	2.17	30.47
Year to date, 1923	2.00	21.17	0.39	11.75	0.19	0.74	1.89	38.13
Dallas:								
April, 1924	0.71	13.44	0.07	7.57	0.07	1.44	0.31	23.61
Year to date, 1924	0.83	15.83	0.21	8.38	0.18	1.79	0.71	27.93
April, 1923	0.90	11.79	0.29	6.84	0.24	1.60	1.46	23.14
Year to date, 1923	0.76	13.76	0.32	7.51	0.31	1.72	1.33	25.71
Mobile:								
April, 1924	1.80	22.00	0.68	5.70	1.93	0.32	....	32.60
Year to date, 1924	1.83	20.90	0.63	5.20	1.93	0.17	....	30.70
April, 1923	1.98	15.72	1.00	5.45	2.07	0.36	....	26.60
Year to date, 1923	1.97	19.50	0.50	5.00	1.88	0.31	....	29.20

Portable Armature Oven

SINCE it sometimes happens that in rewinding armatures the coils do not fit in the armature slots accurately a method to permit the coils to be more readily inserted by heating is of advantage. Also by heating the coils after they are installed they soften and fit the armature slots more accurately so that there is less liability of damage from vibration while in service.

To provide a means for heating armatures while rewinding and also for drying the varnish after they are rewound, the Harmon shops of the New York Central Railroad are provided with a portable oven of the type shown in the accompanying illustration. This is made of sheet iron, approximately 1/16 in. thick, and is lined with asbestos. The size of this portable oven is just sufficient to fit over an armature, and as there is no bottom this can be placed in any location found convenient. The oven is provided with four handles, two on each side at the bottom, for handling by men, and the top is provided with two rings for handling with a crane if found desirable.

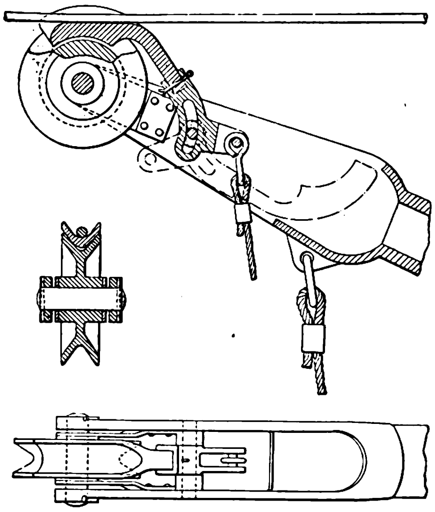


Portable Oven to Be Placed Over Armatures for Heating

Heat is supplied from eight electric heaters mounted inside. These are of the ordinary cross-seat type and are mounted vertically. A flexible connection is provided which can be plugged in at any convenient location and a switch on the end of the oven provides for opening and closing the circuit, as desired. A bank of lamps mounted on the end of the oven also serves as an indication to show when heat is on.

Combination Trolley Shoe and Wheel

A COMBINATION trolley harp, shoe and wheel has recently been designed and patented by Hugh Savage, superintendent of shops Detroit United Lines. The cars of the Detroit United Lines entering the city of Detroit are being equipped with this form of current collector. At the time of the arbitration between the company and the city of Detroit on charges for the use of the city lines by the cars of the company, the city objected to the use of a trolley shoe unless the trolley wire was lubricated. By this combination the cars of the Detroit United Lines can use the shoe on the interurban lines and then, by a slight pull on a short piece of rope, the conductor can change the collector from a shoe to a wheel. The combination has the additional advantage that the wheel can quickly be substituted for the shoe when a car has to back up on an interurban division. For straight running the company prefers the shoe collector for high-speed service.



Plan and Sectional Elevation of Harp, Wheel and Shoe, with Cross-Section Through Wheel Bearing

The construction of the combination is shown clearly in the drawing. The shoe holder is held on the harp by a pivot which passes through a curved slot. The purpose of this slot is to allow the shoe to adjust itself to the wire at all times, regardless of the variation in the height.

Dick's Bosses Discuss Plans

And He Comes Under Observation

722
norman benyon

MR. MILBURN, the new general manager of the Consolidated Railway & Light Company, who had just entered the carpenter shop with Thomas Mullaney, the general foreman, after a trip about the shops, stopped near where Dick Prescott was helping Steve, the now industrious old carpenter, who had spied the pair the moment they appeared in the doorway.

The two men seemed to have been discussing something on which they had about reached a decision, but paused to wind up the conversation before continuing their tour of inspection. Mullaney was speaking earnestly.

"Some of our foremen have been talking about this scheme for quite a while, Mr. Milburn. They seen to think we can save something by makin' drawings of maintenance parts and gettin' somebody to check up all the kinds of material we use. I've heard a lot of talk, too, about how we can get better methods here in the shops. But when I get personal, the foremen all say they're so busy with their regular day's work they can't think much about doin' things better. Anyhow, I've just called a meeting where we're goin' to talk over some of these things. Seems to me the best way to handle it's to start some sort of engineering department."

"That's a good way to go at it, Mullaney," replied Mr. Milburn. "I'm considerably surprised a shop as big as ours has worried along so long without any semblance of such a department. Go to it and find out what the foremen can do to help start it."

"I'm glad you think so, Mr. Milburn."

"Now just a suggestion, Mullaney, about how you should go at this thing to get some real results. You can't make an engineering department by painting a sign on a door and putting in some drawing boards. You'll have to get the right kind of men and give the plan your hearty co-operation if you want to get somewhere with it."

"That's goin' to be the hard part, I'm afraid."

"You're right, Mullaney. You must have a man in charge who has enough judgment and experience to get the confidence and the respect of the shop foremen, and who can soon work up to your assistant. He ought to have some imagination and enough breadth of vision that he can make real suggestions for improvements in our practices. And he must have the viewpoint of the shop departments so he can understand their needs and work out ways of speeding up routine repair work. He ought to be able to get a real system and make the regular work standard. But still he shouldn't load up the shop with a lot of needless red tape."

"I don't know if we can get that sort of a man."

"You can if you go at it right, Mullaney. You'll have to give him a real opportunity and pay him enough to keep him interested. Don't make a mistake and think he can show big results at the start, for the best sort of a man will need time to work the thing out."

"That's right, Mr. Milburn. But one man can't do it all."

"Of course not. Your man will have to build up a real department, and add to it as the work expands. Giving the plan a start is going to be hard. Suppose you begin by investigating the new methods you see described every week in the ELECTRIC RAILWAY JOURNAL, and have some one look them up regularly so that they can be discussed at the foremen's meetings. They're being used in other places, and ought to work in our own shops."

As Mullaney was about to reply, Mr. Milburn's eye chanced to light on Dick Prescott, and he interrupted.

"That young fellow Prescott over there seems to be mighty level-headed for such a young chap."

Mullaney glanced toward Dick for a moment before replying.

Recutting Granite Blocks Makes Big Saving

IN THE Cold Spring yard of the Milwaukee Electric Railway & Light Company scrap granite blocks removed from old track zone pavement are recut to sizes which may be used in special work or patchwork in brick or granite paved streets. Four stonecutters are kept busy during the summer months at this work. The company finds it is able to obtain the small-sized blocks at approximately one-half the cost of new stone.

Four Sizes of Blocks Recut by the Milwaukee Electric Railway & Light Company Are Shown

Stonecutters use discretion in cutting the old blocks into the most advantageous sizes.

Blocks as received are often large enough to make two recut 4-in. blocks. Others may be conveniently recut to a 5-in. size, while some may be converted into 3-in. blocks only. Besides these three sizes the company also has use for granite headers for building flangeways at street crossings. This size is also cut from the larger scrap block.

Cutters are paid on a piecework basis, which enables them to make as high as $8 a day. Each day a company checker counts the blocks cut during the day and the man is paid on the following basis:

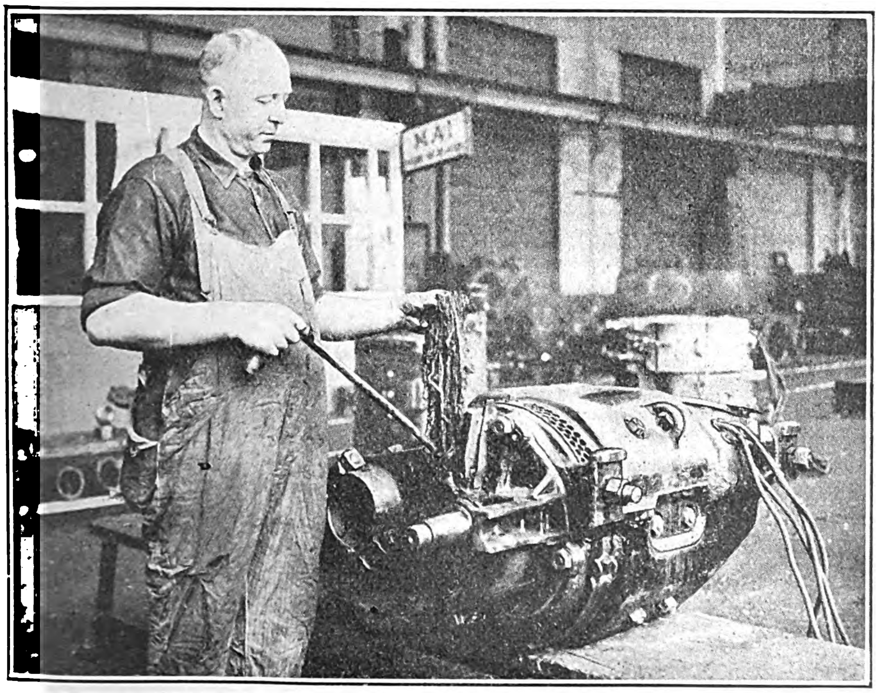
	5-In., Cents	4-In., Cents	3-In., Cents	Header, Cents
Cost	2¼	2¼	1¾	2⅝

As any one of the above sizes would cost new about 5 cents, the recutting saves more than 50 per cent of the cost of new stone. During the month of May this year 22,300 stones of various sizes were cut, this averaging approximately 1,200 per day for four men.

The old paving blocks are removed from the street and the particular job order covering this work is credited with the quantity of stone removed. As new jobs require small-size blocks they are charged with the recut stone at the above prices plus an amount covering overhead and transportation.

Low Benches Facilitate Motor Overhauling

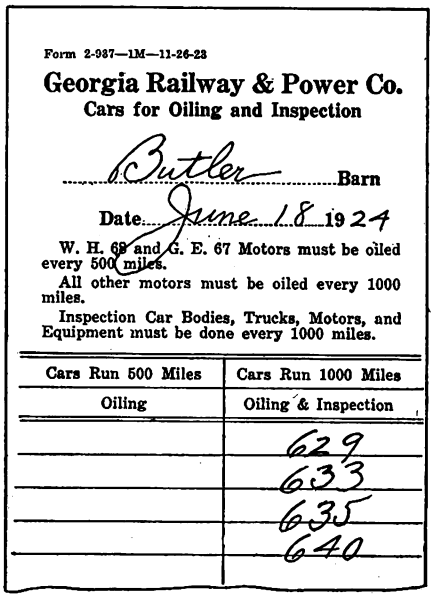
THE advantage of having motors raised from the floor while being overhauled is indicated in the accompanying illustration, showing the packing of an armature bearing. The use of a bench approximately 18 in. high has been found a great convenience while overhauling motors, as workmen are not required to bend over while doing their work, and after the motors are assembled the packing of bearings preparatory to their placement on trucks is greatly facilitated.



Armature Bearings Are Packed Much More Readily If Motors Are Raised from the Floor

Systematizing Car Inspection

CAR inspection on the lines of the Georgia Railway & Power Company, Atlanta, Ga., has recently been placed on a 1,000-mile basis. The transportation department furnishes daily to the office of W. H. McAloney, superintendent of equipment, a statement of the mileage made by various cars on the second day preceding. From these statements the mechanical department compiles a continuous mileage record of individual cars. A list showing the number of cars having run 500 miles, and of those having run 1,000 miles, is sent each day to the foreman at each carhouse. The fore-



Form 2-937—1M—11-26-23

Georgia Railway & Power Co.
Cars for Oiling and Inspection

Butler Barn

Date June 18 1924

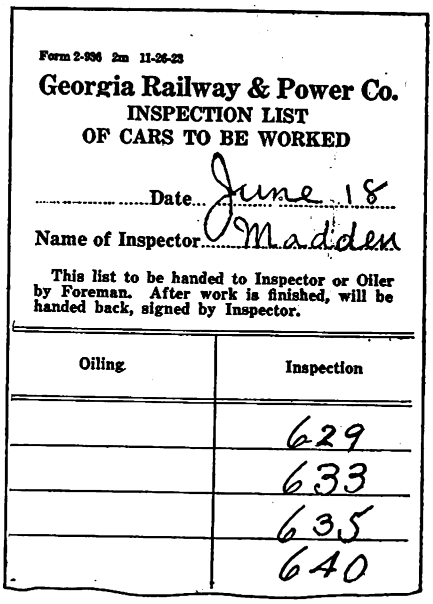
W. H. 68 and G. E. 67 Motors must be oiled every 500 miles.

All other motors must be oiled every 1000 miles.

Inspection Car Bodies, Trucks, Motors, and Equipment must be done every 1000 miles.

Cars Run 500 Miles	Cars Run 1000 Miles
Oiling	Oiling & Inspection
	629
	633
	635
	640

Form Showing the Carhouse Foreman What Cars Are to Be Inspected



Form 2-936 2m 11-26-23

Georgia Railway & Power Co.
INSPECTION LIST
OF CARS TO BE WORKED

Date June 18

Name of Inspector Madden

This list to be handed to Inspector or Oiler by Foreman. After work is finished, will be handed back, signed by Inspector.

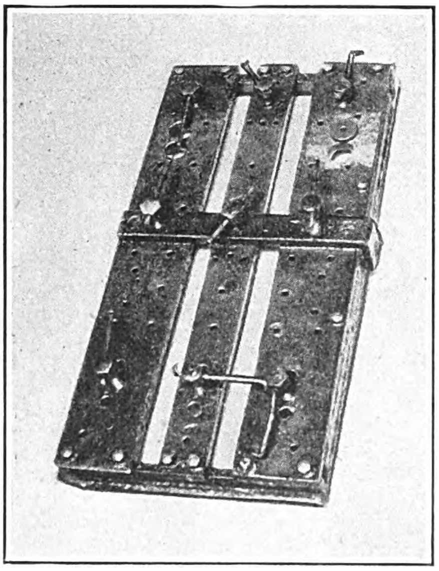
Oiling	Inspection
	629
	633
	635
	640

This List, Printed on Heavy Cardboard Stock, Is Furnished to the Man Who Inspects the Cars

man then divides the work to be done among the different inspectors and oilers, furnishing to each one a list of the numbers of the cars on which he is expected to work. This list is printed on heavy cardboard stock so that the inspector can easily write notations on it. After the work is finished he signs the list and returns it to the foreman. This system supersedes one in which the chief reliance was on the memory of the foreman at the carhouse. It has proved to be much more satisfactory than the old method.

Jig for Drilling 55 Holes

THE maintenance of contact plows for the railways in New York City, where the underground conduit system is employed, is one of the major operations of the various railway companies. The outside protective sheet iron casing for the plow requires many rivets, and these must be located accurately in order to prevent insulation breakdowns. The accompanying illustration shows a jig which is used in the shop of the Eighth Avenue Railroad for drilling the sheet steel portions of their contact plows, which are made of No. 10 and No. 12 gage sheet. This jig is provided with a number of set screws so that up to 12 of the steel sheets can be placed in position and drilled at one time. As there are 55 holes required in each sheet, it will be appreciated that the use of such a jig greatly facilitates the work of drilling, and also insures uniformity, so that the various pieces, after they are drilled, can be mated up and repairs completed without difficulty.

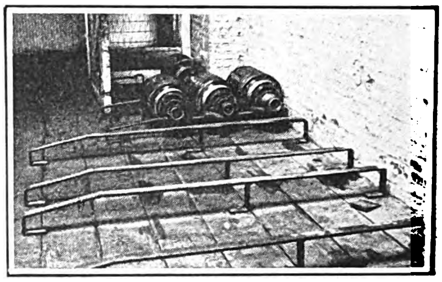


Jig for Drilling Sheet Steel Plates of Contact Plows

Keeping Armatures Off the Floor

IN THE shops of the Denver Tramway the arrangement shown in the accompanying illustration is used to keep armatures off the floor while they are being stored in the shops awaiting repairs or delivery to the carhouses.

The forged bars which constitute the supports are bent down at the front end, so that the armature may be rolled up on the rack without lifting. Old bearings placed over the ends of the shafts protect them from damage. Small wooden wedges prevent the armatures from rolling after placing them on the racks.



Simple Armature Racks Used in Denver

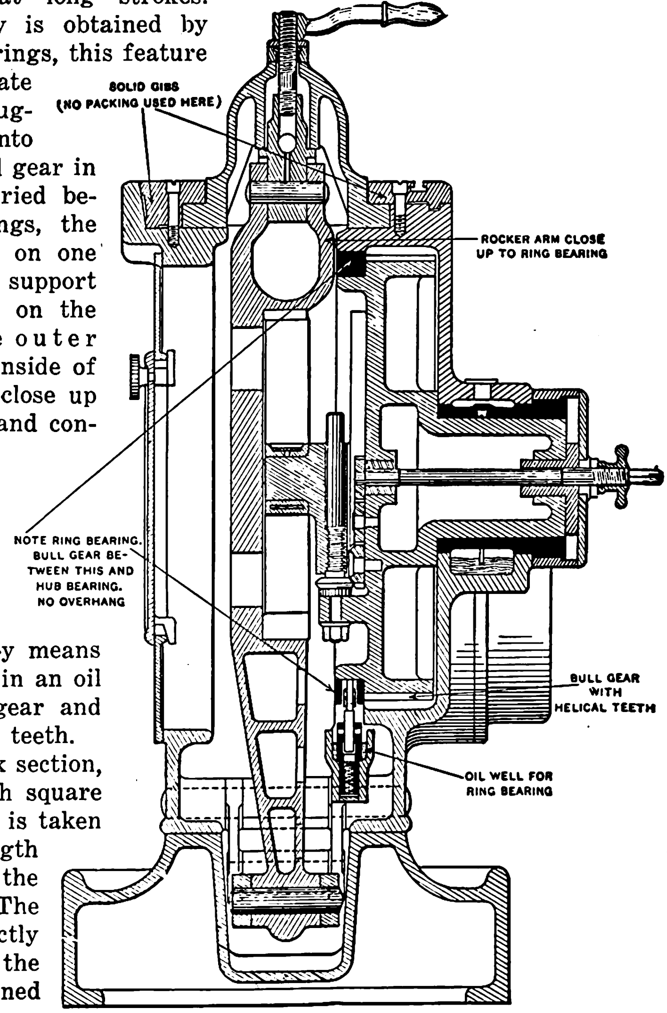
New Equipment Available

New Heavy-Duty Shaper

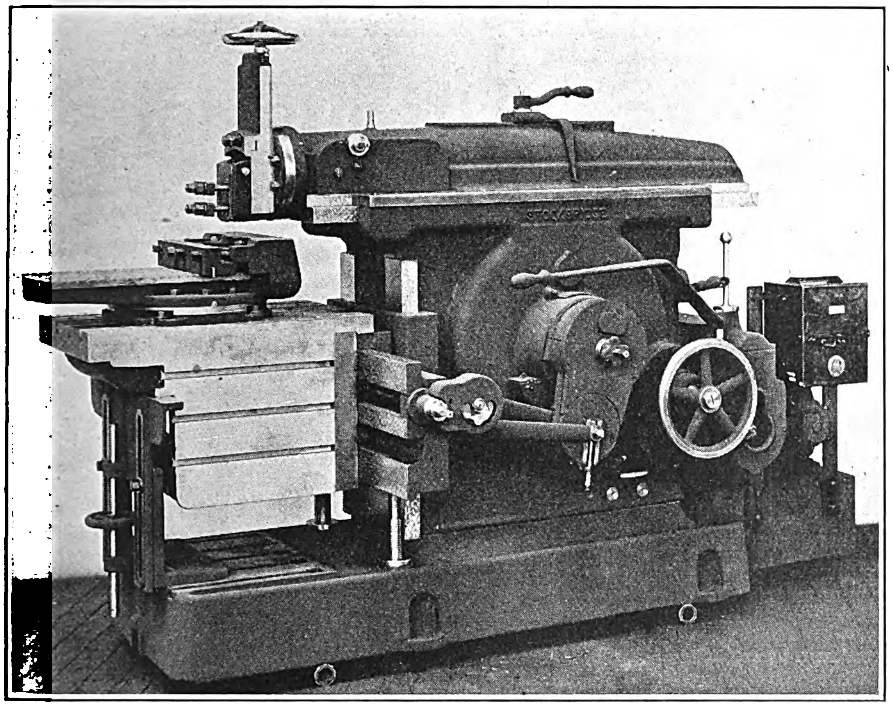
AN IMPROVED type of heavy-duty crank shaper has recently been brought out by the Stockbridge Machine Company, Worcester, Mass. Attention has been given in the design of the crank wheel to eliminate overhang and increase its rigidity when operating at long strokes. Additional rigidity is obtained by the use of two bearings, this feature tending to eliminate chattering from gouging of the tools into the work. The bull gear in this shaper is carried between two bearings, the usual hub bearing on one side and the outer support or ring bearing on the opposite side. The outer bearing is on the inside of the column placed close up to the rocker arm and consists of a ring fitting into the column. The full diameter outer journal of the bull gear revolving in the ring bearing is lubricated by means of rollers running in an oil well. Both bull gear and pinion have helical teeth.

The ram is a box section, heavily ribbed with square guides. The wear is taken up by two full-length solid gibs without the use of packing. The gibs are bolted directly to the column, and the ram can be positioned and adjusted to any length of stroke without stopping the machine. Eight ram speeds are provided.

The head has a graduated swivel for setting to any angle and is provided with a clapper box of improved design with planer type solid binding clamp. The clapper has straps and bolts instead of the


SOLID GIBS (NO PACKING USED HERE)
ROCKER ARM CLOSE UP TO RING BEARING
NOTE RING BEARING. BULL GEAR BETWEEN THIS AND HUB BEARING. NO OVERHANG
BULL GEAR WITH HELICAL TEETH
OIL WELL FOR RING BEARING

Section Showing Construction for Bull Wheel



Heavy-Duty Crank Shaper with Single Pulley Drive

usual tool post. The table has two working sides and can be removed easily for clamping work direct to the saddle. The cross feed operates only on the return of the ram and cannot be fed on the strokes. This eliminates breakage. The feed is automatic and can be varied or reversed while the machine is in motion.

The vise is of special construction with a movable jaw, made in halves. Each half is independent of the other. This permits taper or irregular shaped work to be held rigidly. The speed box is of the selective sliding gear type with ball shift. The shaper is driven by a constant speed motor of from 7½ to 10 hp., mounted on an extension of the base. The regular equipment includes a swivel vise, table support and wrenches. Special attachments include an extended circular feeding head, wedge chuck and a boom crane. The shaper has a 32¾-in. stroke and requires a working floor space of 5 ft. x 10 ft. 4 in. The top of the table is 19 in. x 32 in. and has a vertical travel of 15 in. The automatic cross feed of the table is 36 in.

Forced Ventilation for Old Motors

A DEVELOPMENT by which the ratings of old non-ventilated motors can be increased with but a slight increase in weight has been evolved by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., and has been applied satisfactorily to a number of types. A ventilating system is applied to old type motors, in which the air is circulated by a fan mounted on an extension of the armature shaft at the commutator end of the motor. There are many non-ventilated motors in electric railway service, which are being continually overloaded, due to more exacting service conditions. The addition of external fans to these motors provides a means for increasing their capacity.

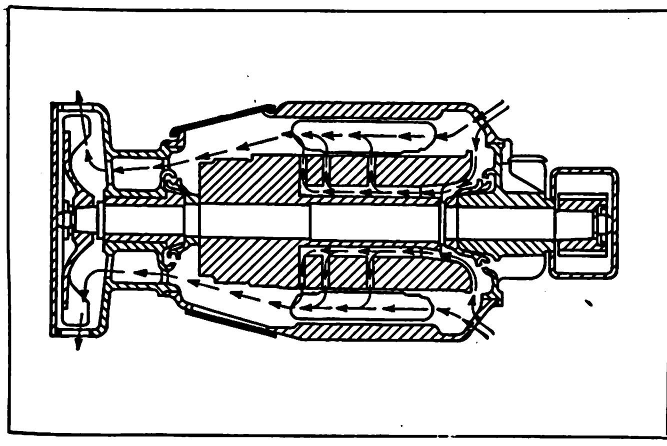
An accompanying cross-section shows the path of the air through the motors. Air is drawn in at the pinion end through openings which must be provided in the motor frame and is then distributed around to the various paths or ducts inside. In a number of the older types of motors, the inspection and hand holes at the pinion end of the frame have been used as air intakes. The air is exhausted by the fan through openings in the periphery of the fan chamber.

As an indication of the increased capacity which may be expected, the accompanying table gives some actual results which have been accomplished by the application of the new ventilating equipment.

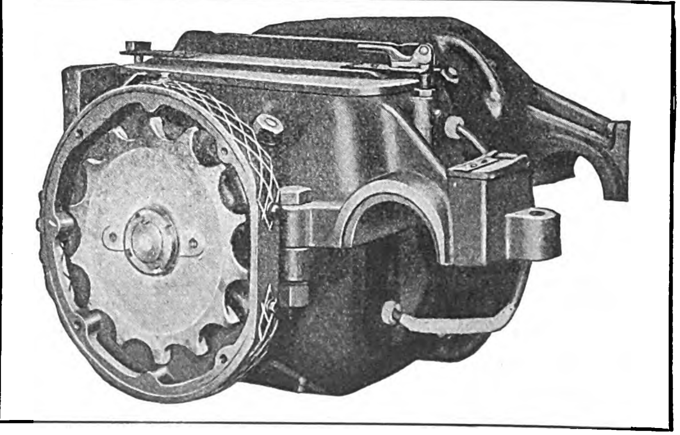
Type of Motor	Per Cent Increase in Continuous Rating at 300 Volts	Per Cent Increase in Continuous Rating at 450 Volts
101-B-2	*20	*38
101 D-2	23	48
306-CA	36	55

*Approximate.

The new parts required for converting a motor of the old type into a ventilated motor include a new shaft with extension for the fan seat; a fan; locking device for the fan; commutator end wiper ring (not always required); new commutator end housing and fan chamber; air intake covers, and commutator end armature bearings (not always required).



Cross-section of a Non-Ventilated Motor Arranged for Ventilation with an External Fan



An External Fan Applied to a Westinghouse Type 101-B2 Motor. The Cover for the Fan Has Been Removed in the Illustration

Association News & Discussions

Outside Factors Affect Damage Claims*

Greater Street Congestion and the Prevalence of Traumatic Hysteria Suggest Greater Care in Accident Investigation

BY F. W. STOCKMAR
Manager St. Louis District,
Railway Audit & Inspection Company

THE normal cost of electric railway damage claims will depend largely on the density of traffic, the condition of the streets and other factors, but will usually run from 1½ per cent to 4½ per cent of the gross receipts, with the average between these two figures. With the increasing use of automobiles, the increasing density of traffic and the increasing carelessness of pedestrians accident claims have become more or less a menace.

CLAIM ORGANIZATIONS

The usual claim organization consists of a claim agent, who may or may not be a lawyer, and a corps of investigators whose duty it is to run down the claims in the shortest possible time. In addition the legal department usually has one lawyer, whose business it is to keep in constant touch with the claim agent and to prepare and handle such litigation as is brought against the company on account of accident. It is usual to limit the investigator as to the size of the claim he may settle and to also fix a limit for the claim agent. The lawyer in charge of accident and damage suits should also have a fixed limit beyond which he cannot go except by either conference with the general manager or the general manager and the executive committee combined.

Where evidence has to be compiled for contested cases the gathering of this information is usually left to the investigating department, some of whose members may be well trained and others not. There are also investigators who are unable to determine, themselves, what constitutes evidence for the defendant. Their reports may be valuable when the summing up takes place.

TRAUMATIC HYSTERIA

During the last twenty years there has been a constant increase of "ambulance chasers," who, I am ashamed to say, receive a great deal of help from the medical fraternity in bringing about settlements. Various and sundry internal injuries have been discovered and once the patient's attention is called to this internal trouble—even if it does not exist—the power of suggestion becomes active and the patient immediately is in the grasp of what is now known by both the medical and legal fraternities as "traumatic hysteria." This in its last analysis means only a suggested trouble which becomes such an obsession that its ultimate relief can only be found in a plaster of greenbacks or, in other words, a settlement of the case. Yet "traumatic hysteria" is real. It becomes part and parcel of the patient. I have seen a case where a man wasted away from 225 lb. to 135 lb. and, while the company's attorney and physician were firm in the belief he was faking, there is no doubt in their minds or in mine that had the case not been settled the man would have died.

Women are particularly prone to cases of "traumatic hysteria." The term "anguish of mind, mental suffering, etc.," very promptly plants in a woman's mind the idea that she has been badly used and she is entitled to a settlement and nothing but a settlement will ever relieve the nervous condition in which she finds herself. Therefore, the lawyer and the physician become doubly culpable, first because they are dishonest, and second, because they, perhaps, ruin the nervous system of the patient by their attitude.

In other cases, the outside doctor will double up in the number of visits or dressings of wounds beyond those given to one of his own patients, the answer being he wants to retain his own patient, but any bill against the company is good.

VARIATION IN STATUTORY LAW

In different states the recovery for different classes of accident and even death differs widely. Where an accident incapacitates a man for his daily vocation, his value to the community should be taken into consideration. In an accident on the electrified division of the New York Central some years ago, where there were a number of deaths, the payments for these deaths ran all the way from $10,000 up to as high as $50,000 and more, as there were a number of lawyers and other professional men on this train. A law of this character is pernicious. A man's worth to his family—dead—should be determined by a number of factors, but in the opinion of the writer a bricklayer is as much of an asset to his family as would be a banker, and both families would be entitled to the same consideration.

Again, it should not be the province of the jury to assess the amount of damages to be given in any accident case. Its province should be, "Was the company liable?" If so, the law should specify the amount of settlement, just as an accident policy does.

Many of the so-called "ambulance chasing" lawyers who make a specialty of accident cases are equipped with investigators of their own, whose business it is to get in touch as soon as possible with people who have sustained the injuries and caution them not to talk with the company's investigators or lawyers.

The services of our own company and those of other similar, high-class organizations have been used to run down cases of this character, showing where there was collusion between the lawyer, physician and claimant, where the patient was faking his case, etc. This leads ultimately to the "traumatic hysteria" mentioned, which is one of the most difficult phases of the accident game.

It is easy enough—if the legal department is lax and the investigators careless—to permit a claimant to intrench himself in an almost impregnable position and ultimately to acquire for the company a reputation of being an "easy mark," which once acquired is one of the biggest burdens and liabilities that any company has to bear.

A few years ago there was in this country a corps of athletes who were able to get themselves thrown from the step of a car to the curbstone, and when picked up it would appear that every bone in their bodies was out of joint. In other cases of seeming paralysis needles or pins might be stuck into almost any part of the anatomy without producing the usual reflex, fooling even the company's physician after a long period of time. In one case of this kind the entire lower half of the man appeared to be paralyzed. In an endeavor to show that this was not true, every conceivable test was tried, but the patient was never caught napping. Finally, he was prepared for the operating table and heard the conversation of the attending physicians and every detail of the proposed operation. About the time it became necessary to administer the anæsthetic the patient threw up his hands and admitted that he had been faking all the time, being more scared of the operation than of the needles and pins with which he had been punctured.

In the "traumatic hysteria" case cited above, where the man wasted away from 225 lb. to 135 lb., he invested the money received—some $4,500—in a livery stable, and was sound and hearty within thirty days after the settlement took place.

In the old days we used to figure in the purchasing of a new property that such outstanding litigation as was in the courts for injuries and damages could be settled for 10 per cent of the face value of the suits. I doubt if this could be done now, because the people have grown much wiser.

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*Abstract of paper presented at the annual convention of the Mid-West Claim Agents' Association, Des Moines, Iowa, July 18-19, 1924.

To summarize:

1. Every just claim against the company where liability is recognized by the legal department should be promptly settled and for the lowest amount possible. In the case of a large accident involving a great many people, the faster the company's agents move the smaller will be the ultimate amount involved.

2. The attitude from the general counsel down to the least important investigator in the claim department should be one of "I am from Missouri, you must show me." While it is necessary for the company to have a reputation of being just and fair, it should also be recognized that the company does not propose to disburse money except for such claims as are absolutely just.

3. Careful thought should be given to such claims as may be doubtful but presage large losses, due consideration being given by the claim department to the mental attitude of the trial attorney, who likes to show the largest number of hits and the smallest number of misses.

4. Employ highly trained outside investigators who have made a wide study of cases of this character.

Latest Development in Track Material*

European Companies Are Closely Following Improvements in Rail Manufacture—Three Standard Sections Proposed

By E. d'Hoop
Chief Engineer Brussels Tramway, Brussels, Belgium

The discussion on track construction at this convention has been divided into four parts, namely: (1) Track material, (2) track construction, (3) special trackwork, (4) electrical and mechanical operation of switches. It is the first of these subjects which has been assigned to me.

One difficulty with the material in track is that the differences between the requirements of rails for electric railway and for steam railroad service are not realized by the manufacturers. These differences are fundamental. Thus, the general dimensions of the rail in street railway service, and consequently its weight, are not dictated by the stresses imposed upon it, but by the fact that it is in paving of a definite depth and in a street which is used by other vehicles, to whose passage it must present the minimum amount of obstruction. As a rail is surrounded by pavement, joint maintenance is difficult and expensive, and it is subject to the wear of the wheels of miscellaneous vehicles, as well as being often covered by sand, dirt and mud. Then, as compared with steam railroad service, the curves have a shorter radius and have no superelevation, grades are sharper, and there are many points at which maximum braking and acceleration take place.

The duplex rail is going out of use, and there is a tendency in all countries toward standardization on a few sections. The following summary of the conclusions of the Swiss Commission on standardization of rail sections are worth repeating:

"The dimensions in the grooved rail section which most need standardization are the shape of the head of the rail, the diameter of the inside and outside fillet, the distance of the gage line from the center of web, the shape of the sides of the groove, its width, the shape of the bottom of the groove, the height of the guard on a guard rail, and the inclination of the fishing surfaces. The dimensions which are not so important to standardize are the depth of the head, the depth of the groove, the thickness of the web, the total height of the rail and the width of the base. The depth of the head ought to be sufficient to insure a certain vertical wear so as to increase the life of the rail, and there should be a relation between the depth of the groove and the depth of the head, so that as the head wears the wheels will not run on their flanges. The point of contact of the tread of the wheel should be over the rail web.

Based on these conclusions and a study of the existing standard rail sections in France, England and Germany, the writer submits three proposed standards with corresponding guard rail. The principles on which these standards are based are as follows:

1. There are three sections for, respectively, heavy, medium and light service.

2. The relation of the height to the base is 1.

3. The head is slightly convex, with a radius of 400 mm., so that it will tend to wear flat in normal service.

4. The depth of the head is sufficient to prevent a permanent deformation resulting from the metal exceeding the elastic limit.

5. The radius of the inside fillet of the head is 6 mm.

6. The inclination of the sides of the groove is 1:8. The depth of the groove is 34 mm. measured from the bottom of the inside fillet.

7. The top of the head is 5 mm. higher than the top of the lip in the normal section and 3 mm. in the guard rail.

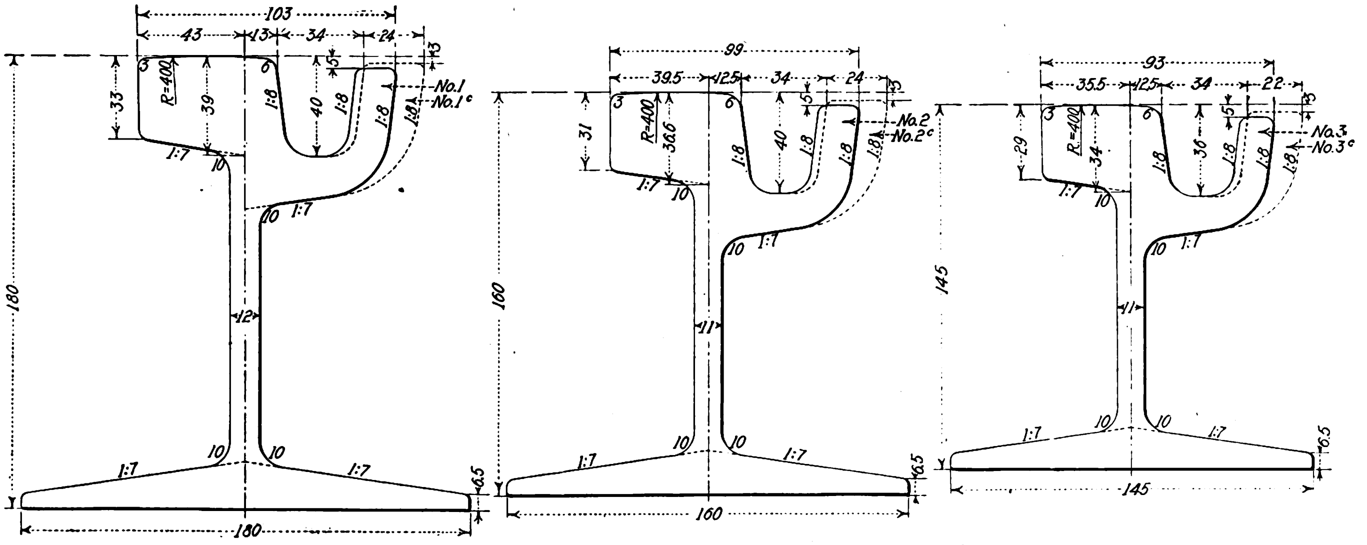
8. The inclination of the fishing surfaces, both top and bottom, is 1:7.

9. The thickness of the web is uniform, either 12 mm. or 11 mm.

10. The distance between the inside face of the web and the inside face of the head (that is to say, the head side of the groove) is 7 mm. in all sections so as to provide for lateral wear of the groove.

11. The axis of the rail is perpendicular to the plane of the track.

12. The standard length of rail is 18 m.



Standard Grooved Rail Sections Proposed at Paris Convention

At left, rail for heavy traffic 180 mm. (7.1 in.) high; in center, rail for medium traffic 160 mm. (6.3 in.) high; at right, rail for light traffic 145 mm. (5.7 in.) high. All dimensions on drawing are in millimeters.

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*Abstract of report presented at the biennial convention of the Union Internationale de Tramways, de Chemins de fer d'Interet local et de Transports publics automobiles, Paris, June 16-22, 1924.

Practice as to the use of guard rails varies greatly. Some companies bolt a guard lip made of manganese or other alloy steel to the standard rail; others use a regular guard rail, and still others use for the outside of the curve a rail with a shallow groove, so that the wheel will run on its flange.

TABLE OF PROPOSED STANDARD RAIL SECTIONS

No.	Type	Height in Mm.	Height in In.	Weight Kg. per M.	Weight Lb. per Yd.
1	Tangent	180	7.1	56.7	113.4
1c	Guard	180	7.1	59.9	119.8
2	Tangent	160	6.3	49.2	99.4
2c	Guard	160	6.3	52.4	104.8
3	Tangent	145	5.7	41.8	83.6
3c	Guard	145	5.7	44.7	89.4

In general, the companies replying to the data sheet preferred the open hearth to the bessemer process for the manufacture of rails. For carbon content, 0.7 to 0.9 point is considered desirable, though it is not always obtained.

Various processes for the treatment of rails have been developed recently and are as great factors in their wear as the question of composition. They include treatment in the ingot during rolling and after the rail has taken form. Much also has been learned during the last few years in regard to the heat treatment of steel, but of the thirty-eight companies replying to the data sheet only seven stated that they had made any tests with rails which had been heat-treated. Of the heat treatments, the best known is probably the Sandberg, in which the head of the rail after coming from the final roll, and while it is still hot, is cooled by cold air blasts. The same process can be applied to rails in place. A variation has been developed by a French rolling mill, known as the Neuves Maisons process, in which the head of the rail while still hot is treated with water. In practice, the rail is inverted and the head is dipped several times in a water vat.

Most tramway companies purchase their rails on specifications, the specifications providing, among other things, for mechanical tests, chemical tests, and microphotograph examinations. Few companies, however, report making any definite measurements on the wear of their rails in service. Exceptions are the Amsterdam Tramways; the Anglo-Argentine of Buenos Ayres, which uses an apparatus for graphically recording the wear; the Paris Tramways, which employs the Thornton device; the London County Council, which uses a micrometer gage, and the Marseilles tramways. London and Paris report a wear of 0.5 mm. per 2,000,000 ton-km. Marseilles reports that in double track the rails nearer the pavement wear in the ratio of 10 to 6 as compared with those nearer the center of the street.

RAIL JOINTS

The rail joint question has become simplified since the development of the welded joints. The alumino-thermit process is the one most generally used, though arc welding is also employed to some extent.

The ties used are generally of impregnated wood. Metal and concrete ties are not very generally employed.

There is little new to report in tie rods, tie plates, and other accessories.

STANDARDIZATION

Standardization is the order of the day, and tramway companies, which have so many different types of rail, would be the first to benefit through standardization. The international conventions on standardization, held in London April, 1921, and in Zurich, 1923, have contributed notably to the development of standards. The Swiss Standards Association has now decided to establish at its headquarters in Baden a central bureau of information, through which the various standards associations can exchange information and obtain data. This step ought to be of benefit to tramway enterprises.

National Safety Council

THE thirteenth annual convention of the National Safety Council will be held at Louisville, Ky., Sept. 29-Oct. 3.

California Association Executive Board Meets

AT A MEETING of the California Electric Railway Association held on July 7 in San Francisco officers for the year were elected.

The new president is H. A. Mitchell, vice-president and general manager San Francisco-Sacramento Short Line. F. W. Webster, general manager California Traction Company and Fresno Interurban Railway was elected vice-president.

The new executive committee of the association will comprise: Paul Shoup, vice-president Southern Pacific Railroad; President H. A. Mitchell; W. R. Alberger, vice-president and general manager Key System Transit Company; Claus Spreckels, vice-president and general manager San Diego Electric Railway; Colonel Charles N. Black, president Market Street Railway, San Francisco, and W. E. Dunn, president Los Angeles Electric Railway.

A new publicity committee was appointed, consisting of M. McCants, Ben S. Allen, R. E. Kelly, R. E. Fisher, J. G. Jeffery and E. C. Thomas.

American Association News

Handbooks on City and Interurban Operation Prepared

IN CONNECTION with the work of the committees on city operation and interurban operation a "handbook of modern methods" has been prepared for each. These handbooks, to which reference has been made previously, and which were described quite fully in an article by R. F. Carbutt, published in this paper June 21, page 987, have now been prepared in tentative form and distributed to all members of the two committees for review and comments at the meetings to be held at the Missouri Athletic Club in St. Louis on July 25.

These handbooks are prepared from contributions by men in charge of various activities in the city and interurban electric railways throughout the country. In general, not more than one typewritten page is devoted to each item, so that the treatment of the subject is not by any means in the form of a detailed committee report. While the detailed descriptions of modern methods are short, they are designed to be complete enough to convey the reasons for the adoption of the method, the results obtained and information as to where full details may be secured.

In order that these concise reports of modern methods might be arranged in a manner such that any subject would be readily available when desired, the form of subject index of the ELECTRIC RAILWAY JOURNAL has been adopted.

The scope of the activities of the committees is very broad as the objective was a general survey of the modern methods in use in the industry. Executives of the properties visited were asked for information on any modern methods they were using. The regional vice-chairmen frequently were asked for suggestions of subjects that would be of interest to other operators; therefore, the following list was prepared based partly on conversations with street railway executives and partly on suggestions from the editors of *Aera*, the ELECTRIC RAILWAY JOURNAL, and *Electric Traction:*

A. Securing public good will.
B. Refinancing plans reducing the cost of new capital; distribution of securities among customers and employees, and other methods of obtaining money for needed improvements.
C. Developing good relations between management and employees.
D. Training of personnel, including safety education.
E. The solution of the city traffic congestion problems.
F. Co-ordination of electric street railway and motor bus service for all transportation requirements and relief from unfair competition.
G. Popularizing electric railway service.
H. Modernizing and developing attractive rolling stock.
I. Providing facilities for maintaining equipment efficiently.
J. Economies in operating and maintenance practice.
K. Improvements in construction practice resulting in reduced first cost, reduced maintenance and improved reliability of service.
L. The installation of automatic substations and other power economies.
M. Relief from paving burdens and other imposts.

Annual Convention and Exhibits

A. E. R. A

Atlantic City, N. J.

October 6, 7, 8, 9, 10

The News of the Industry

Power Being Conserved

Los Angeles Properties Carrying Out Instructions of Commission—Many Stops Eliminated—No Reduction in Rush-Hour Service

Due to the shortage of hydro-electric power in California this summer caused by the light rains of last winter, the Los Angeles Railway is carrying out an extensive program for power conservation along lines authorized by the State Railroad Commission and the Los Angeles Board of Public Utilities.

The first step in the program was the elimination of a large number of stops and the relocation of others. On some of the lines shuttle service is being given at the terminals, particularly in hill territory. There has been very little reduction of morning and evening rush-hour service, but headways have been extended in the midday and night period.

A thorough campaign is being conducted among trainmen teaching motormen how to save the greatest amount of power at the controller and instructing conductors to conserve lights and cut down the time of stops to a minimum.

The Los Angeles Railway has also filed application for operation of a new bus line extending south from the business district, and further rearrangement of the bus facilities is being planned to meet the emergency.

Newspaper advertising space, posters and cards in the cars and "Azuride," the company publication, are being used extensively to acquaint passengers with the necessary changes in service.

In its curtailment and rehabilitation plan due to the power emergency the Pacific Electric Railway proposed a reduction of local car service to the extent of approximately 51,000 car-miles per month, or about 2½ per cent of the total mileage. The company has turned two of its unused steam power plants over temporarily to the Southern California Edison Company, which has rehabilitated the plants for operation as an emergency measure during the power shortage period.

The cut of mileage was made effective July 7 and involved the rearranging of schedules, resorting to the wartime skip-stop method of operation and reducing or eliminating entirely car runs on lines subject to light travel.

The Pacific Electric officials state that the interurban main-line traffic will not be subject to major changes, but on these lines unused cars will be turned back before reaching the end of the line, while three and four-car trains will be cut down to one car. Light traffic local car lines of the Pacific Electric in Pomona, Redlands, Riverside and Long Beach will be eliminated.

General reduction in service will be on the "off-peak" hours and at night. In some districts where car service is eliminated it is proposed to take care of the public with buses.

In Los Angeles local service shuttle runs have been started by the Los Angeles Railway on some of its lines, while it is intended that twenty-one double-deck buses now pending delivery will shortly be placed in service to give relief to the reduced car schedules.

The two traction lines in Los Angeles filed an application with the State Railroad Commission for permission to reduce their schedules in conformity with the commission's order for a 25 per cent reduction in power consumption. The Los Angeles Board of Public Utilities also is conducting a survey for a 25 per cent power-saving plan to be approved by the board in conjunction with the commission's order.

Another Trackless Trolley on Staten Island

A fourth trackless trolley line has been opened by the city of New York on Staten Island. It runs from Meier's Corners, West New Brighton, to Tipperary Corners, New Dorp, via Bradley Avenue, Brielle Avenue and Rockland Avenue.

Meier's Corners is the terminus of the Linoleumville and Sea View Hospital trackless lines, which have been in operation since the fall of 1921, and is on the Silver Lake and Concord Municipal trolley lines. Tipperary Corners is in New Dorp on the line from St. George to Richmond.

Purchase of Bus Line in Interest of City Proposed

An ordinance providing for the purchase of the property of the Detroit Bus Company by the city in behalf of the municipal railway will be submitted to the electors next fall. Announcement to this effect was made by officials of the Department of Street Railways during a hearing before the City Council on the bus company's proposal to establish a new major route running from Fourteenth and Longfellow Avenues in the residential section to the site of the new Book-Cadillac Hotel on down-town Michigan Avenue. The Street Railway Commission is making a survey of the bus company's activities and a report is expected to be submitted to the acting Mayor recommending that the purchase proposal be placed on the ballot. The railway management is understood to regard the proposed new bus route as an extra and unnecessary form of transportation which would take from the railway certain revenues needed to assist in financing extensions.

Bus Company States Plans

Newly Organized Company Conducting Traffic Surveys in Seven Cities—Prepared to Co-operate with Railways

A nation-wide system of urban and interurban motor buses, radiating from virtually all important cities, supplementing or partially replacing electric railways or steam railroads, is the plan of the recently formed Omnibus Corporation of America. Announcement to this effect was made on July 15 by John Hertz and John A. Ritchie, chairman of the board of directors and president, respectively, of the new company. Mr. Ritchie said:

> Buses are the most modern and most economical means of transportation, and as such should be used to the greatest advantage either in replacing existing systems or as auxiliaries. There is a great need for this form of rapid transit in both city and country and the people are going to demand its adoption. We are entering this field with a broad vision, confident that a few years will see the Omnibus Corporation owning wholly or in part companies throughout the United States.

The Omnibus Corporation officials do not subscribe to the theory that the day of the trolley is ended, but they do believe that there are many cities lacking transportation facilities in certain sections that could well utilize auxiliary bus service. While it would not be profitable in many cases for the electric railways to lay track and put in power plants to provide transportation, the bus will enable profitable expansion, according to the Omnibus Corporation officials.

Seven surveys are now being made in various cities to determine the feasibility of bus service, according to Mr. Hertz. In each of these cases the bus corporation is undertaking the investigation with the co-operation of the local traction interests. Two of these companies have accepted the results of the survey, showing the part that buses can profitably take in providing additional and substitute transportation, and plans are going ahead for the formation of companies.

One company has already been formed and an application for a franchise has been filed, but details will be lacking for several weeks. This company will be owned half by the Omnibus Corporation and half by the traction interests, which operate a widespread interurban service. Buses will operate between two of the principal cities of the United States approximately 300 miles apart, and there will be several subsidiary lines running to neighboring towns and cities

In discussing the formation of this company, Mr. Hertz, who will not reveal the name for several weeks, said that it is only one of many that may be started within the next few years. A uniform policy of divided control between the Omnibus Corporation and the local traction interests will be adopted. Mr. Hertz said:

> We are prepared to co-operate with electric railway operators or steam railroad companies in the formation of the bus or omnibus lines. As many of the traction companies lack credit or confidence, the Omnibus Corporation will provide whatever part of the capital is necessary to start these companies. We will assume a one-fourth, a half or three-quarters ownership and start the companies in operation. We have enough confidence in the future of this new industry to match our capital against that of local interests, and we will provide the enterprise, the energy and the operating experience necessary to make such companies a success.

Existing transportation needs and facilities were briefiy sketched by Mr. Ritchie in discussing the future of the bus. He said:

> We are at the point of a new era in distribution. The old methods have failed to meet the requirements of our expansion. There are at present four basic means of distribution.
>
> The first, the steam railroads, with 260,000 miles of lines, definitely limited because of lack of terminal facilities.
>
> The second means of transportation is the street railways. With only 48,000 miles now in operation, they have not expanded, but, on the contrary, have abandoned much trackage since 1917.
>
> The third, the waterways, has decreased in importance in regard to passenger traffic, but because of the inadequacy of the railroads have increased in freight hauling.
>
> The remaining means of transportation, the highways, is the as yet undeveloped hope of the future. There are now in the United States 1,400,000 miles of highway, of which only 36,000 miles are improved. Farmer resistance, which has heretofore obstructed progressive improvement programs, has disappeared. The $11,400,000,000 appropriations of federal and state governments in 1923 are evidence of the development to be expected in highway transportation in the future.
>
> Organized freight and passenger distribution over the unlimited highways of the city and country is fast becoming of tremendous importance. It is the idea of the Omnibus Corporation to be in a position to meet this growing need. With a practical monopoly of experience in bus operation and an absolute monopoly in double-deck bus operation, the new company offers its facilities and financial standing to the struggling transportation systems now trying to meet modern requirements with obsolete equipment.

The Omnibus Corporation is formed of the Chicago Motor Coach, Fifth Avenue Bus and the New York Transportation Companies, which were merged some weeks ago, with a capitalization of $40,000,000 authorized. About $16,000,000 was required for the exchange of securities, leaving the remaining $24,000,000 of capital available for investment in bus systems throughout the United States.

Shipments of Hogs at Indianapolis Grow

It is predicted by Samuel E. Rauh, president of the Belt Railroad & Stockyards Company, Indianapolis, Ind., that within the next three years the interurban electric railways will be hauling three-fourths of the livestock coming into the Indianapolis market, which, in the hog department, is one of the largest in the country.

The increase in the number of cars handled by the interurban roads in five years is 817 per cent in this market. Most of the traffic is inbound shipments, but the outbound division is now also showing large gains. In 1919 only eight cars were outbound, while in 1923 the number increased to 1,086.

Gasoline Cars Will Replace Trolley

Plans are being made to rehabilitate part of the system of the Jersey Central Traction Company, Keyport, N. J., which suspended operations some time ago. The section to be reclaimed lies between Red Bank and Keyport, a distance of 18 miles. In order to carry out the project the Red Bank & Keyport Railway has been incorporated with an authorized capital stock of $250,000, but it is not expected that more than half of this amount will be needed to rehabilitate the road, supply new equipment and furnish necessary working capital. The incorporators of the new company are: Herman E. Schlicting, Red Bank, N. J.; M. M. Zimmerman, 342 Madison Avenue, New York City, and Julius Weiss, New York. Mr. Zimmerman will be vice-president and general manager in charge of operations.

It is not proposed to restore service by trolley, but to equip the line at the start with six gasoline motor cars to be built by the Edwards Railway Motor Car Company, Sanford, N. C. The intention is to supply a twenty-minute to a thirty-minute headway and to divide the road into zones with unit fares of 5 cents each. So far as possible the zone areas will be made to coincide with the business districts of the towns through which the road will operate. The cars to be used are now under construction and it is expected that the rehabilitation of the road will be sufficiently well along to permit restoration of service by Oct. 1. The gasoline car which will be used will be similar in design to other cars of the kind supplied by the Edwards Railway Motor Car Company to the Baltimore & Ohio, Chicago, Burlington & Quincy, Cape Fear Railways, Washington & Lincolnton Railroad and other systems for branch line use. They will be all steel in construction and seat forty passengers each. It is expected that they will be able to operate 8 miles per gallon of gasoline consumed. The former Jersey Central Traction Company operated 40 miles of electric railway. It was controlled by the American Railways, now the American Electric Power Company.

Key System Operating Buses in Alameda

In accordance with an order issued by the State Railroad Commission and with the approval of the Alameda City Council, the Key System Transit Company on July 10 started regular bus service in Alameda with two Fageol safety coaches, operating as feeders to the electric lines, to which the buses transfer.

This operation is the forerunner of a new Key System policy which will be applied to other East Bay cities in the course of time. These cities are growing faster than it is possible to supply railway extensions and it is hoped to solve the problem by the operation of buses.

Up to the time of the experiment by Oakland officials in municipal bus operation it seemed likely that the railway was in for keen rivalry. The "Rosalie," operated by Commissioner Moorehead for the city for five months, showed a deficit at the end of that time, figuring wear and tear and overhead expenses.

Ben Allen for the Key System Transit Company has stated that while the company has no intention of establishing permanent bus lines, it has been deemed advisable to use this mode of transportation on feeder lines in outlying districts. The buses will be replaced just as soon as the construction of railway extensions can be made profitable.

$8,000,000 Subway Expenditure Recommended in New York

The Board of Transportation of New York City at its regular meeting on July 15 adopted a resolution recommending to the Board of Estimate the route it approves for the further extension of the Fourteenth Street-Eastern District subway. This is the first important constructive action taken by the board, of which Commissioner John H. Delaney is the head.

The route adopted is essentially the same as that for which the Mayor and the Board of Estimate have expressed a preference. The proposed new link will add a little more than 2 miles to the 4 miles which are already completed and through which trains are operating regularly between Sixth Avenue and Fourteenth Street, Manhattan, and the present eastern terminal at Montrose Avenue, Brooklyn.

The new link's construction, it is estimated, will add approximately $8,000,000 to the $15,700,000 already expended for the completed part of the line. This estimate does not include interest during construction, cost of superintendence or the cost of equipment.

Question of Operation of Stub Line in Syracuse Held Over

The hearing before the Public Service Commission on order directed against the Syracuse & Suburban Railroad, Syracuse, N. Y., to show cause for failure to operate a stub line in Syracuse was adjourned until Sept. 10 at Albany. Commissioner William R. Pooley suggested that the railroad institute abandonment proceedings in order to clear the matter on the records of the commission.

The controversy hinges on a misunderstanding as to ownership of the East Fayette Street stub, the Syracuse & Eastern Railway contending this part of line was not taken over in the reorganization of the Syracuse & Suburban Railroad and the commission holding that the inclusion of the stub line was stipulated by the commission in its approval of the reorganization. Commissioner Pooley denied a motion of Attorney Hartmann for dismissal of the proceedings, stating that the matter must be closed either by change to abandonment proceedings or by compliance with the order to resume service. Mr. Baker, speaking for the petitioner and the city, stated he did not wish to interfere with the contemplated bus line service, and if such service could be had the people would be satisfied.

Ohio Governor Calls Grade Crossing Safety Conference

The Governor of Ohio has called a special conference to be held in Columbus on July 23 to formulate plans for the reduction of grade crossing accidents in the State. Representatives of steam and electric railways, motor transportation organizations and others interested in decreasing crossing accidents have been invited. A program is being prepared by a committee acting under the Director of Commerce of the state.

The proclamation points out that during the year 1923 there were 157 automobile accidents at grade crossings in Ohio, in which 235 persons were killed and 729 injured. It is further pointed out that there were 1,235 deaths and 6,180 persons injured in the State in automobile accidents in general.

The State has an added interest in the matter on account of the development of the rural school system, and the transportation of a large number of school children in automotive vehicles.

De Luxe Suburban Service by Bus for Rochester

The East Avenue Bus Company, controlled by the New York State Railways, has applied for a permit to operate a de luxe bus service from the business section of Rochester, N. Y., to the exclusive Browncroft subdivision, on the outskirts of the city. If the action of the Common Council is favorable, operation may start on Sept. 1. The fare will be 25 cents and the application states that parlor cars of sixteen-passenger capacity will be used.

The application is made on the solicitation of Browncroft residents for a high-class transportation service. The East Avenue Bus Company, absorbed about three months ago by the railway, also operates over East Avenue, Rochester's exclusive shopping and residential thoroughfare, from the business center to the suburb of Pittsford, a distance of about 8 miles.

More Trouble in Hornell

The Common Council of Hornell, N. Y., will decide on July 21 whether or not a franchise will be granted for the operation of buses. The Hornell Traction Company is fighting the bus projects. For the past few months Raymond E. Page has been operating the railway through his appointment as receiver.

Clyde G. Abernathy, who operates a bus line between Hornell and Rochester, is now seeking permission to operate a line between Hornell and Arkport. This would serve the residents of North Hornell, the traction company having abandoned car service to that suburb because it did not pay. He is also ready to operate bus lines throughout the city if allowed.

At the preliminary hearing on his application, Fred A. Robins, former mayor, appeared before the aldermen and urged that the petition be denied on the grounds that it would mean an end to street car service. He said the company is fighting a hard battle and had been forced to abandon its North Hornell line because of lack of revenue and because a new bridge, costing at least $15,000, would have to be built if the line were continued.

Iowa Company Seeks Restraining Order

A fight waged by the Omaha & Council Bluffs Street Railway to increase fares in Council Bluffs, Iowa, was carried into federal court when the company filed a suit against the city asking a temporary writ of injunction and restraining order enjoining the defendant from preventing the collection of higher fares on the various local lines. The company asks the court to approve the new rates as proposed by the plaintiff and to adjudge the present fares non-compensatory or too low to give a fair return. An injunction is sought to restrain the city from canceling the company's franchise and from interfering in the operation of the system under the proposed new rate of fares.

New fares proposed by the company are as follows: Seven cents for adults or four tickets for 25 cents, 3 cents for children, 5 cents for school tickets; cash fare between Omaha and Council Bluffs to remain the same, tickets at 6⅔ cents each, adult fare between Council Bluffs and the school for the deaf 7½ cents, children 5 cents, round-trip fare between Omaha and deaf school 25 cents.

The new schedule of fares would give the company an estimated increased income of $95,357 or a total return of $652,938. This would amount to approximately 50 per cent of the deficit in earned income for 1923, the petition sets out.

For 1924 the company declares the income shows a gradual decrease while the expense remains practically the same. For the first five months of this year fewer passengers were carried than for the similar period of the last three years, it is stated.

Figuring a 7 per cent return on invested capital the company asserts it has sustained the following deficits in earned income for the preceding years: 1921, $206,366; 1922, $168,444; 1923, $178,441.

Fare Posters in Brooklyn Cars Provoke Widespread Opinions

Patrons of the Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., were attracted to new posters in the cars on July 14 under the caption "Look Ahead" and "Are Public Servants Worthy of Their Hire?" The message read as follows:

> In more than 545 cities transit fares range from 6 to 10 cents, because transit service today costs more than it did in 1913. Adequate service cannot be maintained without adequate fare.
>
> By authorizing a 20 per cent increase in fare on the New York and Queens County Railways Company, the Transit Commission followed the same fundamental principle followed by Mayor Hylan when his salary was increased 66 per cent on May 23, 1923. A public servant transit company is as worthy of its hire as a public servant in any public office.

Fleet of Forty-three Motor Coaches for Interurban

Thirteen new motor coaches have been placed in service by the Chicago, North Shore & Milwaukee Railroad in the last two months, giving the company at the present time a fleet of forty-three motor coaches of the most approved type.

A motor coach line running from Waukegan to McHenry and Woodstock will be put into operation within a few weeks, according to present expectations. Authority to operate the line was granted more than a year ago by the Illinois Commerce Commission, and ordinances were passed by the various villages, but the installation of the line has been delayed on account of the condition of the roads. The last section of the cement roadway is expected to be open for traffic in August.

Two-Year Wage Contract in New Orleans

Three thousand employees of the New Orleans Public Service, Inc., including 1,500 men in the railway department, have signed a two-year contract with the company. The men will receive the same wage as formerly, but the railway men get an eight-hour day instead of a nine, with an adjusted compensation that will make the wage disbursement about the same as it now is. Following is the scale of wages:

> Motormen and conductors of more than twelve months' experience 51 cents an hour, the old rate, with 5 cents an hour extra for operators of one-man cars. Pitmen 59 to 63 cents an hour, helpers 46 cents, dopers 45 cents, washers and other helpers 35 cents, maintenance men from 30 cents for track laborers to 60 cents for pavers. Employees of the gas company on an hourly basis will receive from 30 cents an hour for helpers up to 70 cents an hour for special utility men.

News Notes

Fare Application Amended. — An amendment to its application for an increase in fare has been filed with the Cincinnati Council's committee on street railroads by the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad. This amendment will allow the purchase of tickets at a rate of 7½ cents each, in strips of six for 45 cents, and a cash fare of 10 cents. The original application called for a cash fare of 10 cents without tickets. It was filed with the committee a month ago.

Fare Increase Not in Effect.—Officials of the Springfield Street Railway, Springfield, Mass., want to clear up an erroneous impression held by the general public with respect to a new schedule of 10-cent fares. They state that no fare increase has been put into effect and that the only step in that direction has been a study of the advisability of asking permission to increase fares. Widespread discussion of the matter in the daily papers, none too intelligently directed, had resulted in part of the public taking the increase for granted and tendering the extra money in payment of fare.

Van Loan Corporation to Dispose of Property.—Irving S. Van Loan Corporation, New York, has entered into a contract with Receiver W. G. Meloon of the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., to dismantle and dispose of 45 miles of railway. The deal also includes the powerhouse, substation, cars and equipment. The agreement has been signed and approved by the court.

Competing Bus Operation Allowed.—Permission for the operation of four large buses over the Sixth Avenue car route in Tacoma, Wash., in competition with the Tacoma Railway & Power Company's cars, has been granted by the City Council on recommendation of Mayor A. V. Fawcett. The move was the Mayor's answer to the proposed new franchise submitted by Richard T. Sullivan, manager of the railway, which did not meet with the approval of the Mayor. The Council voted unanimously for the bus permits. The buses will operate on a 5-cent fare, with eighteen hours of service, starting at 6 a.m., at fifteen-minute intervals.

Railway to Expand Trucking Service.—The Detroit United Railway, Detroit, Mich., will establish passenger, freight and express service by automobile in the "Thumb" district of Michigan as a feeder for its electric railway lines. This will be the second freight and express motor truck service established by the company. The first line, between Jackson, Hillsdale, Coldwater and Sturgis, has been in successful operation almost a year. Application for permission to operate motor vehicles in the new service has been made to the State Public Utilities Commission through the Detroit United Railway Trucking Company, a subsidiary. As in the case of the present service, it is planned to develop special trucks with demountable bodies or containers which can be transferred direct to the electric cars.

Debt to Be Wiped Out.—In less than a month the compromise deal will be completed by which the city of Tacoma, Wash., will free its municipal car line of the debt to the Emergency Fleet Corporation incurred during war days. Under the procedure of the Shipping Board the agreement must be prepared by a special department, approved by the Attorney-General, sent to Tacoma for official signature, returned to Washington for signature, then returned to a Tacoma bank in escrow to await the payment of the $115,000 agreed upon as settlement. Later, the suit filed in the United States Court at Tacoma will be dismissed by joint city and government request.

Rates Reduced to Stimulate Business.—The Kansas City, Kaw Valley & Western Railway, Kansas City, Mo., has filed a new schedule of passenger fares for all points between Kansas City, Kan., and Lawrence with the Public Utility Commission of Kansas. The new fares suggested by the company provide a material reduction for round trip charges and for special car and party rates. The ten-ride commutation ticket still stands at five times the full fare. The forty-ride commutation ticket is to be sold at 25 per cent off the full round trip fare and there is to be a three-day excursion ticket sold at 30 per cent below the full round trip fare. The company announced to the commission that it desired to establish the low round trip and special party and special car fares as a means of increasing passenger traffic.

New York Body Puts Off Hearing.—A further adjournment of one week, to July 23, was granted by the Public Service Commission in the petition of the Poughkeepsie & Wappingers Falls Railway for permission to increase its fares. The hearing was to have been held July 16, but the railway company said it would not be prepared to go on with the case at that date.

Trackless Trolleys Discussed.—Mayor Hackett, members of the Board of Contract and Supply and the Board of Estimate conferred recently with representatives of the United Traction Company, Albany, N. Y., and the Westland Hills and Country Club Associations relative to trackless trolleys in Western Avenue west of Manning Boulevard. No decision was reached. Residents want either the trackless trolleys or the trolley tracks moved to the center of the street. The traction company operates over its own private right-of-way and does not wish to pay for the paving between the tracks and for 2 ft. outside as it would have to do if the tracks were moved.

Bus in Mail Service.—An opportunity has been presented to certain bus lines operating in Wisconsin to add to their revenues by transporting United States mail from one city to another where the railroad connecting cities has cut its service due to lack of patronage. Mail for Albany, Monticello and New Glarus will come as far as Monroe and Brodhead by rail, from which cities final delivery will be made by bus.

Safety Work to Be Discontinued.—The Safety Council at Washington, D. C., was dissolved recently by a vote of its executive committee because the public of Washington was "unwilling to contribute sufficient moral and financial support to this great movement." This was the belief of the members borne out in a statement issued by W. Graham Cole, secretary of the council that a small group of public-spirited men had supported the work of the council at great financial expense to themselves and loss of time for nearly two years. Further, that the many people who had profited by the activities of the council had ignored appeals for help. The statement also said that the painting of white lines at street intersections, organization of junior safety councils in schools and the teaching of fire prevention in private families would be abandoned.

One-Man Cars Allowed.—The Public Utilities Commission of Idaho has authorized the Boise Valley Traction Company to put into service one-man cars on the South Boise line and to equip them with proper and adequate safety devices for a trial period of sixty days. The commission's order stated that the system as a whole had not been earning operating expenses and fixed charges and that the public convenience and necessity required the curtailment of expenses. The company applied on May 14 for permission to make the change to one-man cars. A protest was filed and the commission set the case for later hearing.

Franchise Passed in Alton.—The City Council of Alton, Ill., on July 10 passed an ordinance granting franchises to the Alton, Granite & St. Louis Traction Company to continue to operate cars in that city. A clause of the new ordinance provides that with the acceptance of the franchise the company agrees to pay an annual tax of $25 a car operated and will also construct a second track on the City Hall Square. Officials of the company have not stated whether they would accept the ordinance.

Planning Single-End Cars.—The Grand Rapids Railway, Grand Rapids, Mich., is planning to replace all cars with single-end type cars. City Manager Locke has asked the administrative committee of the City Commission to permit the company to use certain city-owned lots on which to build a rail loop in order that the cars may turn upon arrival at the terminal.

Will Run One-Man Cars.—At a recent special meeting of the City Council of Danville, Va., the franchise of the Danville Traction & Power Company was amended so as to permit the use of one-man cars. The question of one-man car operation has been pending for some time, use of the one-man cars being urged because of the serious decline in patronage. The matter was referred to previously in the ELECTRIC RAILWAY JOURNAL.

Bus Regulatory Bill Before Legislature.—The motor bus bill pending in the Georgia Legislature appears likely to pass. The bill provides that the bus lines be placed under the Public Service Commission for supervision. At present the bus lines are regulated by city ordinances, state statutes, county laws and even interstate laws.

Belt Line Proposed.—The Cincinnati, Newport & Covington Railway is negotiating with merchants to establish a belt line of Green Line cars between Ludlow and the various business sections of Covington, Ky. If the present proposed deal for a belt line is effective, merchants say that an effort will be made to have the company establish other belt lines which will bring the outlying districts into closer touch with the mercantile section of Covington.

Eighteen-Cent Rate Reasonable.—Dismissing a petition of a reduction in trolley fare between Camden and Maple Shade, the Board of Public Utility Commissioners of New Jersey held that the 18-cent fare now charged by the Public Service Railway is neither unreasonable nor discriminatory, as alleged in the complaint. The petition pointed out that between Haddonfield and Camden, both of which towns are approximately an equal distance from Camden, the fare was 10 cents, while residents of Maple Shade were called upon to meet the higher fare. The Public Service Railway answered the argument with testimony showing a greater traffic density in the communities paying the lower fare.

Financial and Corporate

Protective Committee for Interurban

Bonner Springs Line Will Pay Aug. 1 Interest, but Has Been Unable to Renew Loan

The financial depression in the Middle West during the last year, especially among the farmers, together with the increase in the use of the automobile, particularly the bus, has not been without effect upon the Kansas City, Kaw Valley & Western Railway, a 40-mile line which operates between Kansas City and Lawrence. In consequence a situation has been created with respect to the affairs of the company which will take time to work out. It is believed that the future business of this line will tend more toward the handling of freight than the transportation of passengers. With the growth of Bonner Springs and the development of the cement plant more business will accrue to the Kaw Valley line. With the almost phenomenal growth of Kansas City, Kan., the population of which is now more than 100,000, and the resultant development of all kinds of business, it is felt that the prosperity of the Kaw Valley will be assured.

Col. Karl D. Klemm, president of the company, feels the company is suffering from deflation that is temporary. He has explained that it will be impossible to pay off funded obligations due on Aug. 1, but that the interest on the first mortgage bonds, will be deposited with the trustee. He says that although passenger business has fallen off the freight business has held its own, even though there has been a business depression. A condensed earnings statement for the ten years of the existence of the company, as made public by Mr. Klemm, follows:

	Gross Earnings	Operating Expenses	Taxes	Net Earnings‡
1914*...	$29,221	$11,701	$185	$17,335
1915...	51,194	28,676	2,112	20,406
1916...	152,959	85,978	2,535	64,445
1917...	221,607	136,087	11,082	74,437
1918...	246,474	159,200	10,057	77,216
1919...	337,545	216,721	12,561	108,263
1920...	469,771	326,944	18,272	124,554
1921...	475,224	293,770	23,964	157,489
1922...	468,903	292,465	19,610	156,826
1923...	461,819	312,398	21,515	127,904
1924†..	148,634	123,569	8,500	16,565

*Six months. †Five months. ‡Before depreciation.

Mr. Klemm says that one of the largest contributing elements to the increase in operating cost has been the mounting burden of taxation. This it has been impossible to combat, although efforts have been made from year to year to persuade the taxing authorities to keep the increases within reason. Mr. Klemm is convinced that the future prospects of the property are bright, if proper legislation is enacted to regulate bus operation or if suitable means can be devised to combat this bus competition. The freight business has shown a continuous increase, and the largest individual shipper, namely, the Kansas Portland Cement Company's plant at Bonner Springs, is at present being enlarged to three times its present capacity. Mr. Klemm also has called attention to the fact that the Kansas City, Kaw Valley & Western Railway has the opportunity of acquiring a half interest in the Kansas & Missouri Railway & Terminal Company, a terminal belt line with some 10 miles of track, located in Kansas City, Kan., running through the center of the most rapidly growing district in that city. This line will be a great producer of freight for all connecting railroads in Kansas City, and its acquisition is considered of the utmost importance for the future of the Kaw Valley property.

A meeting was held July 10, called by Channing Folsom, of Folsom, Wheeler & Company, for the bondholders. Mr. Folsom's company sold some of the bonds locally and he started an investigation about six months ago in the interest of his clients. A protective committee has been selected by Otis & Company, with Mr. Folsom as one of the members.

Seattle Net Income $600,000 Less

Disastrous Results of 5-Cent Fare Pledge Shown in Reduced Revenue of Municipal Line for 1923—Much Greater Use of One-Man Cars Prevents Deficit for Year

THE story of a costly experiment in adjusting fares to suit political expediency is told in the annual report of the Seattle Municipal Street Railway Department for the year ended Dec. 31, 1923, presented to the Mayor and the City Council by D. W. Henderson, general superintendent of railways.

Save for the formal letters of transmittal included, the report consists entirely of statistics, the chronology being the only statement not given in tabular or chart form. The significant events in the chronology, however, are given in the statement of rates of fare, of which the following is a summary:

RATES OF FARE

May 9, 1914—Cash, 5 cents; 6 tickets for 25 cents; 25 tickets for $1. Extra fare required on Lake Burien line outside city limits, or 16 tickets for $1 good for full trip.

April 1, 1919—4 1/6-cent and 6¼-cent tickets eliminated.

July 24, 1920—Cash fare, 10 cents. Token fare, 6¼ cents.

Jan. 9, 1921—Cash fare, 10 cents. Token fare, 8⅓ cents.

CONDENSED STATISTICAL AND COMPARATIVE REPORT OF OPERATION,
SEATTLE MUNICIPAL STREET RAILWAY—1923

	Current Year			Previous Year		
Revenue—Operating	Amount	Per Car-Mile (Cts.)	Per Car-Hour (Cts.)	Amount	Per Car-Mile (Cts.)	Per Car-Hour (Cts.)
Passenger car revenue	$5,613,545	34.70	318.43	$6,130,729	39.64	366.19
Special passenger car revenue	651	0	.04	1,006	.01	.06
Automobile bus revenue	29,543	.18	1.68	28,094	.18	1.68
Municipal department passenger revenue	48,000	.30	2.72	50,000	.32	2.99
Freight revenue	36,510	.23	2.07	43,152	.28	2.58
Mail revenue	17,643	.11	1.00	18,839	.12	1.13
Miscellaneous transportation revenue	....	.....	......	1	.00	.00
Discounts and adjustments	55,295	.34	3.14	55,253	.35	3.31
Total operating revenue	$5,690,598	35.18	322.80	$6,216,569	40.20	371.32
Miscellaneous Revenues and Expenses						
General shops	*38,162*	*.24*	*2.16*	*$38,780*	*.25*	*2.32*
Service equipment	*13,388*	*.08*	*.76*	*1,357*	*.01*	*.08*
Utility equipment	*605*	*0*	*.03*	*1,846*	*.01*	*.11*
Electric current sold	464	0	.03	1,115	.01	.07
Rental of real estate and buildings	4,213	.03	.24	6,158	.04	.37
Rental of tracks and way facilities	24,563	.15	1.37	23,124	.14	1.37
Rental of transportation equipment	1,383	.01	.08	3,363	.02	.20
Station and car privileges	18,162	.11	1.03	18,212	.12	1.09
Lost and found department	*207*	*0*	*.01*	*139*	*.00*	*.01*
Other miscellaneous revenues and expenses	2,763	.02	.16	1,682	.01	.10
Total miscellaneous revenue	*813*	*0*	*.05*	11,533	.07	.68
Total gross revenues	$5,689,784	35.18	322.75	$6,228,102	40.27	372.00
Summary of Operation						
Way and structures	$ 411,365	2.54	23.33	382,805	2.48	22.86
Conducting transportation	2,015,645	12.46	114.34	2,040,453	13.19	121.88
Maintenance of transportation equipment	387,492	2.40	21.98	382,607	2.47	22.85
Housing and hostling transportation equipment	185,308	1.15	10.51	186,955	1.21	11.17
Power	634,724	3.92	36.00	613,676	3.97	36.65
Commercial	60,820	.38	3.45	49,724	.32	2.97
General	335,636	2.07	19.04	290,170	1.88	17.33
Depreciation and amortization	685,114	4.24	38.87	685,114	4.43	40.93
Total operating expenses	$4,716,106	29.16	267.52	$4,631,508	29.95	276.64

INCOME STATEMENT

	1923	1922
Operating revenues	$5,690,598.67	$6,216,569.45
Operating expenses	*$4,716,106.54*	*$4,631,508.20*
Operating income	974,492.13	1,585,061.25
Miscellaneous revenues and expenses	*813.73*	11,533.36
Gross income	973,678.40	1,596,594.61
Deductions from gross income	*804,042.15*	*835,532.61*
Net income	169,636.25	761,062.00

March 1, 1923—Cash fare, 5 cents. Transfers, 2 cents. Tokens, 4 for 25 cents, good for fare with transfer.

June 16, 1923—Cash fare, 10 cents. Token fare, 8⅓ cents. Transfers free.

The total gross revenue for the year was $5,689,785, compared with $6,228,103 for 1922, reflecting clearly the loss due to the 3½ months of operation at the 5-cent fare. On the other hand, operating expenses increased from $4,631,508 in 1922 to $4,716,107 in 1923. This was due to increased costs in all departments except transportation, which showed a decrease, owing to the large proportional increase of one-man car-miles, which went up 64.45 per cent over the previous year while two-man car-miles went down 19.08 per cent.

Operating figures are given in much more complete form in this year's report than previously, the "statistical and comparative report of operation," which is abstracted herewith, giving details of all the operating accounts.

The number of employees was 1,827, of whom 1,157 were trainmen, with salaries of $135 to $155 a month. The highest paid employees on the regular payroll were 44 foremen, receiving $145 to $165 per month. Vacations for the employees cost the railway a total of $138,325 out of a payroll of $3,230,960, or 4 per cent of the total.

A chart is included showing revenue and operating expenses per car mile for each route. In general, these show a balance, the average revenue per car mile being 35.2 cents, while expenses, exclusive of depreciation, were 25 cents. The individual car lines all showed revenues equal to or greater than expenses, except one small crosstown line, while all four of the bus lines had insufficient revenue to cover operations.

Accidents were much higher in 1923, the total being 4,627 as compared with 3,989 the year before. The cost of the injuries and damages account was $81,709 against $37,368 in 1922. This was due principally to a large increase in settlements for collisions with vehicles, which went up to $28,000 from $5,522 in 1922. Another large increase in cost was on account of step accidents. While the number went down to 73 from 89, the cost was $16,930 as compared with $3,363 in 1922. The total cost of injuries and damages for the year, however, amounted to 0.51 cents per car mile or 1.44 per cent of gross revenues.

INCOME STATEMENT, SEATTLE MUNICIPAL STREET RAILWAY

	1923	1922
Operating revenues	$5,690,598	$6,216,569
Operating expenses	4,716,106	4,631,508
Operating income	$974,492	$1,585,061
Miscellaneous revenues and expenses	813	11,533
Gross income	$973,678	$1,596,594
Deductions from gross income	804,042	835,532
Net income	$169,636	$761,062

PROFIT AND LOSS

Losses accrued (other than income) current annual period		$905.28
Delayed losses accrued in prior periods:		
Cost of retiring plant	$83,941.67	
Adjustment of accounts receivable of prior years	3,608.83	
Plant retired—depreciation of prior years not fully accounted	191,880.16	
		279,430.66
		$280,335.94
Net income		$169,636.25
Gains accrued (other than income) current annual period		569.18
Delayed gains accrued in prior periods		2,262.37
Net income, profit and loss (loss) 1923		107,868.14
		$280,335.94

The condition of the property at the close of the fiscal year is shown in the balance sheet and the profit and loss statement, which are published in condensed form. The principal change is the added loss for the year of $107,868, which brings the accumulated railway deficit up to $985,359.

PAYROLLS AND VACATIONS, 1923

Transportation	Payrolls	Cost of Vacations
Office, inspectors, station masters	$109,931	$4,053
Trainmen	1,996,657	87,883
Shops and carhouses	499,620	23,751
Way and way structures	546,403	19,263
Accounting	78,349	3,375
Total	$3,230,960	$138,325

SEGREGATION OF PASSENGER CAR-HOURS AND CAR-MILES

	Car-Hours	Car-Miles
One-man single truck	194,490	1,489,093
One-man double-truck	533,461	5,068,337
Two-man	981,699	9,013,437
Buses	32,725	306,499
Total	1,742,375	15,977,366

CONDENSED BALANCE SHEET OF SEATTLE MUNICIPAL STREET RAILWAY, AS OF DEC. 31, 1923

Capital Assets		
Plant and equipment, less $16,616,789.09, less depreciation $3,065,358.20		$13,551,430.89
Special construction		565,396.63
Loans receivable by bond funds from city railway operating fund		227,000.00
Cash in bond funds		37,602.85
Total capital assets		$14,381,430.37
Total redemption and special fund assets		1,196,889.07
Total current assets		772,079.49
Total deferred charges		76,057.83
		$16,426,456.76
Deficit—Dec. 31, 1923		985,359.24
		$17,411,816.00
Capital Liabilities		
Bonds outstanding	$15,809,000.00	
Bond fund loan payable to railway operating fund	38.62	
Audited and approved claims payable (bond funds)	29.19	
Total capital liabilities		$15,809,064.81
Redemption and special fund liabilities		
Unmatured accrued interest on funded debt	$258,679.17	
Matured unpaid interest on funded debt	4,189.50	
Depreciation fund reserves	6,023.79	
Matured unpaid bonds	400.00	
Total redemption and special fund liabilities		269,292.46
Current Liabilities		
Amounts payable by current (operating) funds to other funds	$975,613.50	
Tokens outstanding	65,457.99	
Audited and approved claims	243,358.32	
Warrants outstanding	49,028.92	
Total current liabilities		1,333,458.73
		$17,411,816.00

Brooklyn Company Offers Stock to Employees

The Brooklyn-Manhattan Transit Corporation on July 15 offered to sell to its employees voting trust certificates for 15,000 shares of its issued and outstanding preferred stock, carrying dividends at the rate of $6 per share per annum, on terms that make the final net cost to the employees approximately $60 per share.

Copies of the circular outlining the offer, together with a letter from President W. S. Menden and subscription blanks have been sent to each of the 14,000 employees of the system. All subscriptions under the offer must be filed with the company on or before July 26.

The subscription price for the stock is $65 per share. The employees have one year in which to pay for the stock and all dividends accrued from July 1, 1924, until final payment for the stock will be credited to the employee's account. In addition two refunds of $1 each a year will be paid to employees who retain the stock purchased under this offer for a period of two years after final payment. To permit the crediting to the employee's account of the dividends accrued from July 1, 1924, until date of final payment, interest at the rate of 5 per cent per annum from Aug. 1, 1924, will be charged on deferred payments.

Employees may subscribe for not more than ten shares and the company reserves the right to reduce subscriptions and allot shares so that every employee may subscribe for and receive at least one share. Employees may cancel their subscriptions at any time before final payment and will receive all payments made together with interest at the rate of 5 per cent per annum on such payments. Prior to final payment the employees cannot transfer their rights to the stock offered except to another employee and then only with the consent of the company. After final payment, however, the voting trust certificates for the stock will be delivered to the subscribing employees without restriction and dividends will be paid directly to them as stockholders.

Suburban Bondholders at St. Louis Seek to Foreclose

Following the failure of the reorganization committee of the United Railways, St. Louis, Mo., to agree upon a basis of refinancing the system satisfactory to holders of the bonds of the St. Louis & Suburban System totaling $6,500,000, the Suburban bondholders committee on July 7 filed suit in the United States District Court to foreclose the bonds. The petition asks for the appointment of a special master to take testimony touching on the validity of the bondholders claim. The mortgages covered by the bonds embrace 116 miles of tracks. A similar petition was filed by the St. Louis Union Trust Company as trustee for the United Railways 4 per cent bonds. United States District Judge Faris took both under advisement.

It is announced that Judge Faris has authorized counsel for Rolla Wells, receiver of the United Railways, St. Louis, to drop court proceedings which are now pending for a review of the valuation of $51,761,384 on the company's properties fixed by the Missouri Public Service Commission in June, 1923. The receiver will drop proceedings provided the city of St. Louis also accepts the $51,761,384 valuation. It is understood that the city is agreeable to this disposition of the matter.

Proposal to Pay Detroit United Preferred Dividend in Stock

Elliott Stevenson, president of the Detroit United Railway, Detroit, Mich., after a meeting of the directors said the dividend of 6 per cent on the common stock would be passed, owing to heavy sinking fund payments for the new loan of $9,000,000. Instead, starting in 1925, shareholders are to be paid 4 per cent per annum in preferred stock, which will amount to about $600,000. This payment is to continue through 1925 and 1926, when Mr. Stevenson hopes increased earnings will permit the payment of common dividends in cash. New preferred stock is itself to pay 4 per cent dividends in cash, or about $24,000 in 1925 and the same in 1926. Thereafter 6 per cent cash dividend is to be paid on this preferred. He is asking shareholders to vote for or against the plan. He expects it to be endorsed, and afterward only formal permission is required from Public Utilities Commission of Michigan.

$200,000 Interurban Issue Offered Direct to Public

Another electric railway is offering its stock direct to the public for subscription. The company is the Milwaukee Northern Railway, Cedarburg, Wis. The issue is a small one compared with ordinary flotations, but the requirements of the property at this time are not very great. The proceeds will be used to finance new capital expenditures. The road consists of about 70 miles of interurban line tied in as regards management with the Milwaukee Electric Railway & Light Company group, which has been very successful in the past in its customer ownership campaigns.

The present offering is $200,000 of 7 per cent preferred stock. The price is $100 a share. The terms are cash or $5 down and $5 a month per share for eighteen months. Interest at 7 per cent on monthly payments takes care of the final payment. The offering has been widely advertised in the daily papers published in the territory served by the company. In concluding the advertisement offering the stock this statement was made:

> The Wisconsin public utilities with which Milwaukee Northern is now affiliated have more than 30,000 Wisconsin share, note and bond holders. They have learned that each new home investor is a new booster for the business. We hope for like results to follow from the sale of Milwaukee Northern's 7 per cent preferred shares to several hundred of our regular customers. We are just as well pleased to sell one share on monthly payments to a small savings investor as we are to sell a hundred shares to a large investor. In either case we feel that we have gained a satisfied partner here at home, who will be able and glad to help us increase the business from year to year.

"L" Stock Going Fast

More than Half $5,000,000 Issued Subscribed by Public and Employees in Six Weeks

Considerably more than half of the issue of $5,000,000 of prior preferred stock of the Chicago Rapid Transit Company, Chicago, Ill., offered to employees and the public, was reported sold on July 16. An average of 400 shares a day was sold in the three days ended July 16, on which date the record of 547 shares was attained. In addition to the usual methods employed the stock is being sold on the elevated platforms and at temporary desks at strategic points.

It is a most unusual operation, this sale of $5,000,000 of 7.8 per cent prior preferred stock on the "passenger partnership" basis, as the Chicago company calls it. Details of the offering have been covered week by week in the JOURNAL, but is interesting to give President Budd's view of the sale as outlined at the recent meeting of the executive committee of the American Electric Railway Association.

The company set aside $1,000,000 for the employees, and with no commissions and no prizes they oversubscribed this amount by $300,000 in a campaign lasting three weeks. Altogether 88 per cent of all the employees purchased one or more shares at 90, with the privilege of paying in twenty months. On June 6 the public sale of stock started. The employees were divided up in teams, with 175 captains and twenty managers in subdivisions. The employees were allowed a commission. About 36 per cent of the purchasers are paying cash and the remainder are paying on a 10-month deferred payment plan. About 30 per cent of the employees paid cash. Mr. Budd said that the plan was interesting because the results so far attained showed that a plan heretofore confined largely to the sale of light and power issues could be applied successfully on a strictly electric railway property.

The rate of return of 7.8 per cent was arrived at because it was thought that a liberal yield would help make the stock popular and also because it provided an even amount of 65 cents a share payable monthly. He said that the success of the whole plan rested on the enthusiasm of the sales force and that in order to have that it was deemed best to sell the stock to the employees first. Each employee of the company will have to sell only eight shares to put the plan over. Every employee is expected to sell at least one share.

Bay City Road Being Scrapped

There appears to be little possibility that local electric railway service will ever be resumed in Bay City. Bond holders of the bankrupt Saginaw-Bay City Railroad are not inclined to invest any new money in the enterprise as was done in Saginaw. According to announcement made at Saginaw negotiations are now under way to junk all tracks and overhead in unpaved streets and the tracks, etc., in paved streets will be retained for use of the Michigan Railroad, which operates interurban cars between Saginaw and Bay City.

The trolley along the old interurban right-of-way between Zilwaukee and Bay City is being removed and it is expected that the tracks will be junked. Most of the cars that were used in Bay City have been sold to a junk dealer. Only twelve that can be renewed at small expense have been retained.

Bay City has been without local street railway service since August, 1921, when the company operating in that city went into the hands of a receiver.

$1,581,000 of Boston "L" Bonds Offered to Yield 5.35 per Cent

Bids regarded as very favorable were recently received by the Boston Elevated Railway, Boston, Mass., from several banking syndicates for a new issue of bonds by the company. The issue amounts to only $1,581,000, but the prices offered by bankers will materially reduce the interest charge. The proceeds of the new issue will be used to pay off an issue of bonds of like amount that come due on Aug. 1. The old bonds, which were sold when the Boston Elevated had been under the public trust form of operation for only a month, bore 7 per cent coupons. The new issue will bear 5½ per cent. The highest price offered is understood to have been par or close to par and was from a syndicate composed of White, Weld & Company, Blodget & Company, Curtis & Sanger and Paine, Webber & Company, which got the business. The bonds will mature on Aug. 1, 1934. They are being offered publicly at a price to yield around 5.35 per cent.

Favorable Showing in Saginaw Despite $12,065 Deficit

The Saginaw Transit Company, Saginaw, Mich., during its first complete six months of operation lacked only $12,065 of earning enough money to pay all operating expenses, interest on bonds, taxes and depreciation, according to the semi-annual report of the company. Company officials feel very well satisfied with the showing made in view of conditions, especially during the final two months of operation.

The company at Saginaw resumed operations in November after a two-year period of suspension, but it did not furnish 100 per cent service until Jan. 1 of this year, and just prior to that time jitney bus competition existed.

Revenue passengers numbered 4,646,131 and transfer passengers numbered, 862,925. Passenger revenue totaled $295,152 and this was augmented with additional revenue from other sources that totaled $20,892. Operating expenses and taxes were $272,636 and the gross income after taxes was $43,409. The amount allowed for interest on bonds and for depreciation was $55,475, leaving the deficit at $12,065. Car-bus miles operated by the company numbered 1,257,326. To maintain regular service, twenty-nine street cars and eighteen buses were operated.

Decrease in Revenue in Baltimore in June—Fewer Passsengers

A decrease in revenues of the United Railways & Electric Company, Baltimore, took place during June, the first month in which the new 7½-cent fare rate was effective. In a statement issued by the company it is stated that an analysis of the revenue passengers carried shows that out of the total decrease of 10.59 per cent, 4.27 per cent was due to zone extensions and the elimination of fare zones through order of the Maryland Public Service Commission putting the increased fare into effect. The balance of the decrease of 6.32 per cent was due, the company pointed out, to decrease in riding, caused by weather conditions, industrial depression and the fact that there were four Saturdays and five Sundays in June this year as compared with five Saturdays and four Sundays last year.

It was also stated that the change in the number of Saturdays and Sundays, as compared with last year, based upon the passenger revenue, accounts for approximately $22,000 of the decrease of $43,768. One thing has been demonstrated, according to the company, and that is that notwithstanding the change in fare from 14 cents to 7½ cents in a number of zones the decrease in fare did not attract any extra riding. Comparative operating statistics for June follow:

	1924	1923
Car miles	3,040,974	3,085,582
Revenue passengers..	18,330,992	20,502,140
Free transfers	7,722,685	8,054,908
Total passengers	27,114,959	29,560,026

Financial Writer Extols the Tractions as Investments

"A new day appears to be dawning for electric railway investors, and those who have exercised patience now can pretty confidently feel that the industry has passed its darkest period."

This is the conclusion expressed by Paul Willard Garrett in the last of a series of three articles contributed by him to the New York *Evening Post* and based on data secured by him in an independent survey which he made of the industry. Among the sources of information upon which he drew freely were the statistics of the industry prepared by the ELECTRIC RAILWAY JOURNAL, the survey by John F. Layng, published in the JOURNAL for June 28, and the statistical studies made by the American Electric Railway Association.

Among the subjects which he covered were the early history of the industry, traffic increases, the increasing use of the bus, the 5-cent fare and service-at-cost grants. He then turned to the interpretation of the facts, pointing out that the darkest days are past, that the tide has turned and that the outlook for the future is bright. As indicated previously the facts about the industry used by Mr. Garrett have all been available before but he marshalled them for public consumption as has never been done before. In concluding his series on tractions Mr. Garrett said:

> Individual companies, primarily the small ones, still have problems for which the solution does not seem easy. That is why the selection of traction securities requires discrimination. However, it is safe to say that the industry definitely is working into a stronger position and that traction securities, properly chosen, occupy a better market position than they have for some time. The future in many cases is positively bright. In weathering the storms of recent years, the industry has learned better how to avoid trouble. Not only that, the business has been put upon a sound basis, a thing which brightens the outlook for traction securities.

Abandonment Ordered.—The Millville Traction Company, Millville, N. J., has been directed by the Board of Public Utility Commissioners of New Jersey to abandon service in Millville on Broad Street from Buck Street to Columbia Avenue and on Columbia Avenue from Broad Street to Sharp Street and to surrender its franchises on those streets. The proposed abandonment already has been sanctioned by the authorities of Millville.

Application to Abandon Not Opposed.—No objectors appeared at the hearing before the Illinois Commerce Commission on the application of the Aurora, Plainfield & Joliet Railroad for permission to suspend operation because of a steady loss in operation. The company has offered to operate buses in lieu of the trolley cars.

Four New Directors at Winnipeg.—At the annual meeting of the Winnipeg Electric Company, Winnipeg, Man., the board of directors was increased from nine to twelve and, owing to the resignation of F. Morton Morse, secretary, four new directors were elected: A. J. Mitchell, formerly vice-president of the Canadian Northern Railway and now of the Canadian National Railway; R. J. Fleming, Toronto; G. W. Allen, K. C., and George F. Galt, Winnipeg. Assistant Treasurer Palk will succeed Mr. Morse. The Winnipeg Electric Company is the successor to the Winnipeg Electric Railway.

Partial Abandonment Permitted.—The Public Service Commission recently issued an order permitting the Geneva, Seneca Falls & Auburn Railroad to abandon the portion of its route in Pulteney Street between Jay and St. Clair Streets in the city of Geneva. It was found by the commission that public interest did not require its continued operation. Approval is granted on condition that the railroad shall remove all of its structures from Pulteney Street and restore the highway to good condition.

Decision in Abandonment Expected.—Decision in the case of the Pennsylvania & New Jersey Railway, Trenton, N. J., which is seeking to abandon service on the Newtown, Pa., and Lambertville, N. J., divisions and the Mill Street branch of the Morrisville, Pa., division, will be announced after the engineering department of the Public Service Commission of Pennsylvania secures more data from the towns interested in the matter. The hearing on the application of the traction company was continued on July 9 in Philadelphia and all the data were turned over to the engineering bureau. Morrisville is the only borough opposing the petition.

Preferred Stock Offered.—W. C. Langley & Company, New York, are offering at 99½ and accrued dividend to yield 7.04 per cent 8,000 shares of the cumulative preferred stock of the Carolina Power & Light Company, Raleigh, N. C. The proceeds from this sale will be applied to the cost of additions, extensions and improvements and to other corporate purposes. The company owns and operates the railway system in Raleight and Asheville, N. C., and suburbs.

Bonds Offered.—The National City Company and Harris, Forbes & Company, New York, recently offered at 99 to yield more than 6.12 per cent, $2,496,000 of the general and refunding mortgage 6 per cent, ten-year gold bonds, of the Washington Railway & Electric Company, Washington, D. C. The purpose of the issue is to furnish funds to reimburse the company for funds used on Dec. 1 last to redeem $1,000,000 of general mortgage 6 per cent gold bonds and for property improvements.

Commission Considering Abandonment Petition.—The Public Service Commission of Pennsylvania is expected to act favorably on the application of the Trenton, Bristol & Philadelphia Street Railway to abandon the operation of its line along Bristol Pike, between Croyden, Bucks County and City Line be granted. Commissioner Clement has recommended that this be done. The commission will also probably act favorably on the application of Minot J. Hill for a certificate of convenience to operate motor vehicles as a common carrier on that portion of the line about to be abandoned.

Short Trolley Being Dismantled and Sold.—The Corry & Columbus Traction Company, Corry, Pa., which recently discontinued service, is dismantling its power house and offering equipment for sale. The overhead material has been disposed of and it is expected to offer the other equipment for sale within a short time. The road was 4 miles long. Oscar S. Fritz, president and general manager, is in charge.

Abandonments Allowed.—The State Corporation Commission has authorized the Virginia Railway & Power Company to abandon its navy yard line in Portsmouth. The company submitted proof that it was losing $4,693 annually from the operation of this line. At the same time the commission ordered a temporary suspension from July 1 until Sept. 15 of the Port Norfolk-Pinner's Point line and the Park View and Cemetery line.

Connecticut Road Awarded $33,142 Verdict.—An opinion by Judge L. P. Waldo Marvin, filed with the Superior Court at Norwich, Conn., finds for Receiver Robert T. Perkins of the Shore Line Electric Railway in his suit against Louis T. Levenson and others, to recover the cost of taking up rails on portions of the line which were abandoned. Levenson took a contract to tear up the rails and dispose of them but did not complete it and the receiver had to carry through the task and sell the material on the market. He sued to recover for labor and the court awards $28,206 with interest of $4.936. The company which went on Levenson's bond is held to be liable.

Personal Items

D. E. Parsons Leaves East St. Louis

Manager of Railway and Lighting Properties Will Re-engage in Manufacturing Activities

D. E. Parsons, for the past nine years general manager of the East St. Louis & Suburban Railway, operating in East St. Louis and neighboring towns, has resigned. Mr. Parsons will become identified with the Railway & Industrial Engineering Company, Greensburg, Pa., manufacturers of outdoor substations, outdoor lightning arresters, switches and choke coils. Mr. Parsons has been interested in this company since it was organized some time ago by old friends and former associates. The business has expanded to a point where the need exists for securing additional engineering and management talent, and Mr. Parsons was prevailed upon to associate himself with the new company. He will probably be affiliated with the sales organization.

The resignation of Mr. Parsons was in no way a surprise to W. H. Sawyer, president of the railway, as Mr. Sawyer and Mr. Parsons had talked the matter over several times. Still the announcement of the final decision of Mr. Parsons to resign came to Mr. Sawyer with a feeling of regret on his part that the pleasant association of many years would be terminated. Mr. Parsons desires that he be permitted to relinquish his railway duties on Aug. 1, and every effort is being made to arrange matters so as to comply with his request.

Of interest in this connection is the statement attributed to Mr. Sawyer to the effect that no further changes in the official personnel are planned at this time. The duties now being performed by Mr. Parsons will be divided among the department managers until some other arrangement appears to be desirable. The posts which Mr. Parsons will relinquish embrace the position of general manager of the East St. Louis & Suburban Railway, East St. Louis Railway, St. Louis & Belleville Electric Railway, East St. Louis Light & Power Company and the St. Louis & East St. Louis Electric Railway.

Mr. Parsons became identified with the properties at East St. Louis on Jan. 1, 1916. He took to the position a wealth of experience along engineering, management and selling lines, not the least important of which was his ability, natural and cultivated, to work sympathetically with others, and to promote good public relations. He went to the East St. Louis post direct from the employ of the Westinghouse Electric & Manufacturing Company at East Pittsburgh. His work with the Westinghouse company dated from 1904, when he entered the technical two-year apprenticeship course in the works of the company. At the end of his student period with the Westinghouse organization Mr. Parsons accepted a position in the sales department, and in 1906 was promoted to be head of the export department. In 1908 he represented the mining department in the sales organization at the branch office of the Westinghouse company in Fairmont, W. Va. In 1909 he was appointed to represent the railway and lighting department in the Pittsburgh office, handling especially accounts with public utility properties throughout eastern Ohio, northern West Virginia and western Pennsylvania.

Mr. Parsons was identified with numerous social and civic activities in East St. Louis and gave much time to promoting better relations in all of them. He was one of the sustaining members of the Boy Scouts organization, was a member of the East St. Louis Rotary Club and the St. Clair Country Club, was an advisory board member of the Salvation Army and became widely known throughout the entire East St. Louis district for his public spirited activities. In 1918 he was elected president of the Illinois Electric Railway Association.

D. E. Parsons

Mr. Parsons was born at Huntington, W. Va., on Oct. 29, 1882. He entered West Virginia University for the degree of bachelor of science and was graduated in the year 1903.

William T. Rossell Goes to Pittsburgh

William T. Rossell, superintendent of the Cincinnati, Covington & Newport Street Railway, Covington, Ky., resigned July 12 to accept a similar position with the Pittsburgh Railways, Pittsburgh, Pa. He will assume his new duties on July 20. Mr. Rossell had been employed by the Cincinnati, Covington & Newport Street Railway, better known as the "Green Line," for the last six years. Prior to that he was with the Cincinnati Traction Company in the engineering department.

Mr. Rossell was graduated from the West Point Military Academy. His ability as an engineer when in Cincinnati attracted the attention of the operating officials in charge of the Cincinnati, Covington & Newport Street Railway, who placed him in charge of its equipment in Kentucky. His new position will virtually place him in charge of the entire equipment of the Pittsburgh Railways. Mr. Rossell is a Cincinnatian by birth. His father was at one time one of the foremost engineers of the city.

J. D. Whittemore Assumes General Managership at Fairmont

J. D. Whittemore, who has been general manager of the public utilities at Greensboro, N. C., operated under the direction of the Barstow management, will become general manager of the Monongahela-West Penn Company, Fairmont, W. Va., according to an announcement made by Capt. George M. Alexander, president of the corporation. Mr. Whittemore will be general manager of all the branches, including railways, gas and light.

Some years ago Mr. Whittemore was employed by the General Electric Company at Schenectady and later was transferred to Boston to the construction department. He subsequently entered the industrial engineering department of the Rochester Railway & Light Company. In the fall of 1917 he was appointed general manager of the West Virginia Traction & Electric Company in Wheeling, following a general managership with the Claremont Railway & Lighting Company, Claremont, N. H. Later he joined the West Penn interests in Pittsburgh and then went with the Barstow Management Corporation.

The West Penn Public Service Company, of which he will assume the managership, formerly had a general manager of railways, but following the resignation of E. Blaine Moore from that post on Dec. 31, last, the position was abolished.

H. C. Patten has been appointed comptroller of the Toronto Transportation Commission. He was formerly engaged in cost engineer work in the commission's office. In his new work he succeeds H. P. L. Hillman, who has been acting comptroller for the commission.

Millard F. Clement, formerly assistant engineer in charge of additional electrical construction on the New York, New Haven & Hartford Railroad, has been appointed local manager of the Orange County Public Service Company, Inc., Middletown, N. Y., operating an electric light and power system recently placed under the management of Charles H. Tenney & Company, Boston, Mass. Mr. Clement was graduated in electrical engineering in 1910 from the Worcester Polytechnic Institute and received the degree of E.E. there in 1912. His early electric railroad work included terms of service on the New Haven system and on the Pennsylvania and the Norfolk & Western electrifications. During the World War he was assistant electrical officer aboard the *U.S.S. New York* with the Grand Fleet in charge of interior electrical communication and fire control systems. In 1919 he was assistant foreman of electrical car equipment in the Philadelphia electric zone. Later he became electrical research engineer for the McGraw-Hill Company, Inc., New York, publisher of the ELECTRIC RAILWAY JOURNAL. Since April, 1920, Mr. Clement has been assistant electrical engineer of Charles H. Tenney & Company, Boston.

Messrs. Bell, Penick and Bayliss Promoted

Virginia Railway & Power Company Announces Changes in Personnel in Light and Power, Railway and Valuation and Purchasing Staffs to Fill Gaps in Ranks Caused by Death of John E. Harvell

THOMAS S. WHEELWRIGHT, president of the Virginia Railway & Power Company, Richmond, has appointed William C. Bell chief engineer and general manager of the light and power system of the company in the six cities in which it operates. J. M. Penick was at the same time appointed general manager of the Richmond & Petersburg railway division and John Y. Bayliss was named valuation engineer and director of purchases and supplies for the system. These promotions were made to fill the gaps in the ranks caused by the death of John E. Harvell a few weeks ago.

W. C. Bell

J. M. Penick

J. Y. Bayliss

Mr. Bell went to Richmond from San Francisco, Cal., where he was employed with two of the largest public utilities of the West Coast. Mr. Bell originally was from Texas and was graduated from the University of California. He went to the Pacific Gas & Electric Company, San Francisco, from school and from this position went to the San Francisco Power Company, San Francisco, a year later. His connection with the Virginia Railway & Power Company dates from 1911, when he took a position in the design department of the Twelfth Street power house. He was employed there until 1913, when the work was completed. He then became assistant general superintendent of lighting and an electrical engineer for the company. In 1920 he was made purchasing agent and chief engineer of the system. From this office he has just been advanced to his present position.

Mr. Penick has heretofore been general superintendent of railways of the Richmond and Petersburg divisions as well as the Richmond-Petersburg interurban division. He has served in these capacities since January, 1923. Mr. Penick joined the company in October, 1910. His first work was assistant engineer in charge of the construction of reinforced concrete carhouses, this being the first big construction work under the company's program for rehabilitating the property after its reorganization in July, 1909.

In February, 1911, Mr. Penick was promoted to assistant chief engineer of railways, having charge of the construction and reconstruction of track, and in January, 1917, he was made engineer of maintenance of way and structures in charge of maintenance and construction of tracks, bridges and buildings. In March, 1922, as chief engineer of railways of the company, he was also placed in charge of equipment. Mr. Penick supervised the installation of the trackless trolley service put into operation recently by that company in Petersburg.

MR. BAYLISS a GRADUATE ENGINEER

Mr. Bayliss was born in Memphis, Tenn. He became connected with the Virginia Railway & Power Company after a score of years' service in many practical posts. Mr. Bayliss is a graduate of Vanderbilt University, with the degree of bachelor of engineering. He started his career with the Bell Telephone Company, in St. Louis, in city surveying and computing. A year later, in 1897, he went to Grenada, Miss., as engineer in charge of constructing sewers. In 1898 he took the position as leveler in a location party for the Kansas City, Memphis & Birmingham Railroads, in Alabama, and in 1898 he became assistant city engineer at Jackson, Miss. In the next few years Mr. Bayliss was employed as a draftsman and recorder in surveys of the St. Lawrence River from Ogdensburg to Montreal, under the United States Deep Waterways Commission; transitman, chief draftsman and resident engineer on the heavy mountain construction of the Guayaquil & Quito Railroad in Ecuador; assistant engineer on maintenance and division engineer in charge of 35 miles of main line construction for the Frisco System in Arkansas.

In 1905 he became assistant engineer on design and construction and in charge of erection of steel bridges and viaducts for the Guatemala Railway, and in 1906 became division engineer in charge of locating 50 miles and constructing 93 miles of the Missouri & North Arkansas Railroad in the Ozark Mountains, in Arkansas. In 1908 he became principal assistant engineer of the Medeira Mamore Railway under construction in Brazil.

RAILROAD VALUATION EXPERIENCE

Just before entering the employ of the Virginia Railway & Power Company he was district engineer of the southern district in the valuation of the railroads of the country under the Interstate Commerce Commission in Chattanooga, Tenn. He left this position in the fall of 1921 to become first assistant engineer and purchasing agent of the Virginia Railway & Power Company. Later he became valuation engineer, general superintendent of materials and supplies, valuation engineer and director of purchases and supplies, in the order named. From this position he was promoted to valuation engineer and director of purchases and supplies.

M. C. Morton, superintendent of the Fort William Electric Railway, Fort William, Ont., has absorbed the duties of master mechanic. The latter position was vacated recently by the resignation of E. H. Workman.

B. J. Yungbluth, formerly assistant vice-president of the Philadelphia Rapid Transit Company in charge of finance and accounting and supervisor of purchasing and supplies, has been appointed assistant vice-president in charge of traffic. The former positions have been abolished. W. L. Maize, purchasing agent; W. E. Scott, superintendent of supplies, and H. A. Skinner, manager printing department, will report directly to W. K. Myers, vice-president in charge of finance and accounting.

Frank Wilson has been promoted to assistant division superintendent of the First Division of the United Railways, St. Louis, Mo. Mr. Wilson entered the service of the company in July, 1898, as a conductor on the Bellefontaine division. In 1899 he was made assistant foreman at the Bellefontaine sheds, then part of the Union Depot Company. Since then he has served as starter, day and night transfer clerk, receiver, teller in the treasury department and day foreman at the Kossuth sheds.

William H. Hodge, manager of the advertising and publicity department of H. M. Byllesby & Company and the Byllesby Engineering & Management Corporation, Chicago, Ill., has been elected president of the Public Utilities Advertising Association. The association, organized two years ago, is composed of representatives of utility companies and utility equipment manufacturing companies throughout the United States. Its object is to improve the status of utility advertising and increase its efficiency. The Public Utilities Advertising Association is affiliated with the Associated Advertising Clubs of the World. Mr. Hodge has been in charge of the advertising and publicity department of the Byllesby organization since the department was established in 1910. He was formerly a newspaper reporter and magazine editor. Mr. Hodge has been closely identified with the development of modern methods of public relations and customer-ownership financing, and has written and talked extensively on these subjects.

Obituary

John G. Ferres, Johnstown, N. Y., vice-president of the Fonda, Johnstown & Gloversville Railroad and president of the Johnstown National Bank, died on July 3, at the age of 80 years, following a brief illness.

William T. Ruete, inventor and authority on interior conduit, died June 7 in New York City. At the time of his death he was consulting engineer of the conduit and wire division of the General Electric Company.

Edward F. Latimer, who was actively identified with early electric railway work in Connecticut and who was in charge of the conversion of the Waterbury system from horse to electric traction, died recently at his home in Edgewood, R. I. Mr. Latimer for the past eleven years had been superintendent of construction for the Narragansett Electric Lighting Company of Providence, R. I. For four years he was in the employ of the United Gas Improvement Company and was in charge for a time of erection work for the McIntosh & Seymour Engine Company. At one time he was with the Southern New England Telephone Company.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Demand Continues for Space at Convention

Increase This Year Is 18 per Cent—Placing Heavy Exhibits Is a Problem

Space assigned on July 15 for the exhibit at the annual convention of the American Electric Railway Association to be held in Atlantic City next October was 18 per cent in excess of the amount assigned on the similar date last year. The space allocated so far this year is 65,383 sq.ft., as compared with 55,421 on July 15, 1923, an increase of 9,962 sq.ft. Of the total amount 19,685 sq.ft., or approximately 30 per cent, is to be used by bus manufacturers.

Requests on hand from railway supply houses, bus manufacturers and dealers in accessories and supplies total an additional 8,000 sq.ft. Inasmuch as the convention is still more than two months away it is expected that the actual space sold will be somewhat in excess of last year's record figure of 75,681 sq.ft. This is considered by the exhibit committee to be very gratifying, the more so because the National Electric Light Association and the American Railway Association recently had exhibits in Atlantic City by many of the same manufacturers who will exhibit at the A. E. R. A. convention.

Companies in addition to those listed in the ELECTRIC RAILWAY JOURNAL, issue of June 28, page 1039, which have applied for exhibit space are as follows:

American Brass Company.
Berry Brothers.
Cheatham Electric Switching Device Company.
Chicago, North Shore & Milwaukee Railroad.
Chicago Rapid Transit Company.
Barron G. Collier, Inc.
Commonwealth Steel Company.
Continental Motors Company.
Charles I. Earll.
O. M. Edwards Company.
Ellcon Company.
Fageol Motors Company.
General Electric Company.
Gould Coupler Company.
Graham Brothers.
Hubbard & Company.
International Harvester Company.
International Register Company.
Irving Iron Works Company.
Leece-Neville Company.
Metal & Thermit Corporation.
Morton Manufacturing Company.
Nachod Signal Company, Inc.
National Lead Company.
National Safety Devices Company.
Newport Coach Company.
New York Transportation Company.
Panelyte Board Company.
Pittsburgh Testing Laboratory.
Root Spring Scraper Company.
Safety Car Devices Company.
Sattley Company.
Star Brass Works.
Taylor Electric Truck Company.
Tuco Products Corporation.
Van Dorn Coupler Company.
Westinghouse Companies.

The necessity to allocate exhibit spaces for buses where the construction of the pier makes it safe to place heavy material of this kind has caused some delay in such allotment. Officials of the A. E. R. A. have been hard at work solving this complicated problem and expect soon to have it worked out to a satisfactory solution.

$9,000,000 Spent for Buses and Garages

More than $9,400,000 has been invested to date by the electric railway industry in buses and bus garages, according to V. E. Keenan, superintendent of the bus department of the United Electric Railways, Providence, R. I.

Mr. Keenan estimates that out of the $150,000,000 which will be spent by the railways during the year for improvements and betterments 4 per cent will go for automotive equipment. He predicts an expenditure of $6,000,000 by the industry for buses in 1924.

Big Detroit Order Goes to the General Electric Company

A contract has just been awarded by the Department of Street Railways, city of Detroit, to the General Electric Company covering a large amount of automatic substation equipment. Ten 2,000-kw. and four 1,000-kw. synchronous converters are included. This is said to be the largest order of its kind ever placed in the United States. Fourteen proposed substations, which will greatly increase the electrical capacity of the municipal railway system in Detroit, have been designed by Smith, Hinchman & Grills, consulting engineers and architects. All of the transformers will be of the outdoor type, although both semi-outdoor and indoor design will feature the substations themselves.

Delivery of the apparatus will be arranged under agreement with the building requirements of the city and will extend until October, 1926. The capacity and location of the new substations have been arranged to fit in with the present feeder system supply-

Metal, Coal and Material Prices

Metals—New York	July 15, 1924
Copper, electrolytic, cents per lb.	12.40
Copper wire base, cents per lb.	14.75
Lead, cents per lb.	7.00
Zinc, cents per lb.	6.20
Tin, Straits, cents per lb.	45.125
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	1.95
Pittsburgh mine run, Pittsburgh, net tons.	2.125
Franklin, Ill., screenings, Chicago, net tons	1.70
Central, Ill., screenings, Chicago, net tons	1.675
Kansas screenings, Kansas City, net tons.	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.00
Weatherproof wire base, N. Y., cents per lb.	17.00
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.01-$1.04
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.625
Turpentine (bbl. lots), N. Y., per gal.	$0.84

ing the railway line. All the substations will operate from the present 24,000-volt, three-phase, 60-cycle transmission line. The apparatus includes high reactance type, oil-cooled, single-phase transformers with 24,000-volt, primary, automatic switching equipment, outdoor type oxide film lightning arresters, oil circuit breakers for the incoming lines and high-speed circuit breakers for the protection of the various substations. The converters will be equipped with the standard G.E. flash barriers and the stations will be fully automatic, including reclosing feeders.

Rolling Stock

Philadelphia & West Chester Traction Company, Upper Darby, Pa., it is reported, has awarded a contract to J. G. Brill Company for ten new cars at a cost of $19,000 each. It is said the motor equipment will be furnished by the General Electric Company.

Helena Light & Railway Company, Helena, Mont., has received its three new cars. The detailed specifications of these cars are as follows:

Date order was placed	Feb. 8, 1924
Date of delivery	June 16, 1924
Builder of car body,	P. A. Thomas Car Works
Type of car	Closed, double-truck safety
Seating capacity	44
Total weight	32,000 lb.
Bolster centers, length	19 ft. 0 in.
Length over all	38 ft. 9 in.
Truck wheelbase	5 ft. $5\frac{3}{4}$ in.
Width over all	8 ft. $5\frac{1}{2}$ in.
Height, rail to trolley base	10 ft. $4\frac{7}{8}$ in.
Body	All steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Axles	Osgood-Bradley
Bumpers	5-in., 6-lb. channel
Car signal system	Consolidated
Car trimmings	Bronze
Center and side bearings	Osgood-Bradley
Conduits and junction boxes	Duraduct
Control	G. E., K-35
Curtain fixtures	Curtain Supply Company No. 28 Ring
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	Pneumatic
Hand brakes	Peacock Staffless
Heater equipment	Consolidated
Headlights	Ohio Brass, Golden Ray
Journal boxes	Symington
Lightning arresters	G. E.
Motors,	G. E. 265 A, four per car, inside hung
Registers	International, air operated
Sanders	Ohio Brass, air operated
Sash fixtures	Dayton
Seats	Heywood Brothers & Wakefield
Seating material	Rattan
Slack adjuster	American, automatic
Springs	Osgood-Bradley
Step treads	Kass
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass, Form 1
Trucks	Osgood-Bradley
Ventilators	Railway Utility, exhaust type
Wheels	26-in. cast iron

Track and Line

St. Louis, Mo. — The Aldermanic Streets and Sewers Committee of St. Louis voted June 11 to report favorably a bill requiring the United Railways to abandon the private right-of-way in the center of Delmar Boulevard between Kings Highway and the Wabash tracks, remove their trolley poles to the curb line and pave the space between the tracks. The United Railways has opposed the change, which will cost $300,000, and which in the opinion of the United officials will increase the accident hazard.

New Brunswick Power Company, St. John, N. B., has arranged to extend its Fairville line about a half mile. The work will be started this month. This company is now executing a comprehensive plan of relaying rails through paved sections in Fairville and St. John.

Cincinnati, Ohio.—The Cincinnati Street Railway has done away with the old Fairview incline and has replaced it with a reverse curve which carries the line over the bluff on the standard type of track construction. This enables the company to use larger capacity double-truck cars and makes the entire operation safer. Electric Railway Equipment Company tubular poles were used in the new construction.

Montreal Tramways, Montreal, Que., is planning to construct 11.033 miles of track on concrete slab foundation, standard 6-in. x 8-in. wooden ties, 2-ft. centers, and steel tie rods, 6-ft. centers, with electric welded joints. The cost will be $732,000.

Dallas - Denton Interurban Railway, Dallas, Tex., will be extended westward from Denton through Decatur. Ground was broken recently in Denton by starting work on the dump for the line after it leaves the Dallas branch of the Katy.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has announced the completion of track and roadbed rebuilding work which was carried on in the vicinity of Racine, Kenosha and Milwaukee at a cost of approximately $25,000.

Power Houses, Shops and Buildings

Knoxville Power & Light Company, Knoxville, Tenn., has started the construction of a combined storage house and garage. It is proposed to spend $60,000 on the storage quarters and $15,000 on the garage.

Southern Public Utilities Company, Charlotte, N. C., is equipping a new repair shop to be located at the Salem Creek station. The new shop will include modern machinery for the upkeep of the cars. The equipment for the shop is expected to cost approximately $5,000.

Trade Notes

S. E. Church, formerly of the S. E. Church Electric Company, well-known electrical dealers of Chicago, has been appointed district manager of the Chicago office of the Triumph Electric Company. W. R. Bonham, who up to July 1 handled the Chicago interests of the Triumph Electric Company, has resigned to devote all of his time to his farm interests in the South.

Spicer Manufacturing Corporation, South Plainfield, N. J., announces the election of Ralph E. Carpenter, heretofore assistant to the president as vice-president. Mr. Carpenter has been closely identified with the automotive industry for many years. He was at one time assistant to the president of the Aluminum Castings Company, and manager of its extensive experimental laboratories.

Jackson & Moreland, consulting engineers, have moved their offices from 387 Washington Street to 31 St. James Avenue, Boston, Mass.

J. F. Buhr has opened an office in the Blodgett Engineering & Tool Company Building, at Fourteenth and Dalzelle Streets, Detroit, Mich. The J. F. Buhr Machine Tool Company will act as sales representative for the Blodgett Engineering & Tool products.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has recently extended its designs of steel-clad high voltage transformers to include those of 6,900, 11,500 and 13,800-volt rating. Hitherto the sheet-metal construction of distribution transformer cases was limited to 2,300-volt service.

Central Iron & Steel Company, Harrisburg, Pa., has recently appointed C. A. Fischer, with offices at 303 Keystone Building, Houston, and 1918 W. T. Waggoner Building, Fort Worth, district representative. Mr. Fischer is looking after the sales on plates as well as stampings.

New Advertising Literature

Kuhlman Electric Company, Bay City, Mich., has issued a new publication called "Better Street Lighting with Greater Safety." This describes the Kuhlman series multiple street lighting systems.

Electric Railway Equipment Company, Cincinnati, Ohio, is sending out a folder which tells what improved street lighting means. To illustrate the points which the company makes Montgomery, Ala., has been taken as an example. The pamphlet shows many illustrations of that city's combination railway and lighting poles.

Crouse - Hinds Company, Syracuse, N. Y., has issued Folder No. 13, on "Connectors."

Rotary Snow Plow Company, Minneapolis, Minn., has issued a ten-page pamphlet describing the Snow King lateral type rotary plow in cleaning the highways of snow. Some attractive illustrations are contained in the booklet.

Electric Service Supplies Company, Philadelphia, Pa., has issued Bulletin No. 196, on "Bus Specialties." The pamphlet, of some forty pages, contains a brief description of specialties adapted for use on buses of either the gasoline or trackless trolley types.

Reliance Electric & Engineering Company, Cleveland, Ohio, has issued Bulletin 2016, giving information on type T Reliance planer motors for reversing service.

Conveyors Corporation of America, Chicago, Ill., has published a new booklet describing its American cast-iron storage tank, which is a sectional tank for the storage of all dry, loose, bulky material, such as ashes, coal and sand gravel. The booklet is illustrated with illustrations of tanks in use.

New York, July 26, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 4

Traction Sunshine from San Diego

WHEN in the year 1924 two newspapers in a city of 100,000 inhabitants can find material for a 32-page story each of another step in the growth of an electric railway it deserves attention. How does it come about that the San Diego Electric Railway had the temerity in the most southerly part of winterless California to inaugurate the $3,500,000 improvement described in the local papers this first of July? Doesn't the management read the automotive prophecies?

Right there is the most interesting part of the story. The balmy climate of San Diego all the year round, the fine roads and the high proportion of persons with ample leisure brought the automobile an ideal market long before railways in less fortunate climes gave rubber-tire competition the slightest attention. Jitney depredations also made serious inroads on the traction revenue years before it was known in the East. From these facts it is clear that the experiences of the San Diego company with automotive competition are a goodly step ahead of the general run of the industry.

San Diego did not meet the situation by lying down and moaning for help. By continuing to improve its service despite jitney competition, the railway placed itself in a strong moral position to demand and secure the elimination of these pests. Next, their return was automatically prevented by the introduction of a genuine zone-fare system that assured a 5-cent fare to practically half the public and for distances liberal enough to meet almost all voluntary riding, as for shopping and pleasure purposes.

But the increasing number of all-year automobiles made it necessary to use still more progressive measures to stop the decline in the car-riding habit. Cars were bought or refitted for one-man operation to permit more service at less cost. Express runs were introduced to cut running time and give the passenger the smoother riding of non-stop operation. While some other railways still continued to denounce buses, the San Diego management voluntarily assumed the operation of both buses and coaches as a proper obligation to its public. Then, studying the wishes and convenience of its customers still further, the company supplemented its successful zone-fare operation by equally successful use of the weekly pass on both city and suburban routes.

All this was going on in a city which had no great industrial plants to assure a steady income to the railway. Even the most prejudiced citizens could see that the management was displaying a praiseworthy civic spirit in establishing such high standards. The effect of all these improvements was soon manifested at an election in which the company received substantial relief in paving and the granting of more liberal franchises, with freight and express privileges included.

As this approval of the public was also backed by substantial increases in revenue and riding, the company felt encouraged to carry out the construction of a high-speed extension to the series of beaches terminating at La Jolla, 14 miles from San Diego. Catenary construction of durable type, cars with the latest automatic refinements, substations of noble Egyptian design—these are but part of the work.

Truly, San Diego has sunshine and lots of it. But one of the best kinds is its traction sunshine. Here are light and warmth and direction for those who have not earned the faith of the public because they lack faith in themselves and in their tools.

Financing of a Modernization Program that Should Inspire Others

THAT much can be accomplished by a wisely directed determination to carry out a program of modernization in the face of what appeared like insurmountable financial obstacles was shown by the recently completed re-equipment of the Indianapolis & Cincinnati Traction Company. Here the possibility of raising nearly a million dollars of new capital to carry out the work of changing over from single-phase to direct-current operation and at the same time purchasing entirely new rolling stock seemed indeed remote. Many who studied the situation considered it impossible.

The necessary money was finally raised by extending the use of the now well-known equipment trust method of financing to the purchase of substation and feeder equipment as well as rolling stock. The essential departure from ordinary practice was the use of this method for financing structures which, unlike rolling stock, are permanently tied up with the real property upon which they are erected. This obstacle to the equipment trust method was overcome by purchasing new sites for substation buildings off the railway right-of-way and taking title to the real estate in the name of the equipment trust.

Of course it is true that in the case of this company's financing, the project could not have been carried out without the co-operation of certain important creditors of the company, who agreed to take junior securities of the new equipment trust company to the extent of 20 per cent of the total amount required, in order that the remaining securities might be made salable. Even with this favorable condition, which might not apply on another road faced with similar problems, the project was only carried out as the result of perseverance and the determination to find a solution.

Modernization programs will only get into full swing generally in the industry when this same frame of mind becomes common. The problem of raising new funds is a serious one on many roads, it is true, but the results accomplished by the I. & C. should be an inspiration to others in carrying out similar programs.

We Can Derive Much Benefit from a Study of Foreign Practice

TO SOME people Europe seems far away. What can American electric railway managers learn from another continent, they say? The conditions are very dissimilar to those in this country. The streets are narrow. The rides are short. The systems are circumscribed in extent. The customs of the people are not like those of our public. The currency and the methods of paying fare are different.

All these statements may be true—at least in part. Nevertheless, it is also true that human nature is about the same the world over, and it is equally certain that two large groups, each studying the same problems, should be able to contribute some information of value to the other. This is particularly true in the case of electric railway development, because for various reasons development of electric railways on both sides of the Atlantic has followed along pretty closely the same lines. One of these is the comparative newness of the industry, so that there have been few preconceived ideas to change. Another is that most of the electrical equipment for the roads throughout the world has been supplied by a very few manufacturing companies, so that there has been an inducement to standardization. Still another reason probably is the familiarity of operators abroad with American electric railway practice through visits to this country and also —though said with modesty—through the printed accounts which have appeared in this paper.

Each continent has, therefore, benefited through the study placed on railway problems by the other. The list of methods and practices for which we are indebted to Europe is a long one. To mention only a few, such a list would include the general use of interpole motors for railway work, stanchions in cars instead of handstraps or handholds for standing passengers, the general use of apparatus on the car for measuring the energy consumption of individual motormen, and developments in joint construction, such as thermit and some phases of the welded joint. Even the principle of prepayment, by which the conductor remains in one place and receives the fares of passengers as they pass by him, instead of making the circuit of the car to collect these fares, was developed outside of the United States, even though it originated on this continent.

This emphasizes the advantage which will accrue to the industry from the study on European conditions of the committee of the American Electric Railway Association, now abroad.

The Conductorette of Yesteryear

RECENT word from St. Louis telling about the original squad of fifty-two conductorettes being reduced to a band of ten recalls to mind the short careers of those energetic women who tried their hands at railway work when the call to a higher duty had depleted appreciably the ranks of the masculine workers. These pioneers "carried on" with such satisfactory results that the Bulletin of the Women's Bureau published in 1921 stated that woman's success in this endeavor was likely to insure another permanently open field for work for women. But experience showed that this prophecy was too optimistic. Today in New York, Chicago, Detroit and Kansas City the job of fare collecting is left almost exclusively to men despite the fact that in August, 1918, the Detroit United Railway employed approximately 300 women and that in December, 1918, the Kansas City Railways employed 150 women.

The causes which led to the disappearance of the woman conductor are partly within the industry and partly without. Altogether, it was perhaps a logical conclusion for the women to pass out of this phase of electric railway work in spite of the many good qualities which experience shows that they possessed for it.

Exclusiveness for Rochestrians at Fifty Cents a Day

SIGNIFICANT news often is tucked away in items that at first glance appear to be remote in their general bearing on events. Thus, in last week's issue reference was made to the proposal to start a de luxe bus service in Rochester by a subsidiary of the local electric railway company. There is nothing particularly new in the idea of a de luxe bus service furnished by a railway. Any number of electric railways are operating services of this kind, particularly on interurban runs, notably the Eastern Massachusetts Street Railway, the Chicago, North Shore & Milwaukee Railroad, Columbus, Newark & Zanesville Electric Railway, to mention just a few. The Rochester proposal, however, does appear to differ from most of the other similar projects in several particulars. First of all, the residents of an exclusive suburban development solicited the railway to establish the new line. Second, both the fare for the run and the proposed type of vehicle to be used deserve attention. The fare will be 25 cents each way for a 3¾-mile trip. Each vehicle will accommodate only sixteen persons. No stops will be made between Brownsville and East Avenue and Main Street, Rochester.

Here are luxury and exclusiveness. If the project is put through, and there appears to be little doubt that it will materialize, business and professional men will be able to ride into and out of Rochester in a public conveyance almost as exclusive as their own cars, while they pull on their panetelas with nary a concern on their part about avoiding passing pedestrians or any need on their part to tell James what he shall do with the car or where they themselves shall park it, or whether it will be safe where it is left to stand in the public street. Moreover, matrons and maids, by making judicious use of the new service, will be better able to do their daily chores and to meet their social obligations. But Rochester will have to be on guard. By and large, the wish is proclaimed not to lose the common touch, but at heart all yearn for things that are exclusive. Will the regular patron for whom the proposed service is primarily intended be inclined to resent the presence of the occasional patron? Will he look upon the transient as an interloper or an intimate?

All these things aside—and the suggestions contained in some of them are not so far-fetched as they seem—the ramifications of the proposal are almost countless. It was made seriously and it will be taken seriously. The bus is a versatile vehicle. It remains to be seen, however, how the city will look upon a proposal to operate non-stop buses over the city streets for the exclusive use of people of a particular community. It is to be hoped that the residents of Rochester's suburbs will be successful in their appeal, as the experiment with a service such as has been suggested deserves to be made.

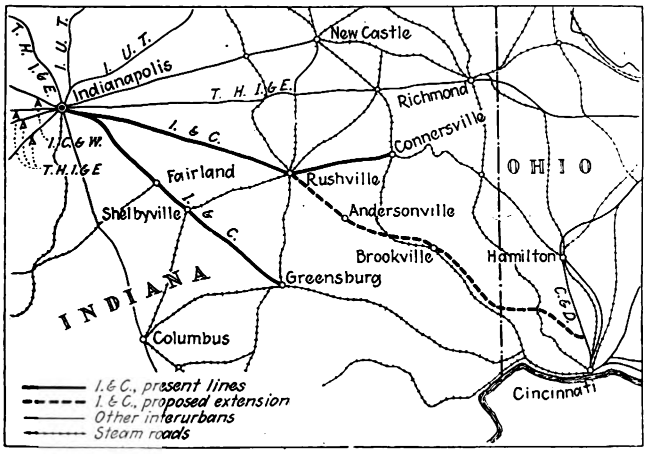
How the Indianapolis & Cincinnati Line Was Rehabilitated

First Article

This, the First of a Series of Three Articles, Describes the Methods Used for Power Supply with Purchased Energy—The Original High-Tension Lines Were Used with Certain Modifications—It Is Estimated the Savings from the Installation Will Pay Its Cost in Ten Years

RE-EQUIPMENT of the Indianapolis & Cincinnati Traction Company's lines for operation on a 600-volt, direct-current, instead of the 3,300-volt, alternating-current system formerly in use, has been completed. Both divisions of the property are now operating on direct current. This change was decided upon as a means of decreasing operating and maintenance costs and at the same time improving the reliability and comfort of the road's service. An analysis of President Charles L. Henry's study of the economics of the problem, which was confirmed in a report by Prof. Albert S. Richey of Worcester Polytechnic Institute, was published in the ELECTRIC RAILWAY JOURNAL of June 2, 1923.

Substantial reductions in operating and maintenance costs were shown to be possible through the adoption of the direct-current system of operation, cars of lighter weight, equipped with modern apparatus, and the purchase of three-phase power. These savings may be attributable to the development in d.c. motor and substation apparatus, which, since the construction of the line of the Indianapolis & Cincinnati Traction Company, has been rapid.



The Indianapolis & Cincinnati Traction Company's Property Consists of Two Divisions Which Run Southeast from Indianapolis, Totaling Approximately 160 Miles of Line

Another factor in favor of the change was the increase in number of interruptions to service caused by failures in the well-worn single-phase car equipment. This condition, combined with the relatively retarded engineering development of single-phase car equipment suitable to interurban operation, gave a high replacement and maintenance cost and made consideration of methods of accomplishing a change to d.c. operation vital to the continuation of the road.

For many years the Indianapolis & Cincinnati road had looked forward to an entrance into the city of Cincinnati. Prospects for the ultimate accomplishment of this object became much brighter with the active development of the new rapid transit loop by the city of Cincinnati, and with this prospect coming again into sight, it became imperative that the subject of the future type of equipment be settled as soon as possible. Once the d.c. system was decided upon, 600 volts followed almost as a matter of course because of terminal operation over city lines where this voltage is used, and also because of the advantages of standardization with the other connecting interurban properties in the highly developed network of lines comprising the central interurban territory and covering the states of Indiana, Ohio and Michigan.

FINANCIAL OBSTACLES OVERCOME

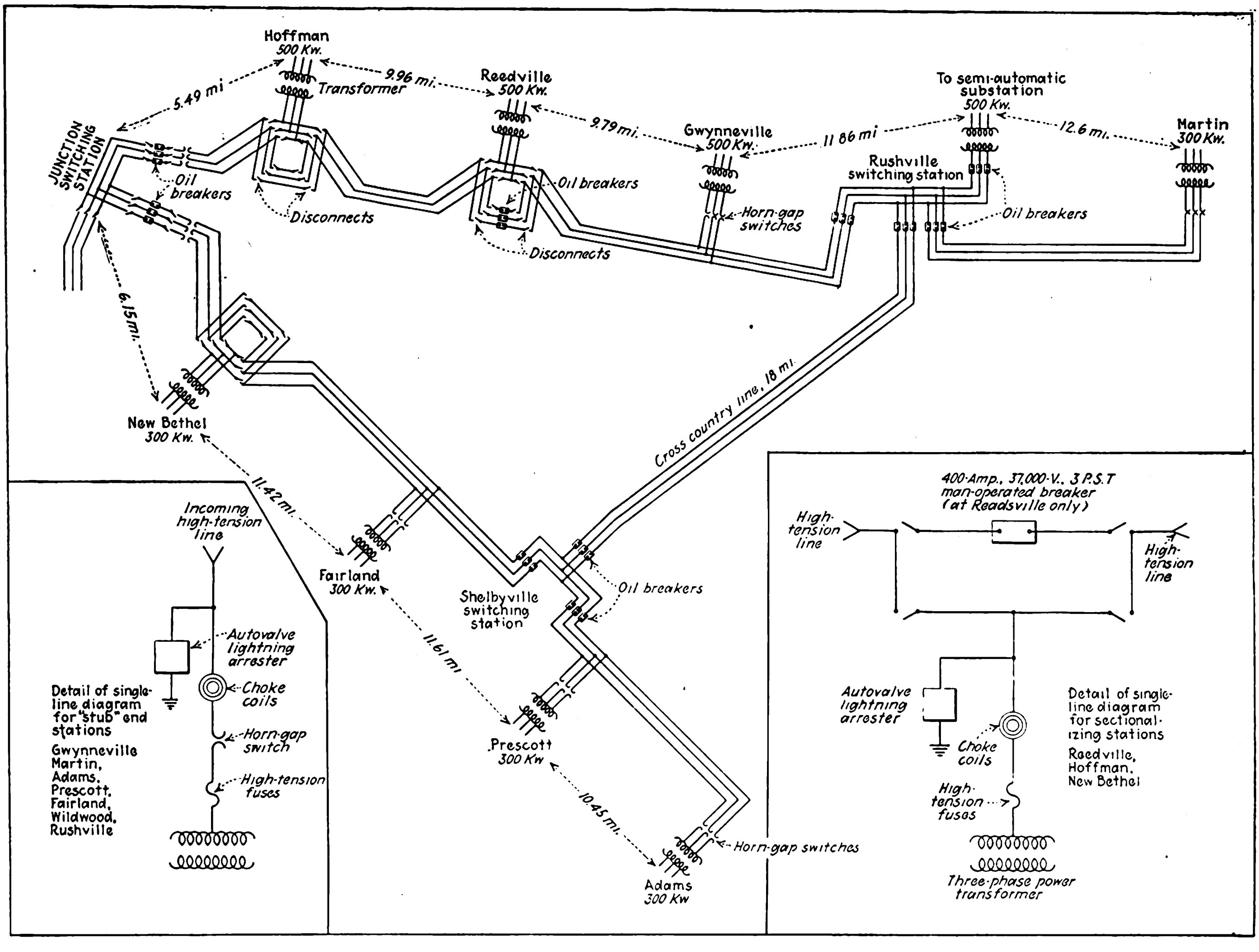
Finances presented an obstacle which was considered insurmountable by many who analyzed the situation. A plan, however, was finally devised by President Henry for extending the principles of the equipment trust method commonly used for financing the purchase of rolling stock to include substation equipment and feeder lines as well. J. F. Wild & Company, a local investment banking firm, agreed to finance the project on the basis of such an equipment trust through the sale of securities to the amount of 80 per cent of the total required, provided that the remaining 20 per cent could be raised in such a way that these securities became a first lien on the total amount of the trust equipment. The necessary additional 20 per cent was advanced by a small group of bondholders of the road who had faith in the ultimate result of the improvement and agreed to accept a second lien as security, in order to make the improvement possible. Preferred stock paying 6 per cent was issued by an intermediate company through which the details of the matter were arranged. The stock comprises two series, covering the 80 per cent first lien and the 20 per cent second lien, respectively. These securities were all handled on a 10 per cent brokerage basis, and the total funds required were banked before any orders were placed with the manufacturers.

Extension of the equipment trust method of financing to the purchase of substation and feeder equipment made it important to avoid any questions or complications as to title to substation buildings or equipment. This was done by purchasing land sites adjacent to the railway right-of-way for the erection of the substation buildings. Although each of the new stations adjoins an old transformer station which was suitable physically for conversion into a rotary converter substation, the question of complication in title made it desirable to adopt the plan of purchasing sites off existing railway property and erecting new buildings. However, by making the new structures as simple as possible, consistent with security and fireproof construction, the total cost of land and buildings was held to within $20,000 of the estimated cost of making changes in existing transformer station buildings.

All feeder cable strung along the right-of-way on the railway's poles, as well as other property purchased with equipment trust funds, was plainly tagged at frequent intervals for identification.

SAVINGS TO PAY COST IN TEN YEARS

Annual rental and installment payments by the railway are to be made at a rate which will wipe out the total cost of the new equipment at the end of ten years. Engineering estimates of the saving in cost of power and the reduction in cost of operation and maintenance to be expected showed that the savings would fully meet all these payments without relying in any way upon the anticipated increased earnings from the improved service. Title to land sites for new substation buildings was taken in the name of the equipment trust company, and will be held in escrow until the expiration of the contract, whereupon these titles will pass to the Indianapolis & Cincinnati Traction Company.


Hoffman
500 Kw.
5.49 mi
9.96 mi.
Transformer
Reedville
500 Kw.
9.79 mi.
Gwynneville
500 Kw.
11 86 mi
To semi-automatic substation
500 Kw.
12.6 mi.
Martin
300 Kw.
JUNCTION SWITCHING STATION
Oil breakers
Disconnects
Oil breakers
Disconnects
Horn-gap switches
Rushville switching station
Oil breakers
6.15 mi.
New Bethel
300 Kw.
Cross country line, 18 mi.
11.42 mi.
Fairland
300 Kw.
Shelbyville switching station
Oil breakers
11.61 mi
Prescott
300 Kw
10.45 mi.
Adams
300 Kw
Horn-gap switches
Incoming high-tension line
Autovalve lightning arrester
Choke coils
Horn-gap switch
High-tension fuses
Detail of single-line diagram for "stub" end stations
Gwynneville
Martin,
Adams.
Prescott.
Fairland,
Wildwood,
Rushville
400-Amp., 37,000-V., 3 P.S.T man-operated breaker (at Readsville only)
High-tension line
High-tension line
Autovalve lightning arrester
Choke coils
High-tension fuses
Three-phase power transformer
Detail of single-line diagram for sectionalizing stations
Reedville,
Hoffman,
New Bethel

The Loop Arrangement of the High-Tension System Gives Protection Against Interruptions to Service. In the Event of Trouble the Line May Be Sectionalized at a Number of Points

In considering power requirements for the re-equipped property, two courses of procedure were open. One involved the installation of frequency changing equipment in the Rushville power house of the traction company, which consisted of three-phase, 2,300-volt, engine-driven alternators connected to step-up transformers, which delivered from their secondaries single-phase, 25-cycle, 33,000-volt power to the transmission lines. The other alternative was to purchase energy from a neighboring power company. The latter course was adopted because of the saving which could be made in the cost of power, due to the small size of the railway company's station. A contract was made with the Terre Haute, Indianapolis & Eastern Traction Company for power delivered to the Junction switching station about 4 miles out of the terminal at Indianapolis, at the point where the two divisions of the railway company separate. This power is supplied at 33,000 volts, 60 cycles, from the West Tenth Street plant of the T. H., I. & E., where a frequency changer is used to obtain 60 cycles from a 25-cycle generating plant. The contract is based on a flat rate of 1.3 cents per kilowatt-hour delivered to the railway company's junction switching station. From this point into the Indianapolis terminal, the cars of the Indianapolis & Cincinnati Traction Company are operated 1⅛ miles over its own tracks, and for the remaining distance, approximately 2⅞ miles to the terminal, they operate over the tracks of the Indianapolis Street Railway.

Plans for the future contemplate utilizing the present power house buildings at Rushville for increased shop facilities. The present engine room is well lighted and is of ample dimensions to provide liberal space for a machine shop and armature room. In addition, it is planned to convert the present boiler room into a car repair shop.

NEW OUTDOOR SWITCHING STATION

The I. & C. switching station at the junction is an outdoor installation, with two sets of high-tension, three-phase oil switches, disconnects, and horn-gap breaks. At this point the purchased energy is metered with independent instruments by both the power company and the traction company. In addition, maximum demand meters will be installed by the latter, in order to analyze the characteristics of the service and determine the relative advantages of the flat rate as compared with the corresponding cost of power under a maximum demand charge contract. All new cars are being equipped with Economy watt-hour meters to give a further check on power requirements, and at the same time stimulate trainmen to save energy in the operation of the equipment.

At the junction the high-tension lines are sectionalized into two main sections, corresponding with the two divisions of the railway. These consist of one route between Indianapolis and Connersville, 58 miles long, and a second line from Indianapolis to Greensburg, 49 miles long. Both divisions run together southeast from the Indianapolis terminal to the junction, 4 miles distant. At this point the lines divide, that to Shelbyville and Greensburg swinging considerably south of the line to Rushville and Connersville.

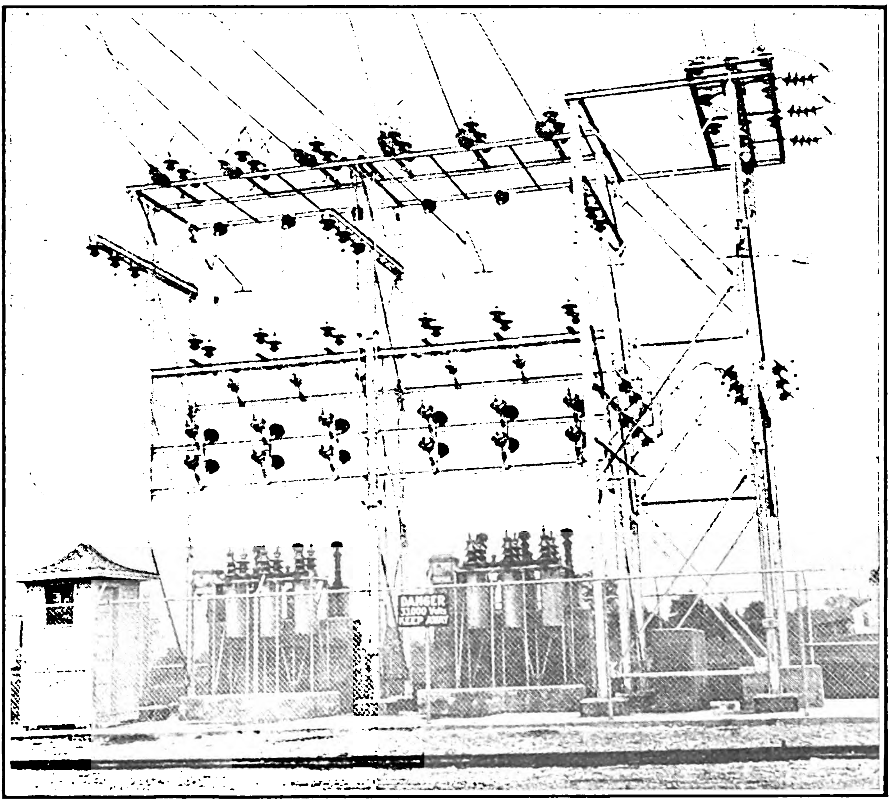
Previous to the beginning of the reconstruction program, the 33,000-volt power supply had been transmitted from the Rushville power plant to each transformer substation over independent two-wire single-phase lines. To feed the Greensburg division from the Rushville plant, a cross-country line approximately 20 miles long was extended from Rushville to Shelbyville, as shown on the accompanying diagram. This consisted of two independent single-phase lines of two wires each extending between the power plant at Rushville and a switching station at Shelbyville. These four high-tension wires were carried through single-pole oil switches to a high-tension bus in the Shelbyville station. From this point, independent single-phase lines of two wires each passed through outgoing single-pole oil switches to each of the four transformer stations on the Greensburg division, two east and two west of Shelbyville. East from Shelbyville the first of these stations was Prescott, and the second was at Adams. West from Shelbyville, the first station was Fairland and the second Wildwood. These points became the locations for new automatic control, rotary converter substations.

Similar individual transmission lines extended from the Rushville power house to the original transformer stations on the Rushville division. East from Rushville two wires carried a single-phase line to Martin, located between Rushville and Connersville. Similarly, in order to supply transformer stations at Gwynneville, Reedville and Hoffman, west from Rushville, six high-tension wires extended from the power house to the first station, four to the second and two to the furthest, which was Hoffman.

ORIGINAL HIGH-TENSION LINES UTILIZED

The original high-tension system was all insulated for 33,000 volts. This current was delivered to the transformer substations, where it was stepped down to 3,300 volts and put on the catenary trolley at that voltage.

Since the construction and insulation of the high-tension lines was entirely suitable for the new transmission system, the existing switching and distribution apparatus and lines were utilized as far as possible. Surplus material was removed from points where it was not required, and if suitable, was used again at other points on the system where existing facilities were not sufficient. This was particularly true of high-tension lines. Where more than three wires were available between old transformer stations, the surplus lines were removed and used to complete the three-phase lines where three wires were not available under the old distribution system.



The Purchased Energy Is Delivered to the Junction Switching Station, Which Is Arranged so that the Two Main Divisions of the System May Be Sectionalized at This Point

Practically all new electrical apparatus for the entire re-equipment of the property, including transformers, lightning arresters, oil switches, substation equipment and motors and control for both passenger and freight cars, was furnished by the Westinghouse Electric & Manufacturing Company.

Since the power is now put on the railway company's high-tension lines at the new junction switching station instead of as before at the Rushville power house, it was necessary to build two additional sections of line. These sections extend from the junction to Hoffman on the Rushville division, and from the junction to Wildwood on the Greensburg division.

All points on the triangle bounded by the junction, Shelbyville and Rushville, are on a loop which can be fed in two directions, thus insuring against a shutdown of service in the event of failure of one section of the line. Martin, Prescott and Adams stations are on protruding legs of this triangle. Since failure of the high-tension lines to these stations would interrupt the service on these sections only, it was felt that the importance of providing against such a contingency did not warrant the expense of building duplicate lines to these points at this time.

LINES CAN BE SECTIONALIZED

Provision has been made for sectionalizing the transmission system in the event of trouble on the lines. By utilizing practically all of the original oil switching equipment and by the installation of three sets of new oil switches, sectionalizing on the important divisions can be accomplished with ease. In addition, air-break disconnects at some of the substations not provided with oil switches are arranged so that the high-tension lines can be opened at several points. At such sectionalizing points the station can be cut off the line, or in the event of trouble in one section, that side of the line can be opened. Under such conditions the station can be continued in operation from the other side of the line. This arrangement is more clearly illustrated in the diagram on page 114.

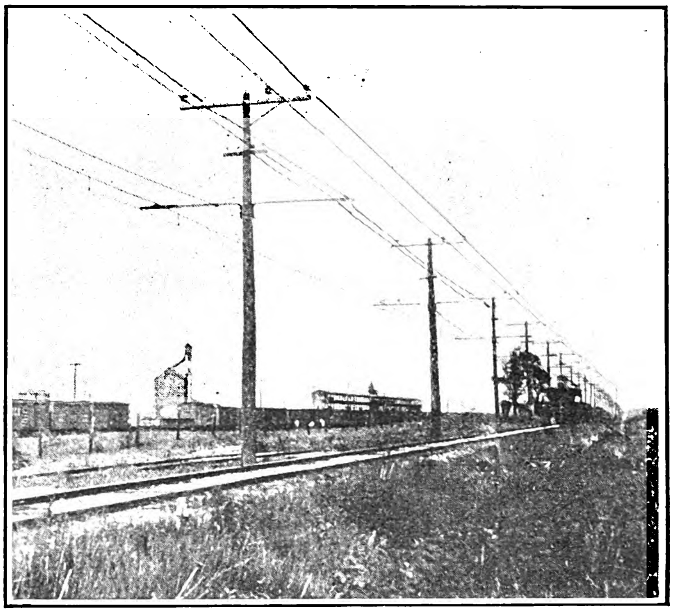
Leaving the junction, the high-tension line on the Rushville division first reaches the new substation at Hoffman. Here it passes through a typical outdoor switching station which, though not provided with oil switches, is nevertheless arranged so that the line can be disconnected in either direction, and the station operated from the one connected end. The switching arrangement is illustrated in the small diagram at the right on page 114, and the appearance of the outdoor apparatus is shown in the illustration on page 115.

The main tower structure is composed of Bates expanded steel poles. Diamond-shaped channel frames are bolted across between the center pole and each of the four corner poles, so as to form supports for the four sets of disconnect switches. The high-tension lines come into the station on two horizontal supports carried at right angles on extensions of the center and two of the corner posts. The lines are then carried to the disconnect switches below. These are arranged so that the lines from each direction may be connected to each other and also to the station. In addition the station may be disconnected entirely, or the two sections of the high-tension lines may be separated, and the station connected to either section.

Westinghouse "Auto-valve" lightning arresters are supported on an angle framework. These are shown together with the outdoor choke coils and transformer in the illustration on page 115.

Reedville is the next station going east on the Rushville division from the junction. Here the arrangement is similar to that at Hoffman except that in addition to the apparatus described for Hoffman, Reedville is also equipped with a set of oil switches which may be used to open the high-tension line.

East from Reedville is Gwynneville, a "stub-end" station in the sense that the high-tension line passes through without any break, and the station is simply connected to it with no provision to open the line at this point. The outdoor switch gear consists of a single set of horn-gap switches. An accompanying diagram illustrates the arrangement of the high-tension wiring at this point. Martin station on the Rushville division and Fairland, Prescott and Adams stations on the Greensburg division all have arrangements similar to that at Gwynneville. Wildwood station on the Greensburg division is similar to that at Hoffman.



This Section of the Line Between the Junction and Hoffman Station Illustrates the Type of Three-Phase Overhead Construction Used. The Catenary Trolley Has Been Retained

SWITCHING EQUIPMENT IN POWER HOUSE UTILIZED FOR SECTIONALIZING THREE-PHASE LINES

At Rushville the substation is of the semi-automatic type, and is connected to the high-tension line as a "stub-end" station similar to Gwynneville. In the power house at Rushville, the generating equipment will be dismantled, but the oil-switch equipment is utilized with some slight changes to make this an important sectionalizing switching station. The original switch equipment at this point consisted of four sets of four-pole oil switches. These switches have been left in place and the operating shafts rearranged so that three poles of each of the oil switches will be utilized to sectionalize the three-phase lines. The new arrangement has the high-tension line coming in from Gwynneville connected to the station buses through three poles of one of the original four-pole oil switches. A second oil switch connects these buses to the cross-country line extending to Shelbyville. The remaining two sets of switches connect the buses to Martin substation and to the Rushville semi-automatic substation respectively.

When the original single-phase high-tension system was built, a switching station was put in at Shelbyville, where the cross-country lines from Rushville connected to the lines on the Greensburg division. This station is retained, and by rearranging the operating shafts on the original two-pole oil switches they have been converted into three-phase switches for use in sectionalizing the new lines. The cross-country line from Rushville comes into this switching station through one set of such converted oil switches, and connects to the station buses. In the same way, the high-tension lines on the Greensburg division, coming from the junction switching station, are connected to these station buses through a similar set of converted oil switches. A third set of switches connects the lines going east from Shelbyville to the same buses.

ONE OF THE SUBSTATIONS INSTALLED IS SEMI-AUTOMATIC

An interesting feature of the new power and distribution system is the use of full automatic control for all but one of the substations, that at Rushville. This is semi-automatic in order that it may operate continuously to maintain voltage in the feeder system. Such an arrangement is necessary because the automatic stations start up on under-voltage and shut down on underload. Unless voltage is maintained on the feeders by the continuous operation of at least one station, the full automatic stations would start up as soon as the voltage dropped, and then if this occurred when no load demand was present, the station would immediately shut down, only to repeat the performance by starting up again because of under-voltage.

Instead of installing the semi-automatic station to maintain the voltage of the feeder system, another alternative would have been to purchase such power from the city lines of Indianapolis. To make the system self-contained, however, one semi-automatic station was installed for this purpose. Although this station is thus required to operate during some periods of the night with no load, it is expected that the increase in freight business, which is handled during the night, will ultimately put some load on the system at practically all hours. This will be particularly true as it becomes necessary to increase the amount of freight switching operations during the night.

TRAFFIC GROWTH PROVIDED FOR

The entire new power distribution system is the result of a complete analysis of the requirements of the present service, with reasonable provision for future growth in traffic and for contingencies arising from interruptions in either the high-tension system, feeder system or substations. Another consideration which was kept in mind, both in selecting the rolling stock and in determining the design and type of apparatus to be used for the power supply and distribution system, was the requirement for the contemplated high-speed through operation when the line is extended to Cincinnati. The new equipment was selected so as to be suitable for use in connection with such service, but at the same time present expenditures were not made any greater than was considered necessary to handle the existing requirements together with reasonable provision for increased traffic or contingencies arising from apparatus failures.

At the present time, the basic service on the Rushville division consists of ten local trains, four limited trains and one freight train in each direction each day. On the Greensburg division there are eight local passenger trains eastbound and eight westbound, together with four limited passenger trains in each direction each day. Dispatch freight (station delivery express) is carried in the baggage-express room of every passenger car. In addition, there is on this division one freight train in each direction daily. The company also brings into Indianapolis two livestock trains daily, one on each division, operated, however, under special orders and not on the time-table.

Passenger train schedule speeds are comparatively high. In limited service the maximum speeds are approximately 60 m.p.h., and even in local service speeds of 50 m.p.h. are frequently obtained. In the event of future extension to Cincinnati, a 3-hour service between the terminals is contemplated.

In subsequent articles will be described the automatic substation equipment, arrangements for insuring continuity of service, and the new cars which are a part of the modernization program of the Indianapolis & Cincinnati.

How Atlanta Keeps Cars on Time

Running Time Cards Carried on the Cars Have Resulted in More Uniform Headways—Schedule Speed Has Been Increased in Spite of Congestion

NARROW streets, a business district concentrated within a small area, and unsatisfactory railway routing, make the job of keeping street cars on time in Atlanta, Ga., a difficult one. The Georgia Railway & Power Company has been working on this problem for some time, and in spite of these handicaps has succeeded in increasing slightly the schedule speed and maintaining uniform headways.

The business district of the city covers a relatively small area. In this section the streets are narrow, and the buildings rise to considerable heights. Traffic congestion has been the inevitable result of these conditions. A steam railroad cut divides this district into two sections, and one of the chief difficulties encountered by the railway is occasioned by lack of means to cross this cut. Only three bridges connect the north and south sides of the city. Cars approaching the center of the town from the south must cross the cut in order properly to serve that portion of the business district which lies to the north, and vice versa. A great number of cars, therefore, must cross the three bridges which are the neck of the bottle.

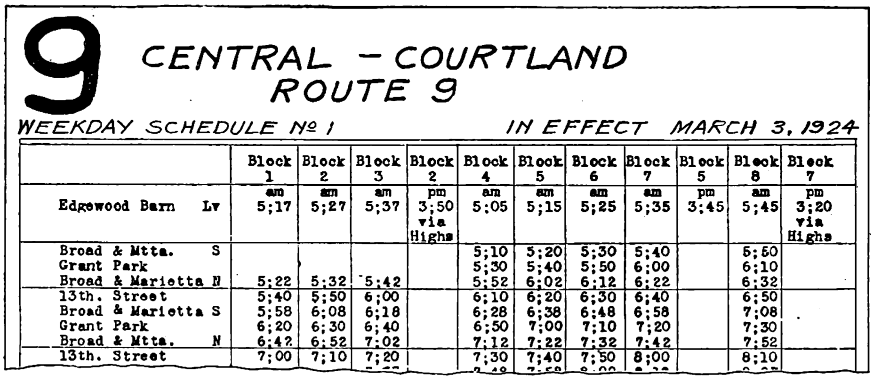
ATLANTA TRACK MILEAGE EXTENSIVE

Atlanta is said to have more miles of track per thousand of population than any other place in the country except Salt Lake City. The railway operates 24 city lines and two interurban lines. Of the city lines 15 are through routes and nine turn back in the center of town. Both of the interurban routes loop back. Excess of track and unsuitability of some routes to present-day needs complicate the problem.

In the morning there are two traffic peaks. The first is occasioned by the negroes who go to work about 7 o'clock, and the second by the opening of the business houses at 8 o'clock and the offices at 8:30 o'clock. This peak is augmented by the fact that the high schools, which open at 8:30 a.m. are located in the downtown district. In the afternoon conditions are worse because all factories, shops and offices, in fact everything except the high schools, close at 5 p.m.

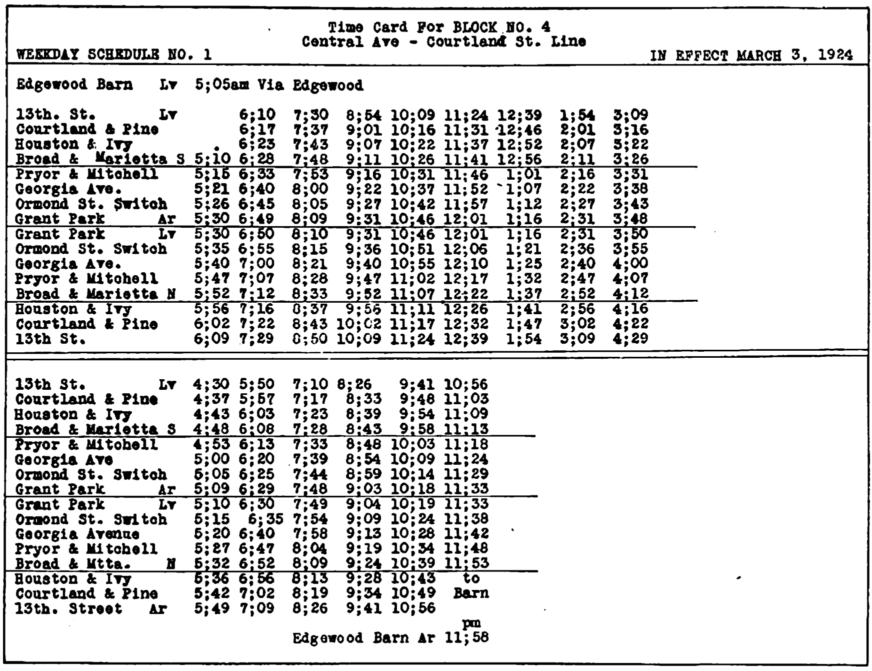
Careful attention has been devoted by the railway to overcoming these difficulties and providing good service. Headways are checked and schedules prepared under the direction of H. C. Fligg, transportation engineer, and W. M. Casey, superintendent of transportation. Four checkers are employed to make passenger counts at the maximum load points of the various lines. All-day checks are made from 5:30 in the morning until midnight, and rush-hour checks from 6 to 9 in the morning and from 2 until 7 in the afternoon.

The form of time-table used by the Georgia Railway & Power Company differs from the standard A.E.R.A. time-table, in that the run numbers are arranged across the page, and the time points are in a vertical column. The time is shown for both ends of the line and also in each direction at the center of the city. An interesting feature is that the time-tables instead of being blueprinted are typewritten, and reproduced on a duplicator machine.



9 CENTRAL - COURTLAND
ROUTE 9
WEEKDAY SCHEDULE Nº 1 IN EFFECT MARCH 3, 1924

	Block 1	Block 2	Block 3	Block 2	Block 4	Block 5	Block 6	Block 7	Block 5	Block 8	Block 7
Edgewood Barn Lv	am 5;17	am 5;27	am 5;37	pm 3;50 via Highs	am 5;05	am 5;15	am 5;25	am 5;35	pm 3;45	am 5;45	pm 3;20 via Highs
Broad & Mtta. S					5;10	5;20	5;30	5;40		5;50	
Grant Park					5;30	5;40	5;50	6;00		6;10	
Broad & Marietta N	5;22	5;32	5;42		5;52	6;02	6;12	6;22		6;32	
13th. Street	5;40	5;50	6;00		6;10	6;20	6;30	6;40		6;50	
Broad & Marietta S	5;58	6;08	6;18		6;28	6;38	6;48	6;58		7;08	
Grant Park	6;20	6;30	6;40		6;50	7;00	7;10	7;20		7;30	
Broad & Mtta. N	6;42	6;52	7;02		7;12	7;22	7;32	7;42		7;52	
13th. Street	7;00	7;10	7;20		7;30	7;40	7;50	8;00		8;10	



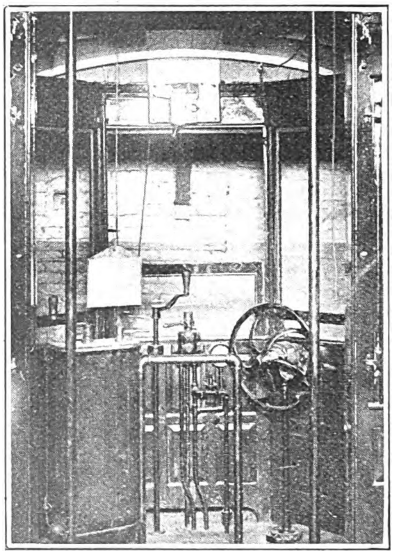
Time Card For BLOCK NO. 4
Central Ave - Courtland St. Line
WEEKDAY SCHEDULE NO. 1 IN EFFECT MARCH 3, 1924

Edgewood Barn Lv 5;05am Via Edgewood

13th. St. Lv		6;10	7;30	8;54	10;09	11;24	12;39	1;54	3;09
Courtland & Pine		6;17	7;37	9;01	10;16	11;31	12;46	2;01	3;16
Houston & Ivy		6;23	7;43	9;07	10;22	11;37	12;52	2;07	3;22
Broad & Marietta S	5;10	6;28	7;48	9;11	10;26	11;41	12;56	2;11	3;26
Pryor & Mitchell	5;15	6;33	7;53	9;16	10;31	11;46	1;01	2;16	3;31
Georgia Ave.	5;21	6;40	8;00	9;22	10;37	11;52	1;07	2;22	3;38
Ormond St. Switch	5;26	6;45	8;05	9;27	10;42	11;57	1;12	2;27	3;43
Grant Park Ar	5;30	6;49	8;09	9;31	10;46	12;01	1;16	2;31	3;48
Grant Park Lv	5;30	6;50	8;10	9;31	10;46	12;01	1;16	2;31	3;50
Ormond St. Switch	5;35	6;55	8;15	9;36	10;51	12;06	1;21	2;36	3;55
Georgia Ave.	5;40	7;00	8;21	9;40	10;55	12;10	1;25	2;40	4;00
Pryor & Mitchell	5;47	7;07	8;28	9;47	11;02	12;17	1;32	2;47	4;07
Broad & Marietta N	5;52	7;12	8;33	9;52	11;07	12;22	1;37	2;52	4;12
Houston & Ivy	5;56	7;16	8;37	9;56	11;11	12;26	1;41	2;56	4;16
Courtland & Pine	6;02	7;22	8;43	10;02	11;17	12;32	1;47	3;02	4;22
13th St.	6;09	7;29	8;50	10;09	11;24	12;39	1;54	3;09	4;29

13th St. Lv	4;30	5;50	7;10	8;26	9;41	10;56
Courtland & Pine	4;37	5;57	7;17	8;33	9;48	11;03
Houston & Ivy	4;43	6;03	7;23	8;39	9;54	11;09
Broad & Marietta S	4;48	6;08	7;28	8;43	9;58	11;13
Pryor & Mitchell	4;53	6;13	7;33	8;48	10;03	11;18
Georgia Ave	5;00	6;20	7;39	8;54	10;09	11;24
Ormond St. Switch	5;05	6;25	7;44	8;59	10;14	11;29
Grant Park Ar	5;09	6;29	7;48	9;03	10;18	11;33
Grant Park Lv	5;10	6;30	7;49	9;04	10;19	11;33
Ormond St. Switch	5;15	6;35	7;54	9;09	10;24	11;38
Georgia Avenue	5;20	6;40	7;58	9;13	10;28	11;42
Pryor & Mitchell	5;27	6;47	8;04	9;19	10;34	11;48
Broad & Mtta. N	5;32	6;52	8;09	9;24	10;39	11;53
Houston & Ivy	5;36	6;56	8;13	9;28	10;43	to
Courtland & Pine	5;42	7;02	8;19	9;34	10;49	Barn
13th. Street Ar	5;49	7;09	8;26	9;41	10;56	

Edgewood Barn Ar pm 11;58



The first illustration shows the form of time-table used by the Georgia Railway & Power Company.

The second illustration shows the time card which informs the motorman when he should arrive at various points along the line.

The view above shows how running time cards are carried in racks on the cars.

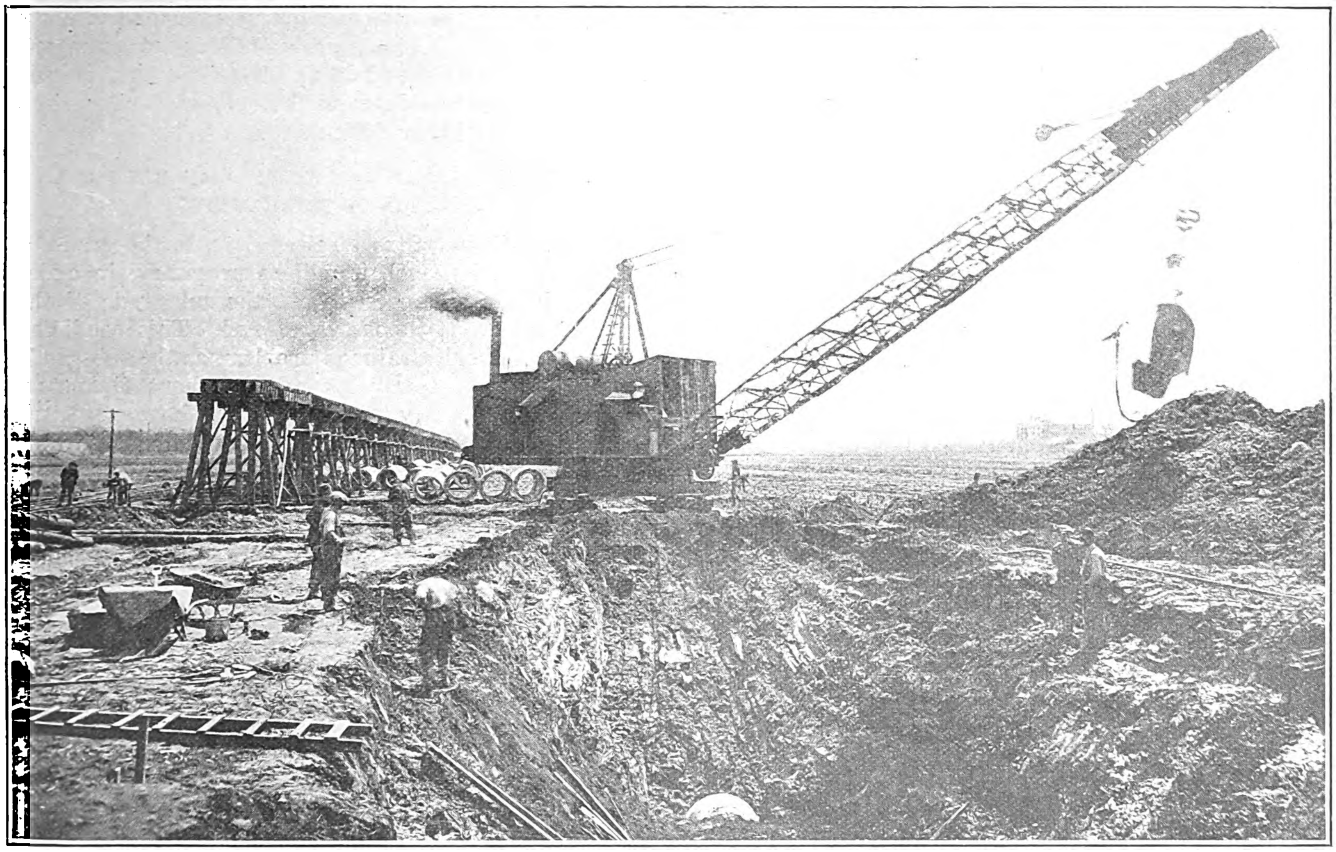
After the time-table has been prepared the schedule is divided into crew assignments, and running time cards are made out for each motorman. It is required by agreement with the men that time-tables be arranged with at least 50 per cent of 9-hour straight runs, 40 per cent of two-piece swing runs with not more than 15 hours spread, and less than 10 per cent of three-piece runs. The minimum pay allowance is for 8 hours time. On Sundays and holidays all runs are straight, but the minimum pay feature is not considered.

An average speed of 9.24 m.p.h. is maintained within the so-called "7 mile" limits of the city. All lay-overs, etc., are included in this figure, the speed being calculated from the time the car leaves the carhouse in the morning until it returns at night. In the congested districts of the city, however, the schedule speed is only 5.87 m.p.h. This is partly the result of the congestion already referred to, but other reasons are the lack of adequate parking restrictions and the excessively close spacing of stops. Longitudinal parking is permitted on the narrow streets, and diagonal parking on the wide streets. As a result, almost all moving vehicles travel along the car tracks. Cars are required to stop at every street in the section, and at many other points. Some stops are less than 300 ft. apart and few are more than 500 ft. apart. Renewed and effective enforcement of the regulation for street traffic and the elimination of unnecessary car stops to effect quicker service have been asked for by the railway in a petition to the Mayor and General Council.

To aid the motorman in maintaining the schedule, a time card such as shown in an accompanying illustration is furnished to him. This is placed in a galvanized iron rack located on the front platform where he can consult it easily at any time. Each trip is divided into short sections and the schedule time at various points about 5 minutes apart is shown. The use of these time cards has resulted in having much more uniform headways. Since the adoption of the scheme the general public has made favorable comment concerning the improvement.

Building the Waukegan Cutoff on the North Shore Line

Initial 5-Mile Section to Be Operated by Chicago Rapid Transit Company—Grade Separation at Streets and Railroad Crossings Insures Fast Schedule—Use of Automatic Pumps Solves Difficult Drainage Problem — Announcement of Extension Creates Spectacular Real Estate Boom



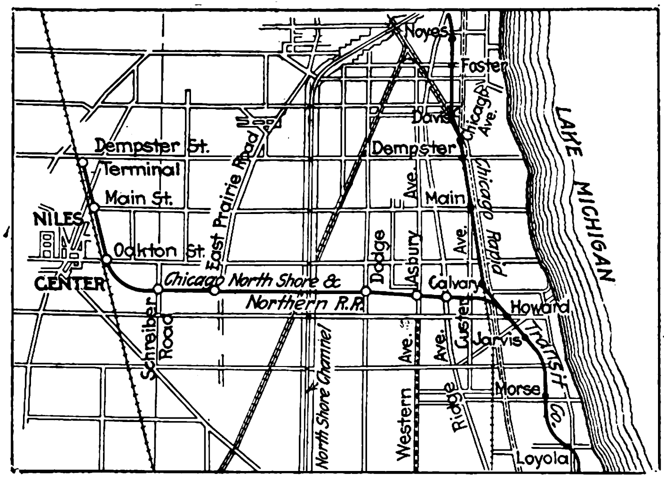
Adequate Drainage Is Provided by a 36-In. x 40-In. Oval Reinforced Concrete Outfall Sewer to the Drainage District Channel. Trestle Work Under Construction Is Shown Looking East from Ridge Avenue

AN INITIAL 5-mile section of a new right-of-way between Chicago and Waukegan has been acquired by the Chicago, North Shore & Milwaukee Railroad and construction work is under way. This is part of a high-speed cutoff which will ultimately give the North Shore Line a private right-of-way from Howard Street to Waukegan. Swinging slightly north of west for approximately 4 miles from the present line at Howard Street in Evanston, the new route then continues north to Dempster Street, Niles Center, where for the present it will have its terminus.

A subsidiary company called the Chicago, North Shore & Northern Railroad has been organized to acquire and build the new extension. Trackage rights will be leased to the Chicago Rapid Transit Company, and for the time being only the elevated trains of that company will be operated between Niles Center and the Howard Street junction. The future extension, from Niles Center to Waukegan, will be made on joint right-of-way owned by the Public Service Company of Northern Illinois and by the Chicago, North Shore & Northern Railroad. All of the right-of-way of this proposed line will be of sufficient width to permit of a four-track railroad and two high-tension transmission lines. The extension from Niles Center to Waukegan will probably not be made for several years. When that work is completed, however, it will enable a material saving in time to be made by the high-speed North Shore limited trains, which are now required to run at slow speed through some of the communities along the present right-of-way.

The significance of the position which will be occupied by the North Shore Line when the new route is completed to Waukegan may be appreciated by a study of the adjoining territory. Extending north from Chicago at the present time are two strips of communities, one on the east, following the line of the Northwestern Railroad and the present North Shore Line, and another on the west, lying along the route of the Chicago, Milwaukee & St. Paul. Between these two belts is a wide and fertile section of territory running north from Chicago in the Skokie Valley. The route of the new North Shore cutoff will extend through the center of this belt and will probably be the means of developing an entirely new string of communities.

Physical conditions have influenced the type of


Noyes
Foster
Davis
Chicago Ave.
LAKE MICHIGAN
Dempster St.
Terminal
Main St.
NILES
CENTER
Oakton St.
East Prairie Road
Dempster
Main
Dodge Ave.
Asbury Ave.
Ave.
Chicago Rapid
Chicago North Shore &
Northern R.R.
Calvary
Howard
Jarvis
Transit Co.
Schreiber Road
North Shore Channel
Western Ave.
Ridge Ave.
Custer
Morse
Loyola

Route of the New 5-Mile Extension from the Howard Street Junction to the Terminal at Dempster Street

construction adopted for the initial section of the new line. Grade separation was dictated by present and future traffic conditions. Howard Street is the boundary line between Evanston and Chicago and there is a very heavy vehicular traffic, both passenger and truck, between the two cities. Sheridan Road, on the east, and Ridge Avenue, on the west, furnish the two main arteries for passenger traffic. At the present time Chicago Avenue, which crosses the new extension a short distance west of the junction point with the present North Shore Line, is the principal north and south traffic street for heavy trucking into Chicago. In addition, this street has a double-track street car line. As the volume of such traffic, both from Evanston and other North Shore communities, is constantly on the increase, other through traffic streets will probably be required in the near future. Such streets are offered first by Custer Street and then further west by Asbury Street, which is a continuation of Western Avenue in Chicago. As these streets afford the only future arteries for the relief of Chicago Avenue, it was necessary to provide for grade separation at these crossings.

After leaving the present elevated North Shore right-of-way at Howard Street, Chicago Avenue and the elevated Milwaukee Division of the Chicago & Northwestern Railway are encountered almost immediately. The contemplated new through traffic streets are crossed further west.

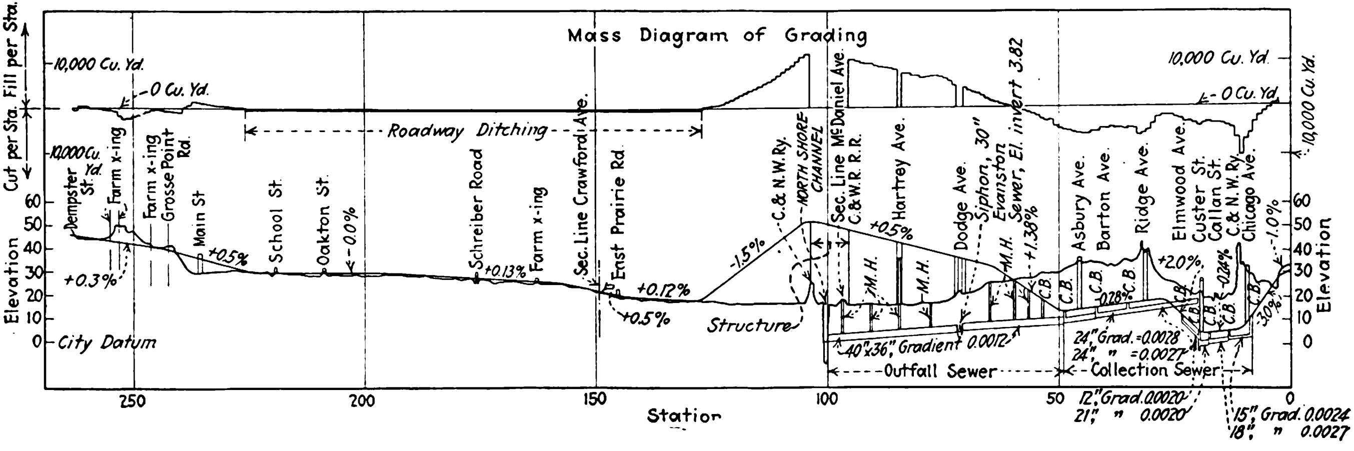
In order to avoid prohibitive grades at the Northwestern Railroad crossing, there was no choice but to go under the existing line. This made it necessary also to go under Chicago Avenue, and in turn complicated the problem of grade separation at the through streets further west, due to the fact that the elevation of the land between the Northwestern right-of-way and Ridge Avenue, approximately ½ mile west, is only about 18 ft. above the level of Lake Michigan and some of the intervening streets were laid out for this level.

Recognizing the physical difficulties involved in providing for grade separation at Custer Street, the authorities of Evanston agreed to raise the level of this street 6 ft. above the established grade, and also agreed to close some of the intermediate, less important north and south streets. The grades of Ridge Avenue and Asbury Street are 38 and 35 ft. above lake level respectively, which allows the new line to pass under them without any particular difficulty.

Independent Drainage System Required for a Portion of the Route

Even with Custer Street raised 6 ft. to the grade of 25½ ft. above lake level, it will be necessary, in order to obtain legal clearances, to put the sub-grade of the line at about 2½ ft. above lake level. This condition introduces a difficult drainage problem, as the sub-grade will be below the sewer levels throughout Evanston. Furthermore, the city sewers do not have sufficient capacity to take the large amount of drainage water which must be handled, and it was therefore necessary to provide an independent outlet.

The only other outlet available is the north shore channel of the Sanitary District, located about 1½ miles west of the cut under Custer Street and about 1 mile west of the depression below Asbury Street. From Asbury Street west the natural surface drainage is toward the channel. There is also a difference in elevation between the bottom of the contemplated cut at Asbury Street and the channel, sufficient to allow a 36-in. x 40-in. oval, reinforced concrete outfall sewer, 1 mile long, to be built with a fall of 6 ft. in 5,000 ft. By providing a hump in the cut between Ridge Avenue and Custer Street the drainage into the cut west of Ridge Avenue will be separated from the portion east of Ridge Avenue. This will localize the drainage into the low area centering at Custer Street and hold the amount of water to a minimum. The drainage on that portion of the cut west of the hump at Ridge Avenue will flow by gravity in ditches and will be collected by catch basins in auxiliary sewers emptying into the outfall sewer.


Mass Diagram of Grading
Cut per Sta. Fill per Sta.
10,000 Cu. Yd.
0 Cu. Yd.
Roadway Ditching
Dempster St. Yd.
Farm x-ing
Farm x-ing
Grosse Point Rd.
Main St
School St
Oakton St
Schreiber Road
Farm x-ing
Sec. Line Crawford Ave.
East Prairie Rd
C.& N.W. Ry.
NORTH SHORE CHANNEL
Sec. Line McDaniel Ave.
C.& W.R.R.
Hartrey Ave.
Dodge Ave.
Siphon, 30"
M.H. Evanston Sewer, El. invert 3.82
Asbury Ave.
Barton Ave.
Ridge Ave.
Elmwood Ave.
Custer St.
Callan St.
C.& N.W. Ry.
Chicago Ave.
+0.3%
+0.5%
-0.0%
+0.13%
+0.12%
-0.5%
-1.5%
+0.5%
+1.38%
+2.0%
-0.28%
-0.24%
-1.0%
-3.0%
M.H.
C.B.
Structure
City Datum
Elevation
60
50
40
30
20
10
0
40"x36" Gradient 0.0012
24" Grad. = 0.0028
24" " = 0.0027
Outfall Sewer
Collection Sewer
12" Grad. 0.0020
21" " 0.0020
15" Grad. 0.0024
18" " 0.0027
250
200
150
100
50
0
Station

Condensed Profile of the New Extension Shows Method of Crossing Through Streets and Also Illustrates the Scheme Adopted to Handle the Difficult Drainage Problem

A smaller sewer will continue east from the east end of the outfall sewer at Asbury Street, rising at the rate of 6 ft. in 5,000, and before reaching an elevation corresponding with the grade of the bottom of the cut it will be carried outside of the cut, continuing east as far as Custer Street. At this point the sewer is considerably above the level of the bottom of the cut.

This location is also the center of the low area east of Ridge Avenue, where the natural land drainage will be into the railway cut. Here, therefore, the drainage water will be elevated by automatic pumps of capacity sufficient to care for the maximum possible rainfall and will be discharged into the sewer just described, which starts west from this point. This will lead directly to the outfall sewer and discharge into it at Asbury Street. The pumps are to be arranged in tandem so as to give duplicate protection in the event one of them fails.

LONG BRIDGE CONSTRUCTION

Near the drainage channel is the Mayfair cutoff of the Chicago & Northwestern Railroad, which is elevated. The new right-of-way crosses this elevated road and in order to get legal clearance, the tracks at this point will be approximately 38 ft. above the natural ground surface. In the immediate vicinity of this crossing it is also necessary to provide spans over two future streets not yet opened through and over the new McCormick highway under construction by the Sanitary District. In addition, the drainage channel must be crossed, as well as the Chicago West Ridge Railroad. To provide for these various crossings will require a total length of structure made up of various types of bridge construction of approximately 1,000 ft. without any intervening embankment or surface construction.

On sections of the line where fills will be made the right-of-way has a minimum width of 150 ft., which gives room for free slope embankments. All bridges and viaducts are being designed for a four-track railroad, but only two tracks will be built at first. A.R.E.A. specifications for bridges and viaducts will be used throughout.

West from the Mayfair cutoff the track will descend to the surface and will continue west and north on the surface to the Dempster Street terminal. The maximum grade of the line, except for two short distances, will be 1½ per cent. The maximum curvature will be 3 deg. and all curves 2 deg. and over will be built with spiral easements. The length of the new line from Howard Junction to the terminal in Niles Center at Dempster Street will be exactly 5 miles. Approximately 350,000 cu.yd. of grading work will be done, 1,700 tons of structural steel will be required and about 20,000 cu.yd. of concrete will be placed. Construction work is now under way and is being pushed as fast as materials become available. It is expected that the work will be completed and the line put in operation within a year. L. E. Myers & Company of Chicago have the general construction contract and are handling most of the work themselves.

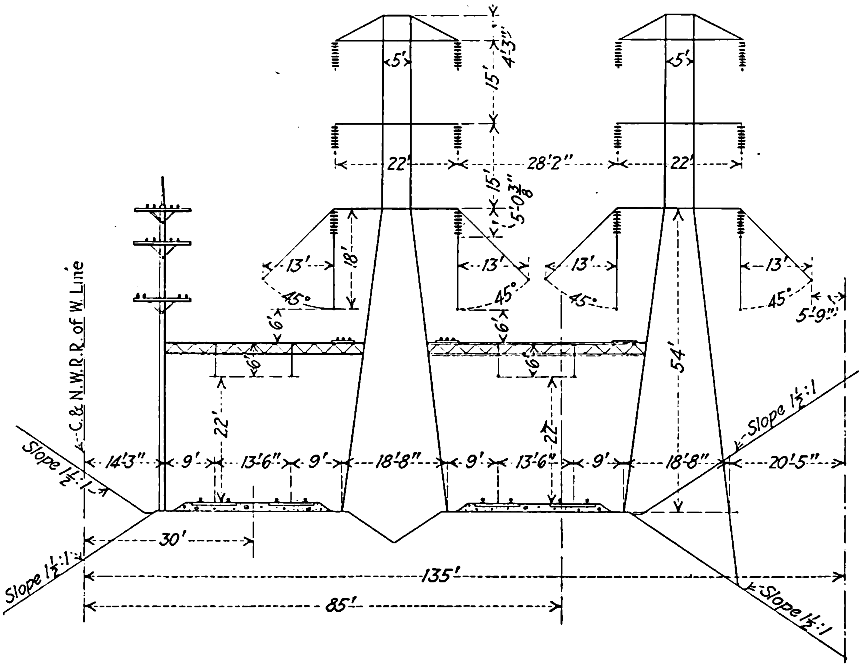
Present Appearance of the Right-of-Way Looking West from Asbury Street. Rapid Transit Service Is Expected to Produce a General Building Development

The Chicago Rapid Transit Company has acquired a 40-acre tract of land on the new line just west of the Mayfair cutoff near the point where the line descends to grade. This is to be used for a future shop and terminal yard.

Stations will be located initially at Ridge Avenue, Asbury Street and Dodge Avenue in Evanston and between Crawford Avenue and Prairie Road and at Schreiber Road, Oakton Street, Main Street and Dempster Street in the village of Niles Center. The first 2 miles of the new line will be in the city of Evanston and the last 3 miles in Niles Center. The stations at Ridge Avenue and Asbury Street will have the buildings at the street level and the platforms in the cut at the track level. The Dodge Avenue station will have the building at the street level and the platform will be elevated to correspond with the track. The rest of the stations are to be at points where the track is on the surface.

SPECTACULAR INCREASE IN LAND PRICES

A striking example of the effect of transportation on property values is furnished by the results following



The High-Tension Line Right-of-Way of the Public Service Company of Northern Illinois Is Wide Enough to Accommodate a Four-Track Railroad and Maintain Legal Clearances. The Line North from Dempster Street Will Ultimately Be Extended to Waukegan on This Right-of-Way the announcement of the new line. Although the property for the railway right-of-way had been acquired very carefully and at favorable prices, public announcement of the new extension was immediately followed by a spectacular real estate boom in all the adjacent territory. Property prices rose overnight to figures in some cases eight or ten times the previous values. Land near the new Dempster Street terminal jumped to figures even higher than these. In other sections of the wide territory affected prices rose from three to five times the values quoted before the new line was announced.

Cost of Carrying Weight on Cars

A Study Made on Boston Elevated Railway Shows that $219 per Ton per Year Is Spent Under Conditions Obtaining in That City

AN INTERESTING study of the cost of carrying weight on cars has lately been prepared by John Lindall, superintendent rolling stock and shops, Boston Elevated Railway, for discussion within that organization. Through his courtesy the following tabulation of estimated costs is presented, the method of reaching these results being somewhat out of the ordinary. The total cost, as determined from the study, is $219 per ton per year, or about 11 cents per pound.

In Table I is given the computation of the above unit cost, based on the company's operations in the year 1923. Starting with the number of passengers carried, and applying the estimated average haul of 4.5 miles per passenger, as derived from numerous traffic studies, the figures for total passengers for the year is determined. Allowing an average weight per passenger of 140 lb. the total passenger-pound-miles reaches 240.75 billions, giving a total passenger ton-mileage of 120,377,145. The total car ton-miles in passenger service is known from company records, and the sum of this and the passenger ton-miles gives a total of nearly 1,500,000,000 ton-miles. An interesting side light is the ratio of passenger ton-miles to total ton-miles, which is 9 per cent.

TABLE I—COST OF CARRYING WEIGHT ON CARS, BOSTON ELEVATED RAILWAY, YEAR 1923

Number of passengers carried	382,149,667
Multiply by average miles per passenger ride	4.5
Total passenger-miles	1,719,673,501
Multiply by average weight per passenger	140
Passenger pound-miles	240,754,290,140
Total passenger ton-miles	120,377,145
Total car ton-miles	1,331,121,632
Total car and passenger ton-miles	1,451,498,777
Ratio of passenger ton-miles to total ton-miles	0.09
OPERATING EXPENSE ACCOUNTS, 1923	
Way and structures	$4,030,197
Equipment	3,507,213
Power	3,094,731
Total	$10,632,141
Divide by total ton-miles	1,451,498,777
Cost of carrying weight in mills per ton mile	7.3
Multiply by miles per car per year	30,000
Cost of carrying weight per ton per year	$219
GENERAL BALANCE SHEET: INVESTMENTS	
Roadway and structures	$60,895,144
Equipment	23,915,042
Power	16,545,809
Total	$101,355,995

The major items in operating expenses related to the weight of car traffic include maintenance of way and structures, maintenance of equipment, and cost of power. The total of these for last year was $10,632,141, and dividing this by the total ton-miles gave 7.3 mills per ton-mile as the cost of haulage. On the known basis of 30,000 miles run per car-year, the cost of $219 per ton per year was reached.

TABLE II—CAR WEIGHTS, SHOWING POUNDS PER PASSENGER BASED ON MAXIMUM PASSENGER LOAD, SURFACE LINES

Type of Car	Number of Seated Passengers	Total Number of Passengers	Light Weight, Tons	Car Weight per Passenger, Lb.	Cost per Car-Mile,* Cents	Hp. per Ton (Light)
16-ft. box	22	68	8.4	247.05	6.1	....
20-ft. box	26	82	9.7	236.5	7.1	5.62
25-ft. box	34	88	12.5	284.09	9.1	8.0
26-ft. 6 in. box	34	96	15.5	322.9	11.3	5.16
No. 1 semi-convertible	48	140	23.5	335.7	17.1	5.53
No. 2 semi-convertible	52	150	26.7	356.0	19.5	4.86
No. 3 semi-convertible	52	150	28.5	380.0	20.8	7.01
Nos. 4, 4-A, 4-A-2 and 4-A-3 semi-convertible	52	159	26.6	334.5	19.4	9.02
34 ft. 4 in.	52	159	24.4	306.9	17.8	5.32
Nos. 1, 1-A, 1-B, 1-C, 1-D, 1-E trailer	62	159	13.1	164.7	9.5	....
Birney safety	32	66	8.3	251.5	6.1	6.02
Nos. 1, 1-A, 1-B, 1-C, 1-D center entrance motor	56	157	22.2	282.8	16.2	7.20
Nos. 5, 5-A, 5-A-1, 5-A-2 semi-convertible	48	151	15.7	207.8	11.4	6.35
No. 4 semi-convertible and trailer (train)	114	318	39.6	249.0	28.9	6.06

* Way, equipment and power.

From the general balance sheet of the company it will be seen that the investment in roadway and structures, equipment and power supplying facilities totaled more than $100,000,000. A portion of the fixed charges on this investment is properly to be apportioned to the cost of carrying weight on the cars of the company, and not all the operating expenses above listed can be billed directly against the pounds carried. There appeared to be more or less of an offset between these rather indeterminate items. For this reason the total operating cost was prorated against the ton-miles and the resulting figure taken for the purposes of the study. This was applied to the design of rolling stock for train service in the East Boston tunnel and was used in other ways.

Table II shows the relations between weight and passenger carrying capacity, including standing passengers, for the various types of passenger cars used by the company on its surface lines, and Table III gives similar data for the rapid transit lines. The average cost of weight haulage, figured as 7.3 mills per ton-mile, has been applied to these car types. The results are shown in the next to the last column in each table, which represents the estimated cost of dead-weight haulage per car-mile in terms of the combined way, equipment and power expenses.

TABLE III—CAR WEIGHTS, SHOWING POUNDS PER PASSENGER, BASED ON MAXIMUM PASSENGER LOAD, RAPID TRANSIT LINES

Type of Car	Number of Seated Passengers	Total Number of Passengers	Light Weight, Tons	Car Weight per Passenger, Lb.	Cost per Car-Mile,* Cents	Hp. per Ton (Light)
Nos. 1 and 2 elevated	48	162	29.6	365.4	21.6	11.82
Nos. 3, 4, 5 and 6 elevated	48	162	34.9	430.8	25.5	6.87 10.02
Nos. 7 and 8 elevated	44	167	33.9	405.9	24.7	7.28
Nos. 1, 2 and 3 Cambridge subway	72	287	43.2	301.0	31.5	10.41 10.87 9.25
No. 1 East Boston Rapid Transit Tunnel	44	180	22.0	244.4	16.1	7.27

* Way, equipment and power.

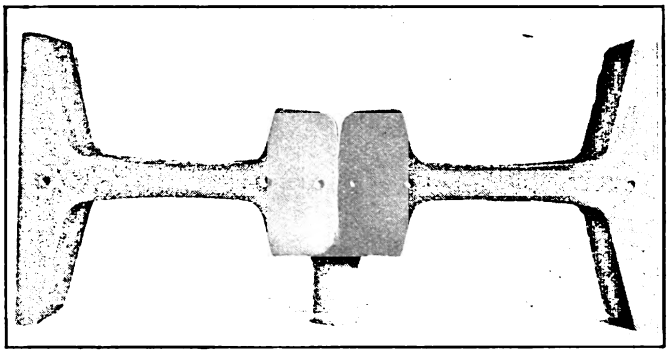
Mill Treatment Doubles the Life of Rail

Service Tests Made by the Boston Elevated Railway Show Wear on Sandberg Sorbitic Rail to Be Only About One-Half that on Untreated Rail in the Same Track—Cost of Treated Rail Is Slightly Higher

A CAREFUL and thorough investigation has been made by the Boston Elevated Railway to compare the wear on high carbon rails, mill treated by the Sandberg sorbitic process, with the wear on ordinary open hearth ferro-titanium rails. Conclusions reached from measurements taken on 25 rails after they had been in service over two years under heavy traffic indicated that the Sandberg rail was from 100 per cent to 300 per cent better than untreated rail. In individual cases the figures varied considerably from the average, but in every case the wear on the Sandberg rail was markedly less than on untreated rail.

Open hearth ferro-titanium rail and the same rail treated by the Sandberg process were laid for purposes of investigation on four curves of different radii on the elevated structure. These locations were: Haverhill and Causeway Streets, southbound track with 90-ft. center radius; Haverhill and Causeway Streets, northbound track with 90-ft. center radius; Henley Street, southbound track with 420-ft. center radius; Rollins Street, southbound track with 1,000-ft. center radius. After the test specimens had been in service for some time the amount worn off the heads of the rails was measured from time to time and the wearing qualities expressed in square inches reduction in cross-sectional area per million tons of service were averaged for each kind of rail. For purposes of comparison various rails laid on other curves were measured in a similar way. The general results of these tests are shown in Table I.

Although the cast manganese rail stands at the head of the list as regards wearing qualities, its cost is practically prohibitive, being nearly seven times that of the Sandberg rail. At the time this investigation was made the Sandberg sorbitic rail cost 73.36 cents per linear foot. Cast manganese rails cost approximately $5 per linear foot and possessed wearing qualities only 38 per cent better. The best of the open hearth specimens showed a wearing quality approximately 45 per cent as good as that of the sorbitic rail at a cost 85 per cent as great, or 61.97 cents per linear foot. Rolled manganese rails cost $2.087 per linear foot, but showed greater evidence of wear than the Sandberg rail. From these figures the Boston Elevated Railway concluded that the Sandberg sorbitic rail was the best rail procurable for use in curved track.



On the Right a Section of Sandberg Sorbitic Rail and on the Left a Section of Ordinary Open Hearth Ferro-Titanium Rail. The Locations of Brinell Tests Are Shown

TABLE I—GENERAL RESULTS OF RAIL TESTS

Kind of Rail	Date of Rolling	Wear per Million Tons Service, Square Inch
Cast manganese	....	0.0085
Sandberg sorbitic	....	.0118
Rolled manganese	....	.0127
Open hearth	July, 1908	.0263
Open hearth ferro-titanium	January, 1915	.0296
Open hearth ferro-titanium	August, 1912	.0331
Bessemer	March, 1903	.0337
Open hearth ferro-titanium	August, 1911	.0344
Open hearth ferro-titanium	November, 1911	.0382
Bessemer	November, 1902	.0393
Open hearth	January, 1911	.0442
Open hearth ferro-titanium	January, 1911	.0516
Open hearth ferro-titanium	....	.0606
Open hearth ferro-titanium	June, 1913	.0643
Bessemer	March, 1907	.0742
Bessemer nickel	March, 1900	.0960
Bessemer	July, 1906	.0973
Open hearth	October, 1915	.1028
Bessemer	December, 1905	.1044
Bessemer	February, 1905	.1323

DETAILS OF TESTS

Taking measurements of wear on Sandberg rails has been continued since the compilation of the figures shown in Table I and these later tests have confirmed the original conclusions. At Haverhill and Causeway Streets the outer rail of a 90-ft. radius curve in the southbound track was laid on Aug. 31, 1921, with seven Sandberg rails replacing 85-lb. A.S.C.E. section T-rail made by the open hearth ferro-titanium process, laid Oct. 31, 1916. The conclusions reached after the Sandberg rail had been in service about two and a half years was that it was about 115 per cent better than the untreated rail. Details of the tests made at this location are shown in Table II.

In this test measurements were taken 3 ft. from each end of each rail until Feb. 12, 1924, when additional measurements were taken on each rail to determine the greatest wear. This was found to be on the fifth of seven rails, counted in the direction of traffic. Comparison of service rendered by the Sandberg rail compared with previous service from untreated rail showed

TABLE II—AMOUNT WORN OFF HEAD OF OUTER RAIL OF 90-FT. RADIUS CURVE, SOUTHBOUND TRACK MEASURED VERTICALLY IN FEET

	4/1/22		12/2/22		6/1/23		9/1/23		11/10/23		2/12/24	
Rail	North End	South End	North End	South End	North End	South End	North End	South End	North End	South End	North End	South End
No. 1	0.000	0.002	0.002	0.010	0.008	0.016	0.008	0.017	0.008	0.018	0.010	0.021
No. 2	.002	.002	.011	.011	.015	.016	.016	.018	.017	.022	.019	.023
No. 3	.005	.005	.011	.015	.016	.022	.022	.022	.022	.024	.023	.026
No. 4	.004	.004	.015	.014	.022	.022	.024	.025	.027	.027	.029	.031
No. 5	.004	.006	.014	.014	.023	.025	.024	.025	.028	.028	.031	.031
No. 6	.005	.006	.014	.011	.024	.015	.027	.016	.028	.018	.031	.019
No. 7	.003	.001	.009	.014	.014	.002	.016	.002	.020	.003	.021	.003

TABLE III—AMOUNT WORN OFF HEAD OF RAIL OF 90-FT. RADIUS CURVE, NORTHBOUND TRACK, MEASURED VERTICALLY IN FEET

Rail	Heat	6/25/21	9/24/21 North End	9/24/21 South End	12/31/21 North End	12/31/21 South End	2/15/22 North End	2/15/22 South End	7/15/22 North End	7/15/22 South End	10/28/22 North End	10/28/22 South End	1/12/23 North End	1/12/23 South End
Untreated No. 1	13,617	0.010	0.013	0.016	0.021	0.028	0.022	0.032	0.008	0.013	0.016	0.030	0.023	0.038
Treated S.S.S. No. 2	13,617	.004	.007	.007	.012	.017	.015	.020	.024	.027	.029	.032	.031	.035
Treated S.S.S. No. 3	6,017	.004	.007	.007	.013	.011	.014	.013	.030	.021	.038	.025	.043	.028
Treated S.S.S. No. 4	13,617	.002	.006	.006	.009	.009	.011	.011	.020	.019	.023	.026	.026	.028
Untreated No. 5	12,818	.008	.017	.007	.014	.012	.025	.014	.012	.007	.029	.014	.036	.018

TABLE IV—AMOUNT WORN OFF HEAD OF RAIL OF 420-FT. RADIUS CURVE, MEASURED VERTICALLY IN FEET

Rail	11/26/21 South End	11/26/21 North End	7/15/22 South End	7/15/22 North End	1/6/23 South End	1/6/23 North End	7/14/23 South End	7/14/23 North End	9/1/23 South End	9/1/23 North End	10/23/23 South End	10/23/23 North End	3/20/24 South End	3/20/24 North End
Treated S.S.S. No. 1	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.003	0.001	0.003	0.001	0.003	0.001	0.004
Treated S.S.S. No. 2	.002	.002	.003	.003	.003	.004	.003	.006	.003	.003	.003	.004	.003	.007
Untreated No. 3	.005	.005	.007	.007	.010	.012	.011	.016	.011	.016	.011	.014	.012	.020
Untreated No. 4	.005	.005	.010	.010	.015	.015	.018	.018	.020	.020	.021	.021	.026	.029
Treated S.S.S. No. 5	.002	.001	.005	.005	.008	.008	.011	.011	.011	.011	.011	.001	.014	.014
Treated S.S.S. No. 6	.002	.003	.006	.006	.009	.007	.011	.010	.011	.011	.011	.011	.016	.013
Untreated No. 7	.006	.005	.014	.014	.021	.016	.025	.026	.027	.028	.029	.029	.035	.035
Untreated No. 8	.007	.007	.011	.012	.016	.023	.021	.027	.022	.029	.032	.030	.037	.036
Treated S.S.S. No. 9	.003	.003	.005	.007	.010	.011	.011	.015	.012	.017	.014	.017	.016	.020
Treated S.S.S. No. 10	.003	.003	.004	.005	.007	.011	.007	.014	.008	.006	.009	.017	.014	.023
Untreated No. 11	.004	.004	.017	.015	.031	.022	.035	.027	.036	.031	.041	.033	.045	.036
Untreated No. 12	.004	.003	.014	.013	.023	.024	.030	.031	.031	.033	.032	.036	.035	.040
Treated S.S.S. No. 13	.002	.001	.007	.004	.012	.004	.014	.007	.014	.007	.015	.007	.019	.007
Treated S.S.S. No. 14	.000	.000	.001	.000	.002	.002	.004	.004	.004	.004	.004	.004	.004	.005

0.0232 sq.in. reduction in cross-section of the treated rail per million tons of service and 0.0499 sq.in. worn off the head of the untreated rail per million tons of service. After the test had been completed the rail was removed from track and more recent measurements are not available.

A different procedure was followed on the northbound track at the same location. In this case the curve, which also has a 90-ft. radius, was laid March 9, 1921, with three Sandberg rails and one untreated rail at each end, making a total of five rails. Rails Nos. 1 and 5 were removed after about six months service and new open hearth ferro-titanium rails installed in their places. Details of this test are shown in Table III. The conclusion reached at the end of one year, ten months and three days was that the Sandberg sorbitic rail was 59 per cent better than untreated rail. The reduction in cross-sectional area per million tons of service was 0.0313 in the case of the treated rail and 0.0499 in the case of the untreated rail. The fact that the service given by these rails in the northbound track was notably less than similar rails in the southbound track may possibly have been due to the fact that in the former case the duration of the test was shorter than in the case of the rails laid in the southbound track.

Rails mill treated by the Sandberg process and tested at Henley Street on a 420-ft. radius curve on the southbound track were found to be 112 per cent better than untreated rails. In this case 14 rails were laid in the outside of the track on July 26, 1921, with alternate pairs of Sandberg rails and untreated rails. At the end of about 2 years and 8 months' service the treated rails showed a wear of 0.0109 sq.in. per million tons of service and the untreated rails a wear of 0.0232 sq.in. Details of the tests made at this location are shown in Table IV.

Extensive tests were made also on a 1,000-ft. center radius curve at Rollins Street. At this location the inner and outer rails were laid with alternate treated and untreated rails, 11 being used in each case. These were laid respectively on Oct. 14 and 11, 1920. At the end of more than 2 years' service these tests showed, for the inner rail, a wear of 0.0064 sq.in. per million tons of service on the Sandberg rail and 0.0195 sq.in. on the untreated rail. On the outside the Sandberg rail had suffered a reduction of 0.0050 sq.in. area per million tons of service and the untreated rail 0.0207 sq.in. This led to the conclusion that the treated rail was 204 per cent better than untreated rails on the inside and 314 per cent better on the outside rail. Complete figures for this test are shown in Table V.

COMPOSITION AND HARDNESS

Analyses were made of the chemical composition of the mill treated rails and also Brinell hardness tests. Sandberg rails used by the Boston Elevated Railway were made by the Bethlehem Steel Company. The

TABLE V—AMOUNT WORN OFF HEAD OF RAIL OF 1,000-FT. RADIUS CURVE, MEASURED VERTICALLY IN FEET

Rail	6/12/21	8/5/21	12/1/21 North End	12/1/21 South End	4/1/22 North End	4/1/22 South End	9/1/22 North End	9/1/22 South End	12/1/22 North End	12/1/22 South End	2/1/23 North End	2/1/23 South End	6/1/23 North End	6/1/23 South End
Inner rail laid Oct. 14, 1920.														
Untreated No. 1	0.008	0.010	0.008	0.013	0.010	0.017	0.012	0.019	0.012	0.019	0.012	0.019	0.012	0.019
S.S.S. No. 2	.006	.006	.006	.007	.008	.009	.010	.011	.010	.011	.010	.012	.011	.012
Untreated No. 3	.012	.014	.014	.018	.017	.020	.020	.023	.022	.025	.002	.026	.022	.030
S.S.S. No. 4	.003	.004	.008	.009	.009	.011	.012	.013	.012	.013	.012	.013	.012	.015
Untreated No. 5	010	.012	.017	.017	.020	.019	.024	.024	.025	.025	.025	.027	.025	.029
S.S.S. No. 6	.004	.006	.008	.009	.011	.011	.013	.014	.013	.014	.014	.014	.015	.016
Untreated No. 7	.008	.010	.018	.015	.024	.018	.028	.022	.028	.022	.028	.022	.030	.026
S.S.S. No. 8	.004	.005	.007	.007	.010	.009	.012	.011	.012	.012	.012	.012	.013	.015
Untreated No. 9	.012	.017	.017	.024	.019	.028	.020	.032	.022	.036	*Rail renewed		1/8/23.	
S.S.S. No. 10	.005	.005	.007	.006	.009	.007	.011	.009	.011	.011	.012	.012	.014	.012
Untreated No. 11	.006	.015	.020	.012	.023	.014	.023	.014	.024	.014	.024	.016	.024	.017
Outer rail laid Oct. 11, 1920.														
Untreated No. 1	.006	.012	.004	.013	.005	.016	.006	.019	.006	.020	.006	.021	.006	.025
S.S.S. No. 2	.004	.005	.007	.006	.009	.007	.010	.009	.010	.009	.010	.009	.012	.010
Untreated No. 3	.012	.016	.018	.022	.019	.026	.020	.030	.020	.030	.022	.030	.025	.030
S.S.S. No. 4	.006	.007	.008	.008	.011	.011	.012	.012	Rail changed account crack.					
Untreated No. 5	.010	.016	.016	.015	.018	.017	.022	.020	.022	.022	.022	.022	.022	.023
S.S.S. No. 6	.005	.006	.003	.007	.004	.008	.006	.010	.006	.010	.008	.011	.009	.013
Untreated No. 7	.008	.013	.013	.016	.015	.017	.018	.021	.018	.021	.018	.023	.018	.026
S.S.S. No. 8	.003	.005	.008	.007	.008	.008	.009	.010	.010	.010	.010	.010	.011	.011
Untreated No. 9	.010	.016	.010	.019	.016	.025	.019	.030	.023	.035	*Rail renewed 1/8/23			
S.S.S. No. 10	.008	.005	.009	.006	.010	.007	.012	.007	.012	.008	.012	.008	.012	.010
Untreated No. 11	.010	.006	.011	.008	.012	.009	.014	.011	.015	.011	.014	.011	.014	.011

*Renewed on account of uneven wear. Inner rail worn 0.038 and outer rail worn 0.039 when removed.

chemical composition in the various tests was as follows:

Elements	Haverhill and Causeway Streets, Southbound	Haverhill and Causeway Streets, Northbound	Henley Street	Rollins Street
Carbon	0.850	0.850	0.930	0.880
Manganese	.75	.75	.80	.71
Phosphrus	.036	.037	.035	.029
Sulphur	.048	.048	.058	.067
Silicon	.20	.20	.20	.20

Note: A few individual rails from different rollings had chemical compositions varying slightly from the above figures.

Three samples were selected for making the Brinell tests. On sample No. 1 this test in the head of the rail gave values of 351 and 340. In the base of the rail it gave a value of 351. In sample No. 2 the values for the head of the rail were in each case 364 and in the base of the rail the same as in the first sample, namely, 351. Sample No. 3 gave two values of 418 in the head of the rail and a value of 387 in the base. The locations where these tests were made are shown in an accompanying illustration.

Briefly described, the process of hardening the rail at the mill consists of quenching by compressed air a red hot rail after it has gone through the last regular rolling. A long pipe with a series of vents in the bottom is suspended immediately above the rail and the compressed air released through these holes. A difficulty which it is understood sometimes is encountered in the process is the bending of the rail when being quenched, which necessitates its being put through the rolls again. It is understood that the manufacturer is not in a position at the present time to supply this rail in large quantities.

Service tests have been carried on in Boston for the past two or three years and the results have been excellent both as to wear and as to non-breakage of the rails. Some doubts were expressed at the beginning of the tests as to whether or not this process would cause brittleness, but inasmuch as tests were made on curves of very short radius and the rails were curved cold, the company feels that the rails received a thorough test. No breaks at all have occurred to rails in tracks. The extra first cost amounts to practically nothing compared to the cost of renewing rails at frequent intervals.

The Boston Elevated Railway considers the results achieved on its rapid transit lines so satisfactory that it is endeavoring to have all rails for installation on curves treated by this process before leaving the mill. It is believed by the company that this process is equally applicable to rails used in surface tracks.

Sandberg sorbitic rails have been used also to some extent by the Interborough Rapid Transit Company, New York City; the Philadelphia Rapid Transit Company, the Denver Tramway and the Cumberland County Light, Heat & Power Company, Portland, Me. Various steam railroads have also used these rails, and the Pennsylvania Railroad carried on extensive tests to compare them with untreated rails.

Electric Railway Industry Prospers

A Survey of Recent Financing, Operating Results, Receiverships Lifted, New Track Construction and Purchases of Rolling Stock, Covering the First Six Months of This Year, Shows the Excellent Condition of the Industry—Railways Are Taking Up Operation of Buses

WHILE there has been a general feeling that the electric railway industry is once more sound and progressive, and numerous articles have been published within the past year to that effect, a large part of the general public, as well as many operators and manufacturers in the industry itself, have failed to visualize the tremendous advance it has made since the hard times of the post-war years. The editors of ELECTRIC RAILWAY JOURNAL have recently gathered together and summarized a great mass of material, all of which has appeared in this paper from time to time, and here present part of it, and that in summarized form.

It is not necessary to go into the really fundamental reasons for belief in the soundness of the industry. Factors contributing to the improvement in the situation are definite breaking down of the 5-cent fixed fare, elimination of irresponsible jitney competition, the greatly improved public relations, the general realization of the necessity for high-grade service, and the new appreciation of the necessity for merchandising service. These fundamentals are already well fixed in the minds of the public.

First the financial side of the industry will be considered. For several years investment bankers have been strictly bearish on electric railway securities. Some have even taken pains to note on prospectuses of light and power company issues that the property in question has little or no railway operation. These and other acts have assisted in building up among the investors a psychology which has caused a great many combination power and railway companies to change their names to eliminate the evidence in the corporate title of the inclusion of any railway property as a part of the company.

But this line of thinking has run its course. The bankers are beginning to take an interest in electric railway issues. The railway companies are helping this by the spread of the work of selling securities to local people on the customer-ownership idea. As definite evidence of this increasing interest, a few cases will be cited.

During the last twelve months the Electric Bond & Share Company, which has heretofore been interested almost exclusively in light and power companies, has purchased the New Orleans Railway & Light Company, the Birmingham Railway, Light & Power Company, the Memphis Street Railway, and has recently completed the purchase of the American Electric Power Company, formerly the American Railways, whose holdings included the Scranton Railway, Peoples Railway of Dayton, Wilmington & Philadelphia Traction Company, Roanoke Traction & Light Company, Chicago & Joliet Electric Railway, Ohio Valley Electric Railway, Huntington, W. Va., and several other properties which comprise electric railways.

This indicates that this conservative holding company sees a real opportunity to make money on railways or it would never have purchased them, for it has been an organization heretofore definitely not interested in railway work.

J. K. Newman has organized an investment banking house, known as Newman-Saunders, which has purchased control of the bonds of the United Railways of St. Louis and the Kansas City Railways, both of which are now in receivership. The St. Louis railway system showed an increase in net earnings of more than $300,000 in 1923 as compared with 1922, and its rehabilitation program has only begun. Furthermore, it has not only paid all its bond interest to date, including that on some bonds which have been extended at high rates, but has accumulated a surplus of more than $4,000,000. Under better management the Kansas City Railways in the last three years has changed from a net operating deficit of $1,500,000 to a net income of more than $500,000, an increase in the annual net income of more than $2,000,000. This is the showing made in spite of the fact that the company has paid off nearly $20,000,000 in accumulated liabilities.

The Atlantic Coast Electric Railway has been bought by Fitkin & Company.

The Northern Ohio Traction & Light Company has purchased the Cleveland, Alliance & Mahoning Valley Railway.

The General Gas & Electric Company has purchased the Salisbury & Spencer Railway.

The Interstate Public Service Company has purchased the Winona Interurban Railway.

The Indiana Service Corporation has offered to purchase the Fort Wayne & Northwestern Railway.

The West Penn Company has bought control of the Monongahela Valley Traction Company.

The Virginia Western Power Company has bought the Charlottesville & Albemarle Railway.

While some of these purchases included light and power operations, they all include substantial railway properties, which indicates that each purchaser was convinced that it could place the railway on its feet, if it were not already there, and make it a paying proposition.

SECURITIES TOTALING MORE THAN $48,000,000 ISSUED

As further evidence of the growing interest of bankers in electric railway securities, the following security issues may be cited as some which have been successfully floated so far this year:

Market Street Railway	$13,000,000	7 per cent bonds, sold at par
Grand Rapids Railway	3,200,000	7 per cent bonds, sold at 99½
Pittsburgh Railways	3,000,000	5.22 per cent to 6 per cent car trust certificates
Chicago Rapid Transit Company	6,500,000	6½ per cent bonds, sold at 94½
New Orleans Public Service, Inc.	7,500,000	8 per cent common stock, sold at par
(The railway operation in this company is earning the full allowable 8 per cent return)		
Maryland Electric Railways	4,000,000	6½ per cent bonds, sold at par
Boston Elevated Railway	3,000,000	6 per cent bonds, sold at 103.
(These traction bonds were returned to the legal list for savings banks in Massachusetts)		
Charleston Interurban Railway	500,000	6 per cent stock, sold locally at par
Key System Transit Company	2,410,000	6 per cent bonds, sold slightly under par

In addition to the above the Chicago Rapid Transit Company is now selling $5,000,000 of 7.8 per cent prior preferred stock to its employees at 90 and to the public at par. The employees promptly took up $1,500,000 of this and the company is meeting with good success in selling to the public, more than half the issue already having been taken. This is the outstanding customer ownership effort to date in the electric railway field. In addition, the Galveston-Houston Electric Company has sold $400,000 of 7 per cent notes direct to the public. The total of all of these railway issues amounts to more than $48,500,000, and this is by no means a complete summary of the new electric railway financing done this year.

In New York City, which has the most difficult political situation in the country for traction lines, the Brooklyn City Railroad has returned to a 10 per cent dividend basis and has recently declared a 33⅓ per cent stock dividend, which last week was approved by the Transit Commission. The Brooklyn-Mahattan Transit Corporation declared an initial dividend on preferred stock which was paid May 15, although this was not compulsory under the terms of the reorganization plan until 1925.

Among the annual reports published so far this year the Twin City Rapid Transit Company, Minneapolis; the York Railways, York, Pa.; the British Columbia Electric Railway, Vancouver; the Columbus Railway, Power & Light Company, Columbus, Ohio; the Chicago, North Shore & Milwaukee Railroad; the Chicago Surface Lines; the Hudson & Manhattan Railroad; the Duluth-Superior Street Railway; the United Railways of St. Louis, and the United Railways & Electric Company of Baltimore have all shown substantial increases in their net revenue. Of course, a few reports which have been published have shown decreases in net, but there were special reasons for some of these, such as bad strikes. In general the most of the reports show an increase.

SEVERAL IMPORTANT RECEIVERSHIPS LIFTED

Among the more important receiverships which have been lifted from electric railway properties so far this year are the following: Pittsburgh Railways; Birmingham Railway, Light & Power Company; Binghamton Railway; Northern Massachusetts Street Railway, Greenfield, Mass; Winona Interurban Railway, Warsaw, Ind.; Chicago & Oak Park Railway; Toledo & Western Railroad; Coney Island & Brooklyn Railroad, New York City; Northampton-Easton & Western Traction Company, Easton, Pa., and New York Railways.

In addition the properties at St. Louis, Kansas City, and Erie, Pa. (the Buffalo & Lake Erie Traction Company), will most likely be reorganized soon and emerge from receivership, as will the Second Avenue Railroad, New York City.

New receiverships this year so far comprise only four small companies, as follows: Grand Rapids, Holland & Chicago Railway; Ithaca Traction Company; Charleston-Isle of Palms Traction Company and Columbus, Newark & Zanesville Traction Company. This would indicate that the year 1924 would see even fewer receiverships than the number in 1923, which was 12, and that was the lowest in any year since 1910.

So much for strictly financial evidences of the soundness of the industry. Now what is the tendency in the amount of traffic handled by the electric railways? Figures compiled by the American Electric Railway Association comprising 400 electric railways, representing more than 80 per cent of the whole industry, show that during 1923 the number of passengers carried was 13,280,730,742, as against 12,822,423,121 in 1922, an increase of 3.6 per cent. Corresponding figures might be cited on the number of car-miles operated and the gross revenue also, but they all point to the same thing, namely, that in 1923 the electric railways carried more passengers, operated more cars and more car-miles, and had the greatest gross revenue in the history of the industry. There is in sight no other means of transportation that can undertake to supplant the electric railways in this tremendous job of handling 16,000,000,000 passengers a year. Nor is there any evidence in this great number of passengers carried that electric railways are on the decline. These figures are even more significant when one stops to think that in 1923 there was a total registration of more than 15,000,000 motor vehicles.

PER CAPITA RIDING HAS INCREASED

Analyzing these traffic figures a little further, a special study made by John F. Layng, published in ELECTRIC RAILWAY JOURNAL for June 28, page 1011, showed a comparison of the number of revenue passengers per capita and revenue passengers per car-mile carried by the electric railways in the years 1910, 1920 and 1923, for 45 companies scattered over the country and in cities of various sizes. Of these 45 companies, 27, or 60 per cent, showed an increase in the number of revenue rides per capita in 1923 over that in 1910, and 37 companies, or 82 per cent, showed an increase in revenue rides per car-mile operated. Totaling the figures for revenue miles and revenue passengers for all 45 companies, it will be found that the revenue rides per capita in all these cities increased from 223 in 1910 to 244 in 1923, and the revenue rides per car-mile increased from 5.54 to 7.12. The real significance of this is that every inhabitant of all these cities rode on the street car 21 more times in 1923 than he did in 1910, in spite of the fact that the total registration of motor vehicles increased from 470,000 in 1910 to 15,092,177 in 1923.

SIX MONTHS' TRACK CONSTRUCTION ESTIMATED AT $85,000,000

Another evidence of the soundness of the industry is the extent to which it is buying. Taking the material that has been published in the JOURNAL so far this year as a basis, it is found that there have been published 126 news items concerning new track construction or reconstruction, involving an estimated total of 1,142 miles of single track, at an estimated cost of $85,000,000. Of the total number of track items, 63 included paving work, totaling about 2,550,000 sq.yd., the cost of which is included in the above estimate. This 1,142 miles indicates that track construction compares with a total during 1923 of 1,114 miles. Of course, this new figure is for work authorized, while that for last year was track actually built or rebuilt during that year. A comparison with similar items published last year, however, indicates that the track built in 1924 will be much in excess of the amount of construction that was carried out last year.

In the first six months this year the JOURNAL published 194 news items telling of the purchase or prospective purchase of cars, trolley buses and buses by the railways. The number of items indicating prospective purchases comprised 946 cars, 12 trolley buses and 27 buses. The items telling of orders placed comprised 1,731 cars, 2 trolley buses and 298 buses.

Other important projects that are now under way involving large expenditures include the $4,000,000 Babylon electrification of the Long Island Railroad, the $10,000,000 authorization in connection with the Illinois Central Suburban electrification, the electrification of the Staten Island Rapid Transit Company, the electrification of a piece of the Missouri, Kansas & Texas Railway, for which $1,000,000 has been authorized, and the Hollywood tunnel contract, which has been let with an expenditure of $3,000,000. The Boston Elevated Railway has announced a five-year program, including $4,500,000 for a new elevated shop, $4,000,000 for surface lines shop, $3,000,000 for station improvements, $3,000,000 for new steel "L" cars, $3,000,000 for "L" storage facilities, and miscellaneous planned improvements $7,400,000—a total of $24,500,000 to be spent on these items alone during the next five years. Of the $5,000,000 stock issue now being sold by the Chicago Rapid Transit Company, $3,000,000 is to be spent for important improvements, including 100 new steel cars. The other $2,000,000 is to be used for refunding purposes.

RAILWAYS ARE ADOPTING THE BUS AS AN ALLY

Railways are now putting the newest transportation tool, the bus, into use as an ally before it has become a serious competitor. They are beginning to buy buses, but the job is only well begun. Up to date about 150 railways have taken up bus operation in a small way, including several very sizable undertakings. They are operating at least 2,000 buses. Obviously, this is thus far mainly in the nature of a feeler as to the possibilities.

The leaders of the industry see the field of the bus and are now of the belief that, if the railways take advantage of their present opportunities, they will be the operators of the great bulk of the buses of the future. Very definite steps are being taken to harmonize the thinking of the railways and that of the bus manufacturers and the bus industry generally, and substantial progress has already been made. This is coming fast, for the bus manufacturers have been quick to see the railway field as an enormous future market. To cite just one example, at least one large bus manufacturing company has stated that it is definitely aiming its main sales efforts at the railways.

The possibilities of the use of the bus are almost without limit. There will be bus lines everywhere, affording ready means of direct communication where none now exists. They will very naturally feed business to steam and electric rail lines for the longer hauls. The railway people are the logical ones to develop this field, because they know transportation. They can also bring about the bus development in the way most effectively to increase the earnings of the rail lines. They can even parallel their own rail lines with a de luxe type of service that will develop riding that never could be secured for the railway, and it has been done in several cases at rates higher than those charged on the railway.

The picture which these figures present is not complete. It is not intended to be complete. In no way do the data from which they were drawn compare with the results of the exhaustive survey from which the figures are compiled that are published annually by ELECTRIC RAILWAY JOURNAL gathered from both railway companies and car manufacturers. It is, however, concrete evidence that shows the rapid strides being made by the electric railway industry in its modernization program.

Association News & Discussions

Central Association Considers Methods of Increasing Business

At the Cedar Point Meeting Freight and Passenger Business and Public Relations Are Main Topics—Improvement in Financial Situation Shown

DETERMINED to look on the bright side of the future of the electric railway business in the central district and in the nation at large, the C. E. R. A. devoted the program of its summer meeting, held on July 17 and 18 at Cedar Point, Ohio, to a discussion of ways and means of increasing passenger and freight business. Being a large factor in this program the subject of publicity occupied a prominent place in the discussion.

President Harry Reid, president Interstate Public Service Company, opened the Thursday morning session with a brief outline of the general situation as it stands today and took an optimistic view of the future of the industry. He said that the affairs of the association are in excellent condition and that committees have been functioning in a whole-hearted effort to co-operate in working out the problems of the industry.

Although the current year started with general increases in business, Mr. Reid said that most of the companies in the central district have been feeling some effect from the general slackening of industrial activity. He anticipated, however, a general recovery by fall which will give a more favorable showing for the entire year than is indicated by the results achieved during the past few months.

Continuation of the movement for progress and modernization was advocated as an essential policy to insure future prosperity. The various companies must take care fully of the territory served and must expand their facilities to meet the desires of the riding and shipping public. Improved equipment and auxiliary transportation agencies, such as the motor bus, were advocated where their use will help the railway maintain its leadership as the exclusive transportation agency in a given field.

Citing the experience of the Interstate Public Service Company in adopting dining and club cars for service between Indianapolis and Louisville, Mr. Reid said that he was convinced that these improved facilities for the convenience of the traveling public were profitable to the railway. Their use has increased the aggregate earnings of the road both through the direct patronage which they attract and also because of the favorable publicity which they give.

The report of Secretary L. E. Earlywine showed a membership on July 1 of 62 interurban lines, 4 city properties and 2 steamship lines. Reports of the committee on rules for the interchange of equipment and of the committee on annual transportation were accepted by the association. A resolution was adopted tendering sympathy to the family of Past-President C. N. Wilcoxon, whose death was recently reported in the ELECTRIC RAILWAY JOURNAL.

The report of the safety committee, which was approved by the association, advocated medical examination of employees, investigation of the moral standing of new employees, careful training of men, personal talks by executives to raise the morale of the men in the ranks and careful supervision and checking of older employees so as to maintain high efficiency. Painting of diagonal black and white stripes across concrete roads at railway crossings was recommended.

PUBLICITY GIVEN PROMINENT PLACE

E. F. Wickwire, chairman publicity committee, opened a general program devoted to this subject by a report from his committee. After outlining the general principles, he advocated co-ordination of the efforts of the C. E. R. A. with the work which is being done through the American Association and urged each company to make use of the carefully prepared material which is sent out by the national association.

W. H. Boyce, commercial manager Pittsburgh Railways, described some of the publicity methods used by both this company and the Beaver Valley Traction Company, of which he was formerly general manager. His paper is abstracted elsewhere. Mr. Boyce supplemented his paper by showing examples of effective and constructive publicity material used by the London Underground Railways, the Chicago Rapid Transit Company and the Pittsburgh Railways.

In discussing Mr. Boyce's paper, W. H. Sawyer, president East St. Louis Railway, said that the day has passed for advocating the need for publicity, and that present-day effort should be devoted to discussion of the best methods of carrying out constructive work along these lines. Since so many examples exist of properties which have been saved from ruin by constructive publicity, Mr. Sawver said that a railway executive who does not recognize the value of such work now has no place among progressive electric railway people.

"The Pittsburgh strike was won by constructive publicity, and the winning of that strike was of national benefit to us all," said Mr. Sawyer. "True, it was publicity backed up by performance—backed up by men who meant what they said and said what they meant—but that is what all publicity must be. Unless backed by performance, publicity is useless and worse than useless." Publicity work by a railway was held to be equally important with any other departmental activity. For this reason it should be considered as a distinct department, ranking equal with any of the regular operating departments of the organization.

Labert St. Clair of the American Association staff and representatives from the committees on public utility information in Indiana, Ohio and Michigan discussed the subject of railway publicity. Mr. St. Clair said that the function of the American Association was primarily to tie together the activities of all other agencies, and he offered the Central Association the full co-operation of his department. That railways are making publicity for themselves all the time, whether or not they are engaged in active work along these lines, was brought out by one of the speakers. Every time a passenger and a conductor make contact a certain publicity reaction is obtained, and it was consequently held that the progressive executive will take active steps to make sure that the public is so informed regarding the business of the company that it may correctly judge the value of the service which is rendered.

G. Bennett, general agent Chicago, North Shore & Milwaukee Railroad, outlined some of the principles applied by that company for building public good will and increasing passenger traffic. J. C. Matthieu, commercial engineer Dayton Power & Light Company, read a paper on methods used for increasing the light and power business. He also held that an improvement in public relations is the surest method of increasing the utility business and advocated full publicity on all phases of the industry.

In a paper on the subject of forestry conservation by David L. Goodwillie he pointed out the many ways in which this work affects the prosperity and happiness of the nation.

ENGINEERING COUNCIL

The afternoon session was devoted to the meeting of the Engineering Council of the association, with Chairman G. K. Jeffries presiding. The two papers presented and the moving pictures on the manufacture of steel wheels provided an opportunity for constructive discussion on the part of the members and guests present. The first paper, read by K. A. Simmon, manager light traction division Westinghouse Electric & Manufacturing Company, gave some of the details of the organization of the Engineering Council of the association. It is abstracted elsewhere in this issue.

The discussion following the question raised by Mr. Simmon as to how to obtain a larger attendance at regional group meetings resulted in a motion to have the chairman of each group write a personal letter to the general manager of each property included, asking him to order men to attend the group meetings. In supporting this motion, A. V. Brown, Lake Shore Electric Railway, brought out the fact that many members of the Engineering Council were too backward in advising their managers of the scheduled meetings, with the result that often these men waited in vain for the officials of the property to tell them to attend. A. Schlesinger, Terre Haute, Indianapolis & Eastern Traction Company, suggested that standing orders be issued by general managers making it imperative that the members of the council attend the group meetings. He said that inasmuch as the council was divided into four groups, it was easy for a man to attend a group meeting without being absent from his property for more than a day.

High-tension insulators, their application and economic installation, were the subject of a talk by Arthur O. Austin, chief engineer and factory manager Ohio Insulator Company and consulting engineer Ohio Brass Company. He went into considerable detail in analyzing the various factors which determine the proper type and construction of insulators which should be used to obtain the best results.

An interesting description of the manufacture of rolled steel wheels was given by Lawford Fry, metallurgical engineer Standard Steel Works, with the aid of moving pictures. The committee report on "Standardization of Freight Equipment for Interchange, the Development of Limit Gages and Rules for Application" was presented for formal approval. After some discussion it was deemed advisable to approve only sections 1, 5, 6, and 7. The sections dealing with standards, determination of capacity and capacity markings, and limits for wear gages were referred back to the committee for further consideration.

Friday morning's general session was opened by a paper presented by L. M. Brown, superintendent Interstate Public Service Company. This paper outlined the work of his company in dealing with the increase in the freight business experienced by the railways around Indianapolis. An abstract of the paper is printed elsewhere in this issue.

"What Does the Interurban Electric Railway Mean to the Economic Development of the Central West," was the subject of a paper presented by Joseph A. McGowan, Terre Haute, Indianapolis & Eastern Traction Company. This paper is abstracted elsewhere in this issue.

The talk given by J. P. Harris, vice-president Union Trust Company, Cleveland, Ohio, proved an inspiration to his listeners. Stating that he was optimistic regarding the future of the traction business, he gave many reasons why he advised his clients to invest in public utility securities, particularly those of electric railways. Paramount among the reasons advanced was the necessity for transportation in a community in order to insure its growth. With this fact established in the minds of investors and the bankers, the demand and price for traction securities should improve materially. Mr. Harris pointed out that the value of a municipal security depended largely on the service rendered by the local transportation company, so he argued that in many ways the bonds of the latter should be as good as if not better than the municipality's. The trouble in the past with the public utilities, and particularly the electric railways, has been due to the actions of unscrupulous promoters who have made the traction companies susceptible to blackmail by the city officials.

One electric railway, that, after it became the property of the bondholders, was put on its feet by his bank with the result that it was returned to a public utility operating company at a profit to the bank was the example Mr. Harris used to show what could be done with traction lines. This system was similar in many respects to others operating at that time and even today. The cars were 28 years old, the track was worn out, no franchises were held in the towns through which the line ran, and in other ways the property had suffered due to the war and the neglect of the former operators. The first step in the rehabilitation work was the determination of the worth of the property. This was done by experts, and upon their advice new cars were purchased, the track was put into good condition and the power facilities improved. With this work well under way the bank's representatives sought to obtain franchises in the various towns. After a two-year fight to make the town authorities extend to the railway the cordial wlecome and respect accorded to other industries franchises were obtained wherever needed. This was accomplished by holding up the money to be used in the community until the town council issued the franchise and treated the company in a proper manner. After operation had started and the property was assured of a successful future the bank sold it to a public utility operator at a price higher than the total investment including the interest charges after only ten minutes of negotiation.

The Thursday evening banquet was attended by almost 300 members and guests of the association. A lively program of entertainment was followed by a talk by Robert G. Gordon of Louisville, who explained some of the salient facts connected with the controversy over the development of Muscle Shoals.

The executive committee of the association approved a recommendation from the traffic association in favor of a combined freight advertising program. The conference called by the Governor of Ohio on July 23 to consider the subject of grade crossing safety was also discussed by the executive committee, and a special committee was appointed to handle some of the details of presenting the electric railway view on this subject.

Dayton, Ohio, was selected as the place for the next meeting of the association, which will be a two-day session to be held next January.

What Are We Doing to Increase Our Freight Business?*

By L. M. Brown

General Superintendent Interstate Public Service Company,
Indianapolis, Ind.

For a number of years the lines reaching the larger terminals in the C.E.R.A. territory have been greatly handicapped in the handling and solicitation of freight business by the lack of adequate station and terminal facilities, which has in a great measure restricted the development of this phase of operation, and much tonnage which might have been moved by electric lines was lost to other means of transportation, including the motor truck. However, there has been a marked tendency during the past year to increase station and terminal facilities, and it is understood that improvements of this nature are contemplated or are under way at many points.

Probably the most notable accomplishment in this direction during the past year was the completion and putting into operation on June 1 of the first unit of the new million-dollar Indianapolis joint freight terminal, which is now occupied by all of the interurban lines entering Indianapolis. This terminal has platform track capacity for more than 80 cars at one time, and team track capacity for 30 cars; also ample storage tracks. The buildings are modern in every respect and equipped to insure prompt and economical handling of freight and facilitate the transfer of interline tonnage at a minimum cost. The combined length of the present station buildings and platforms is approximately 1,300 ft. with ground available practically to double this when necessity demands.

Many other steps have been taken by electric lines in the territory, both individually and collectively, to increase the freight business, including the organization of more efficient traffic departments to develop and solicit business, extending the scope of freight operation through the establishment and publication of through interline rates and divisions, and arranging through connecting line schedules. Much attention has been given to the matter of maintaining fast and dependable through interline service, and a great deal has been accomplished in this direction, with the result that overnight service is rendered covering a large part of Central Electric territory, and second morning delivery between the more widely separated points. Shipments of both carload and less are moved for distances as great as 400 or 500 miles, and service rendered is comparable with or even better than where shipped via American Railway Express.

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*Abstract of a paper presented at the meeting of the Central Electric Railway Association, Cedar Point, Ohio, July 17, 1924.

On the line with which I am connected there has been a very satisfactory increase in freight earnings so far this year, notwithstanding the general depression in practically all lines of business. This has been brought about, we believe, by fast, dependable service, personal touch and solicitation by the traffic department, co-operation of agents and other employees with the public, establishment of industrial switches and filing of commodity rates.

The giving of real dependable service cannot be successfully accomplished unless the entire organization, including platform men and trainmen as well as the solicitor is sold on the idea of service. It is not enough to solicit the business and then forget it, but it must be followed up until the customer is convinced that the service is all that it is claimed to be. One mistake or delay on a trial shipment may cause the loss of several hundred dollars worth of business which may never be regained. In taking on new business of any importance we always make it a rule to spare no efforts to make the service absolutely first class in every respect, even though it costs us money to do so. After the service has once been satisfactorily established economies of operation can be put into effect and the public served is willing to co-operate in improving the service and to report mistakes or delays so that they can be corrected promptly. If one of our patrons has an interruption to his business and asks some special favor, we go out of our way to accommodate him. We have found that special attention to matters which may seem trivial to us but of great importance to the other fellow is one of the best business builders.

We have a sufficient amount of motive power and rolling stock, forty-seven additional cars having been added within the past year, which enables us to take care of calls promptly, especially for car load shipments. About one-third of our total freight revenue is derived from car load business. Outside the larger cities trains of from five to twelve cars are operated which reduces train labor costs, facilitates dispatching, etc.

A few years ago we started a special fruit service from southern Indiana to Indianapolis. This business has increased so that from two to seven cars are operated daily carrying berries, fruits, green vegetables, melons and other perishable commodities for about five or six months in the year. This train leaves the southern end of the line about 9 p.m., arrives at Indianapolis about 2 a.m., is immediately unloaded and contents delivered to the commission merchants and sold in time to be on the breakfast table. For this service an all-steel, high-speed motor car and special steel trail cars with steel wheels for fast running are used. With these specially constructed steel express trail cars which can be operated behind limited trains, we recently added to our list of perishable products a new commodity. In a period of about eighteen days approximately 11,000,000 tomato plants were handled from two stations on the line with a gross revenue of more than $2,100.

Industrial switches have been established at such places as canning factories, cement mills, wood-working factories, for road contractors and others. Recently a large stone quarry on the line has been leased for commercial use which will give us several hundred carloads per year. Several hundred cars of sand and gravel are already being handled for road building purposes.

All the lines entering Indianapolis handle a large amount of livestock into and out of that city, almost 12,000 cars having been handled last year. Recently our line made a connection into the stock yards at Louisville, which gives us stock yard facilities at both ends of the line. A part of the stock cars have been double decked, which increases the revenue per car and reduces cars per train. This results in more economical operation. A special livestock solicitor devotes his entire time to this business. Through the solicitors and with the co-operation of the agents, the traffic department keeps in close personal touch with all lines of industry in the communities served. Frequent meetings of the agents, heads of departments and clerical forces are held, and at these meetings general conditions are discussed and suggestions for improvements in service are made. We also have a special women's committee made up of the women employed by the railway, who meet regularly to discuss public relations and other matters pertaining to the railway.

A prominent industrial traffic manager in the Indiana territory makes these suggestions, from a shippers' viewpoint, as to how the traction lines may increase their freight business:

The business which the traction lines may secure will be divided into two classes:

1. That which has been established and is now moving regularly, either by steam road, traction or truck.

2. New business which may possibly be developed.

As to the first class, it is becoming evident that the freight business must contribute an increased proportion of traction line revenue. The very pronounced increase of late years shows what can be done. The highly organized steam line and unorganized truck are still after the business, but superior service will get the traffic of the future just as it has in the past.

Prior to September of 1917 the scale of class rates in the central territory was very low, but even under the low rates the traction lines laid the foundations for an improved service, which together with an indifference on the part of the steam carriers, enabled them to secure a very substantial tonnage.

The present rates would appear to be remunerative and if the traction lines can build up such a tonnage under adverse circumstances they certainly can do still better under present conditions.

From observation a few suggestions are offered which we believe would attract traffic:

A system whereby expense bills would be in the cashier's hands immediately after the freight is unloaded—a dual waybill—expense bill form might be adopted.

A careful effort to locate the consignee before shipment is placed in storage.

A reasonably liberal policy in handling loss and damage claims more nearly in line with that adopted by the steam roads.

As to the second class the proposition of creating new tonnage appears to be much more difficult than that of getting the established and steadily moving traffic away from competing agencies. A survey of the products of the territory adjacent to the lines might be made and if the lines could jointly form some agency for disposing of these products it might be possible to increase this movement via a joint truck and traction arrangement.

It is generally conceded that in the future development of the freight business on electric railways there is still room for further improvements in working out connecting schedules, the loading of through package cars, the elimination of delays at transfer points, etc. It has been suggested that there should be some organization of the operators themselves to get together frequently to work out through schedules and otherwise improve the service.

The lack of industrial sidings causing the shipper to pay cartage charges to the electric line when he can get a steam road car at his own door and the fact that truck operators make door to door delivery at electric line rates or lower, has created a problem that is not easy of solution. It is known that some lines have under consideration a pick up and delivery system at certain points to meet such competition. Where rates have been established with trucks which act as feeders to the railways this service has been found to be both satisfactory to the shippers and a source of added revenue to the railway. There is opportunity for development here.

In addition to increasing the volume of freight business, much of the success of freight operation depends upon the economies which can be inaugurated in handling, not only at terminals and stations, but also on the road. The selection of motive power suitable to the service to be performed is important and may be the means of materially reducing operating costs, especially labor, through the handling of longer trains, and facilitating movements over the line. It has been found that material reductions in operating costs may also be made by giving special attention to proper distribution of cars, reducing non-revenue or empty car or train mileage, etc., thus adding to net results, which after all is the principal incentive for operating freight service.

That freight business, properly and economically conducted, is not only desirable but highly remunerative needs no further proof than the results obtained by many electric lines in the territory.

What May Be Accomplished by Constructive Publicity*

By W. H. Boyce

Commercial Manager Pittsburgh Railways

METHODS employed in dealing with the public are, of course, largely dependent upon local conditions, although there are certain rules of the game that must be pretty generally observed no matter how small or how large the community served. I think I can best illustrate this point by saying that a southern railway manager told me that he had been taken to task, rather severely, for some of the material that had appeared in the company publication that is distributed in the cars, his Eastern bankers taking the position that the material was not dignified enough and complained because they had not seen therein articles along certain lines that would have interested them. This manager finally convinced his people that if the publication was of a nature not to suit them, it was just exactly what was needed for the type of people in his district and from whom the railway company received a large portion of its earnings. He stated further that if ever the publication did get so it would suit them he hoped they would notify him at once, as he would then have to make some radical changes.

A few years ago a number of companies conceived the idea of employing press agents who attempted, through various methods, to have inserted in the newspapers articles regarding the financing and operation of their companies. The public was quick to sense the origin of such articles. Today it is pretty well understood among utilities that the "paid for" advertising space is the proper method to employ in putting over our case with our public. Of course, I do not mean by that that a company should not give all the information necessary for a reporter of any paper to write an article concerning the operations of the company, but I do mean that all of the facts should be laid on the table.

To my mind all of the public relations work, from the dealing with the individual car riders to the membership of the civic and municipal bodies, in a great measure comes under the head of publicity, either verbal or written. Constructive publicity is publicity with a punch designed to sell the idea of safety, a car ride, bonds, an idea, good will, your operating or financial problems, or what not. It may be put out in the form of really truly news stories, newspaper advertising, copy for car cards, posters, pamphlets, bill boards, novelties and, by no means last, through the spoken word. It is publicity prepared with much care and viewed and criticised by several members of your organization. It is publicly based upon "the truth, the whole truth and nothing but the truth." It is honest and does not forget the human element among employees and patrons. It invites friendliness by being friendly, and solicits constructive criticism. If it is street railway publicity it is in direct competition with the advertising of "Rears-Sawbuck," the United States Mail, the "Well Belephone Company," jitneys, freight and passenger buses, trucks, about fourteen million autos and Fords, and the shoe leather express.

It will let your public know of the mutual concern and responsibility of public and public utility management. It will teach your patron that he is not giving you a certain number of dollars per month or year, but that in many cases you are giving him more dollars in the form of service than you receive in cash from him. It will not speak of educating your public, but it will give all the facts and let the public decide who is right or wrong. It will help secure the hearty co-operation of all employees, but you must keep everlastingly at it.

Constructive publicity for the Beaver Valley Traction Company, with which I was formerly associated, put its employees in such a frame of mind that they loaned the company many thousands of dollars one year when the bond interest was due. It made more courteous, polite, attentive salesmen of our trainmen. It put our public in such a frame of mind that we were able to abolish workmen's two-for-5-cent tickets, go to a straight 5, then a 6-cent, then a 7-cent fare, and finally a revision of zone lengths from 6 miles down to 2 miles (providing a 28 per cent increase in revenue), all without having to face a complaint filed by a citizen, or corporate, or civic body of the thirteen boroughs and townships served.

In Pittsburgh during the past five months it has kept our earnings above the point that we could reasonably expect them to reach, considering the mercantile trade and base industries indices. It has brought crowds to our zoo and art galleries and to the parks.

The Commercial Department of the Pittsburgh Railways was formed because in the judgment of our president and our general manager there existed as much need for a selling organization on a street railway property as in a manufacturing organization. This department is responsible for the quality and quantity of service, public relations and advertising. It is headed by the commercial manager, assisted by a director of traffic promotion, under whom is the traffic department, a director of public relations and his assistants and the general ticket agent and his branch agents. When new cars are purchased or old cars rebuilt this department is expected to make recommendations on body color, interior finish, type of grab handles, seat upholstering and spacing. The superintendent of transportation is furnished information on increasing or decreasing car mileage, the rendering of special service, all special car orders, rates of fare and transfer privileges, and anything that has to do with the sale of transportation.

Through the director of public relations police and traffic matters as well as all complaints are handled, a majority of the latter, no matter how trivial, being adjusted by a personal call upon the complainant. I believe that practice has done more to make friends for us than any other one thing we have done.

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*Abstract of a paper presented at the meeting of the Central Electric Railway Association, Cedar Point, Ohio, July 17, 1924.

Fair Rates and Fair Speaking*

By J. C. Matthieu

Commercial Manager Dayton Power & Light Company

TO INCREASE our light and power business we are striving to give the right kind of service at fair rates and, furthermore, to maintain good, sound public relations. To establish the proper relationship with the public requires the same careful planning and foresight as the other vital policies of your company.

Education of the public is an absolute necessity in the development of satisfactory and sound public relation. Too many people have the wrong impression of our business because they have been misinformed. Education should begin within our own organization for the reason that most of our employees do not understand the problems of the utility any better than the masses, and yet it is largely through the actions and sayings of our employees that public opinion is molded. Consequently, one of our best avenues of approach to the public is well within our control. Take the employees into your confidence and tell them something about your business and they, in turn, will become more interested because it broadens their views, affords new insight and makes them more efficient.

Let the public know what you are doing and what you stand for. If you make an improvement in your service, tell them about it. Use your newspapers. Do a little publicity advertising; you'll be surprised to know how the public responds if you tell the truth. If you have an accident, tell how it happened, the cause, etc. In most cases you are not to blame, so get it to the press as quickly and as straight as possible. The press is anxious for the right information, but you must make it easy for press representatives to get it. Designate some person on whom they may call and feel sure they are getting the right information. The public is fully aware that accidents and interruptions to service will come, and it is only human nature that they should be curious to know the cause. By correctly advising them you gain two points—you satisfy their curiosity and, more important, you educate them in the problems of your business in a manner that is pleasing to them.

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*Abstract of a paper presented at the meeting of the Central Electric Railway Association, Cedar Point, Ohio, July 17, 1924.

Did you ever stop to analyze yourself when you have a tendency to become provoked in a public office? Usually it is due to some minor thing that the employee is doing, perhaps not to you but to the fellow who is in line ahead of you; immediately the entire organization is wrong, at least in your opinion.

Service—that for which we are in business—must be rendered efficiently, courteously and willingly. To do this, our property must be kept in a neat, workmanlike manner; if it is run down in appearance, just so will the entire organization be reflected in the minds of the public.

Possibilities of the Engineering Council*

By Karl A. Simmon

Manager Light Traction Division,
Westinghouse Electric & Manufacturing Company

REALIZING that the diversified operation prevailing in the Central states presents numerous engineering problems that can be solved with the greatest dispatch and reliability among its own members, the association several years ago organized an engineering branch, providing for regional engineering group conferences three or four times per year; these regional groups to be supervised and guided by an engineering council responsible to the executive committee.

It is now universally realized that no matter how brilliant a man may be his knowledge, vision and judgment are improved by contact and exchange of views with his fellows. The opportunity, therefore, for each individual member of the Central Electric Railway Association to become well informed upon transportation matters in general has been set up by his association, and it only remains for each one to make the most of this privilege.

One of the major problems confronting transportation management today is that of developing men capable of assuming and efficiently discharging the responsibilities of departmental heads and their allied supervisory staffs. These engineering and operating group conferences offer one of the very best ways for any individual to become better informed upon operating problems in general.

We are all more or less limited in our vision, although we may not freely admit this and sometimes make the mistake of believing that since we happen to be, for example, in the car equipment maintenance department, and are especially interested in the exchange of ideas with others on that subject, that it is a bore and a waste of time to listen to a discussion on overhead line material or trackwork. There is, of course, some truth in this, but by and large it is an error of judgment, excepting for the man who has no hope or desire to advance in the transportation industry.

One of the basic opportunities of these regional group conferences is to provide a forum for exchange of ideas and practices between the different departments that, of necessity, must co-operate with each other in order to render the right sort of service to the public.

Frequently, the mediocre or negligible results secured by association effort are due to the indifference manifested by the executives of the individual properties. The average man dislikes to tell his manager that he ought to, or wants to attend a meeting, where expense is involved. He assumes that the "boss" knows all about it and will tell him to go and, in the absence of definite instructions, he does not promise to attend, and, frequently, does not attend.

If the best results are expected from these regional group meetings, the individual executives must, by all means, take an interest in them and use these opportunities to find out what value he is getting from them. In addition he is obtaining assistance in developing his own staff personnel.

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*Abstract of a paper presented at the meeting of the Central Electric Railway Association, Cedar Point, Ohio, July 17, 1924.

Getting More Riding*

By G. Bennett

General Agent Traffic Department,
Chicago, North Shore & Milwaukee Railroad

TO INCREASE passenger traffic we must hold our present patrons. This is of the utmost importance, for if new business is acquired while old patrons are permitted to drift away, our efforts in devising schemes for bringing new riders to our line will not show us satisfactory results. The first step toward increasing our passenger business must be in retaining the favor of those patrons who are the foundation for any increase we may promote.

Good, old-fashioned courtesy on the part of all employes is the foremost step toward ultimately bringing traffic up to the ideal of operating capacity. This is just as important as keeping the equipment up to a high standard of operating efficiency. Trains may continually run on time, but if an employee answers a passenger's inquiry in a surly manner, such discourtesy will be remembered, and the fact that the passenger arrived at his destination safely and on time will be forgotten. In other words, a smile and a pleasant word from a ticket clerk, information clerk or train conductor constitute an additional something which induces the passenger to think pleasant thoughts and speak good words for the company.

Operating schedules must be arranged to meet the needs of the community served. Cars and stations must be kept clean and attractive.

When it comes to the actual solicitation of traffic we must remember that this is an age of specialization. To sell service and actually to develop new business it is absolutely necessary at the present time to place your work in the hands of men trained and skilled in the selling profession as adapted to the requirements of particular electric lines.

A great deal of assistance can be rendered to the traffic salesmen and a fine, loyal spirit developed in all employees by offering prizes for suggestions for improvement of service or increasing business. Printed schedules, framed if possible, should be hung in hotels, theaters, lobbies of public buildings and at information booths and at waiting rooms of department stores and at summer resorts. It is well to call on hotel clerks and clerks in information booths to obtain their good will and learn from them of the public attitude toward electric lines.

Frequently valuable suggestions are picked up in such places. Newspapers and certain trade papers should be watched carefully for party movements and movement of prominent individuals. Our experience on the North Shore Line shows that, taking the year round, 65 per cent of special business secured originated from live tips picked out of the newspapers.

Where business houses have employees doing regular traveling, it is well to show the firm members how money can be saved by the purchase of mileage books or other commutation tickets, so that taking the electric line will become a habit. Keep the public at all points along the line informed of amusements or other interesting events which may take place at other points on the line or at points to and from which the line may be available. Many manufacturing concerns and department stores give their employees an annual picnic. These should be solicited for holding at suitable, available resorts served by the electric line.

Business may be picked up through co-operation with motor coach lines by using such lines as feeders. The establishment of through rates with connecting electric and boat lines, and the through checking of baggage with such connections, will result in swinging a great deal of business our way which might otherwise turn to the steam roads.

In conclusion, it may be said that the chief avenues opening to an increase in passenger business are: First, for us to realize that electric lines are occupying a more important position with the traveling public than ever before, and second, that they have many inherent advantages which should be considered in the same way that any merchant takes an inventory of the goods he has for sale.

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*Abstract of a paper presented at the meeting of the Central Electric Railway Association, Cedar Point, Ohio, July 17, 1924.

How the Interurban Serves*

By J. A. McGowan

Secretary and Treasurer Terre Haute, Indianapolis & Eastern Traction Company

When we are asked what interurban electric railways mean to the economic development of the Middle West, we are called upon to state their contribution to the material resources and the production and distribution of wealth, and the means and methods of living well for the individual, the family and the state. In all these respects, interurban railways have been of incalculable benefit in developing and improving rural districts, small towns and cities. They have extended the city well into the country, and have brought the country into the city. They have created a vast amount of new business by the establishment of new industries on account of the facilities rendered for frequent and rapid travel. If we were content to rest upon past achievements, we might "point with pride," as the politicians express it, to what interurban electric railways have already done within the past quarter of a century. From a few miles of interurban railways in the states of Ohio, Indiana, Illinois, Michigan and Kentucky at the beginning of 1900, there are at present in these states more than 10,000 miles reaching like a great network in all directions, uniting rural districts, towns and cities.

In a commercial way these electric railways have been one of the most important factors in adding to the value of farm lands along their routes, and thus creating new values from which have been derived increased taxes for the building of roads, bridges and school houses. Interurban railways have provided the farmer new markets for his produce by means of frequent and rapid transportation. Figures show that in our Middle West states tens of thousands of employees through payrolls, have received millions of dollars, and these sums have been distributed in all directions, adding to the wealth of the communities served. It is safe to estimate that 250,000,000 passengers traveled on interurban railways in the Middle West states during the past year, while about 5,000,000 tons of freight were hauled. A large part of this passenger and freight business was created by the interurban railways.

In a social way the interurban railways have been of inestimable advantage by bringing to the rural districts all the comforts and conveniences of the city, thus improving living conditions, while at the same time the city dweller is enabled to enjoy the health-giving benefits of the farm and country life by means of the interurban railways extending the boundaries of cities well into the country. Interurban railways furnish commuter service to the smaller towns which the steam roads could not supply at such low fares, and they greatly assist the labor situation by affording easy means of transportation between the country and city.

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*Abstract of a paper presented at the meeting of the Central Electric Railway Association, Cedar Point, Ohio, July 18, 1924.

World Power Conference Begins

The most important engineering feature of the Wembley Exposition in London this year is probably the World Power Conference, held during the two weeks from June 30 to July 12. The attendants included distinguished engineers from nearly every civilized country, and the topics embraced not only the generation and distribution of power, but also its application, particularly in the form of electric power, to various industries, including the railway industry.

At the opening session there was an address by the Prince of Wales, who expressed belief in the benefits which would be derived from international discussion and co-operation in power problems. "It is difficult to conceive any modern industry where power in some shape or form does not play a part," he said. "It forms the one great instrument in the possession of man by which he is capable of extracting from nature everything of value that nature can offer and of converting this material wealth into something of immediate use."

State Versus Private Management

A paper at one of the early sessions by Arthur T. Hadley, president emeritus of Yale University, discussed public versus private management of power plants, a subject which he said is becoming more important because of the increased use of water as a source of power, because this water power is a national monopoly, and because of the recent discussion of an organized nationwide power system under the term "super-power."

The speaker divided industries into two kinds, the standardized and the progressive. In the former, such as the post office or municipal water supply, where a large part of the work is routine, honesty in management is an all-important condition, and the capital invested is either small in proportion to the year's business, as in the post office, or subject to easily calculated depreciation charges, as in the water supply. In the other class of industry, conditions are very different. Much depends on management, the amount of capital involved is large, depreciation cannot be accurately calculated, and a delay in scrapping a group of obsolete machines may convert a real loss into an apparent profit. Among the large industries of the present day, the one which is least standardized and most progressive in its character is the electric power industry.

The history of state railroad management should indicate what results we may expect to reach and what dangers we have to fear if electric power development should be placed in government hands. Only in Russia and in South Africa have government-owned railroads succeeded in earning the full amount of interest on the capital invested, and no operating improvement of importance has ever had its origin on a government railroad system. State railroads have been equally backward in commercial improvements.

One advantage urged for government operation of power plants, Doctor Hadley said, is that they can give lower rates because of their exemption from taxation and because they are not trying to make a profit. As a matter of economic theory, both of these methods of lowering costs are wrong in principle. Exemption from taxation is merely a shift of the burden to other shoulders. It also has a bad effect on the morale and efficiency of government industry. As for the second argument, if government enterprises have been barely able to pay current expenses, they cannot make their rates lower by renouncing a profit which they have never had. There is another objection to this idea that municipal ownership will lower rates. In a progressive industry, where rates are at a reasonable figure through competition or the action of public service commissions, profits are made either by developing new business, which allows the plant to be better utilized, or cheapening the cost per unit. In neither case is there any loss to the public, and the experience of every industry with large fixed capital shows that a reduction of unit cost makes a reduction of rates not only possible but profitable. On the other hand, where profits are limited or not permitted, there is no stimulus for introducting new methods which would lower costs and increase sales.

Other Papers

Secretary Herbert Hoover contributed a paper pointing out that since modern power developments cover a field much more extensive than the limits of any one state, there must be a uniformity and continuity in policy between adjacent states. Thus, administrative interconnection might obviate the necessity of federal intervention in interstate power matters.

General Guy E. Tripp discussed the question of public ownership of power resources and said that the adoption of government ownership of a utility of such tremendous proportions as the power industry would impair public credit and introduce a positive political menace.

William S Murray pointed out the advantages of super-power for railway electrification, as it would give not only adequate, reliable and economic power, but would relieve the railroads of building their own power stations and leave only the financing of the rolling stock and contact systems.

A. Hultquist, secretary Swedish Tramway Association, said the first Swedish horsecar line was built in Stockholm in 1877 and the first electric tramway in Stockholm in 1901. Tramways now consume about 1¼ per cent of the total energy production in Sweden, taking in 1923, 35 442,857 kw.-hr. The speaker said there are at present fifteen tramways in Sweden, with a total length of 374.5 km. (234 miles), 672 motor cars, and the number of passengers carried by all lines in 1923 was 200,621,160.

Uno Forsberg, assistant managing director S.K.F., Sweden, gave particulars of the use of ball and roller bearings on the Swedish state railways. The savings in power effected were from 11½ to 14 per cent. In both Sweden and Denmark, practically all of the modern double-truck railroad cars are equipped with roller bearings.

Committee on Welded Rail Joints

THE executive committee of the committee on welded rail joints held a meeting at the Bureau of Standards, Washington, D. C., on July 18. There were present: Dr. G. K. Burgess, chairman; E. M. T. Ryder, vice-chairman; William Spraragen, secretary; R. C. Cram, E. J. McIlraith, H. M. Steward and W. W. Wysor, members of the executive committee, and H. H. George, H. F. A. Kleinschmidt, E. F. Begtrup, representing J. H. Deppler, Dr. H. L. Whittemore and A. P. Way, members of the main committee. Several of the metallurgists and physicists of the bureau were also present.

It was stated by the chairman that the Emery testing machine to be used for completing the tensile tests had been calibrated and that the completion of these tests will be put through as rapidly as certain rush work for the Navy Department will permit.

The bureau has set up the new repeated impact testing machine, and the committee inspected it. Unfortunately, owing to an unexpected amount of rebound of the hammer, the lifting cam was broken, and this will delay its operation for about two weeks.

Arrangements are to be made for securing some test data as to impact at defective joints in actual service car tests by means of the otheograph device recently installed by the General Electric Company in its test track at Erie, Pa. An offer from the General Electric Company to erect and operate the proposed rotary testing machine at cost, was discussed at length, as were several types of test tracks which might be used to secure similar information as that from the rotary device. No action, however, was taken or is contemplated at the present time.

There was some discussion of the matter of specifications for welding wire used for arc weld joints.

The special committee on examination of broken test specimens inspected the specimens which have been broken in the bend test at Purdue University and the drop test at the University of Illinois and the few that were broken in the tensile test before the Emery machine was dismantled. The nature of fractures was carefully described and recorded by sketches.

The chairman appointed a sub-committee of five to draw up a detailed program for the future work of the committee. Test results, comments received on Progress Report No. 2 and the report of the special committee to examine broken specimens will be used by this sub-committee as the basis of proposed program for the third stage of the work, which is that of testing variations in methods and processes which may help to improve the various types of welded rail joints.

American Association News

Executive Committee

AT A meeting of the executive committee held on July 18 aboard the yacht *Tilicum*, off Sandusky, Ohio, a number of committee reports and general policy subjects were taken up and discussed. Those present consisted of President B. I. Budd, F. R. Coates, J. N. Shannahan, W. H. Sawyer, R. P. Stevens, Harry Reid, J. H. Hanna, Cornell S. Hawley and Past-Presidents Charles L. Henry and A. W. Brady. E. P. Waller represented J. G. Barry, M. B. Lambert acted for H. D. Shute and G. C. Hecker represented Secretary J. W. Welsh, who is in Europe as a member of the committee on foreign operation.

Mr. Hanna reported the recommendations of his sub-committee on depreciation, giving an outline of the arrangements contemplated for preparing the material which will be presented for the electric railway industry. The report was discussed by members of the finance committee, and at the request of President Budd several others expressed their views on the proposed method of procedure. The recommendations of the committee were adopted.

Reports from the committees on company membership and on individual membership were presented. It was reported that the total number of individual members of all the affiliated associations now amounts to 746. Several applications for new membership were approved.

Program plans for the annual convention to be held at Atlantic City, October 6-10 were taken up by Chairman Coates, of the committee on meetings and subjects, and Mr. Hecker reported on the tentative arrangements planned by the entertainment committee of which F. H. Gale is chairman. Although the program is still subject to some slight modifications, the executive committee approved it in its present form.

A progress report from the exhibit committee on the amount of space sold for the coming convention showed a total of 65,383 sq.ft. of space sold so far this year in comparison with 55,421 sq.ft. at the corresponding time last year, an increase of approximately 18 per cent. From the rate at which requests for space are being received the committee estimates that the total space taken for this convention will exceed the record figure of 75,681 sq.ft. sold last year.

Some further discussion of the subject of exhibits took place. President Budd expressed himself in favor of encouraging operating companies as well as manufacturers to exhibit cars and other railway equipment. He said that such displays by operating companies will increase the interest and value of the exhibits and should be encouraged. New developments in car design, construction and arrangement, it was felt, should occupy an important part of the exhibit space, so as to disseminate to the industry at large the progress along these lines during the year.

Not only cars and car equipment but also any other new devices or methods developed by operating companies, as well as manufacturers, were considered valuable for exhibition. It was pointed out that many operating companies are backward about calling attention to new developments which they have made, and for this reason they should be encouraged and urged to take part in promoting the progress and development of the industry by exhibiting new methods worked out on their properties. In order to encourage the exhibition of car equipment at next year's convention, the association staff was instructed to make an investigation of available locations for the convention which will be particularly suited to the exhibition of electric cars.

Activities of the publicity committee which have been carried on since the last meeting were described by W. H. Sawyer, chairman. This included distribution of the booklet "Electric Railways Have Come Back" to practically every financial editor in the country. The committee reported that the financial pages of the daily press are reflecting a much friendlier tone toward electric railway securities than has been the case heretofore. Other recent work done by the committee has included wide distribution of the facts regarding several recent events which, it was felt, would give the public at large a better understanding of the electric railway situation. A new series of "Traction Tom" posters have been prepared, and the committee has also taken steps to advise the industry that the publicity material put out by the advertising section is designed to be used in whole or in part by the various operating companies to fit their individual requirements.

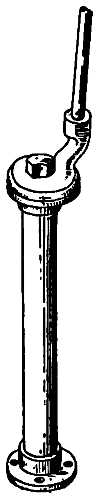
In the absence of Mr. Storrs, Mr. Brady reported for the committee on co-operation with the National Automobile Chamber of Commerce. Recommendations were made in regard to proposed revisions in the constitution of the association to allow membership of bus subsidiaries of railway companies. These recommendations were discussed and the committee was authorized to prepare certain tentative changes in the present constitution so that they may be taken up at the next meeting.

The subject of a contribution to support the work of the street and highway safety conference organized by the Department of Commerce was discussed and was referred to the finance committee. Participation in this work was urged by several of those in attendance.

There will be no further meeting of the executive committee until just prior to the annual convention. In consequence, the next meeting is scheduled to take place on Oct. 6 at Atlantic City, N. J.

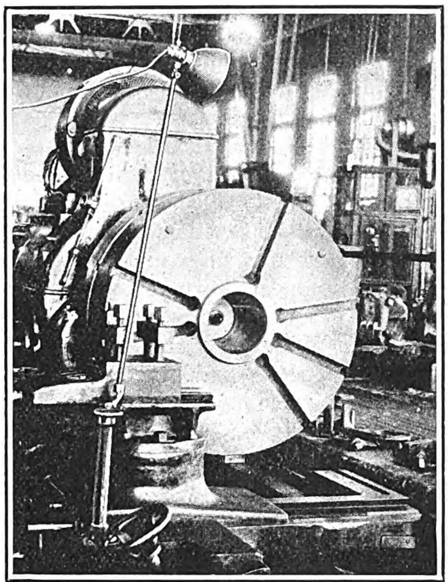
Maintenance of Equipment

Light Support Mounted on Lathe Carriage



Detail of Double Joint for Light Swivel

THE most essential point to illuminate in connection with machine tool work is the cutting tool. As this moves with the carriage where work is done on a lathe, the New York Central Railroad in its Harmon shops has found a supporting bracket for a light mounted on the lathe carriage of advantage. An accompanying illustration shows this mounted on the carriage of a 42-in. engine lathe. The lower part of this consists of a stand constructed of a floor plate with 1-in. pipe upright, about 15 in. long. The top of this upright is also fitted with a floor plate and a double joint is bolted to this. One end of this double joint can rotate about the upright pipe support and the other end clamps the supporting arm of the light, which can also rotate in a vertical plane. The light can thus be arranged in any desirable location properly to illuminate the work. The upright pipe arm which supports the lamp is of $\frac{3}{8}$-in. pipe and the receptacle with shade mounting is attached to the end of this. The bottom part of the floor plate which rests on the lathe carriage has a projecting lug which is fitted in a bracket so that it can be lifted off when the bracket is not required or when work is being installed in the lathe.



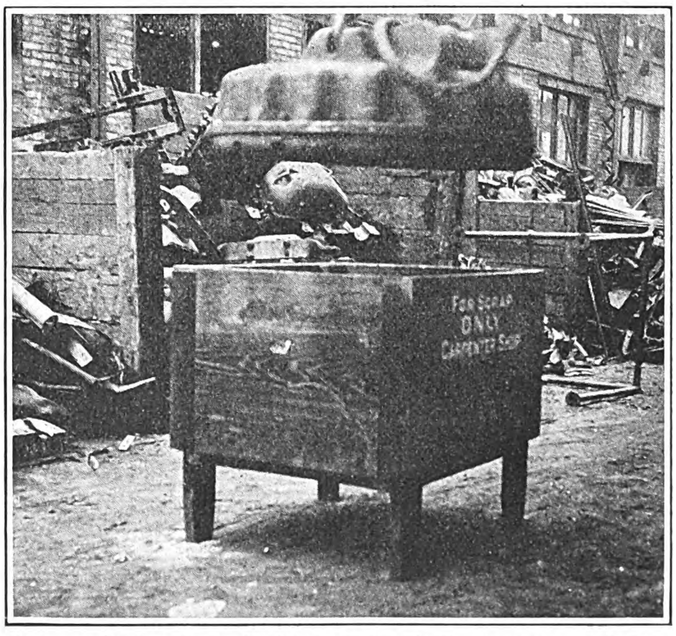
By Mounting This Adjustable Lamp Bracket on the Lathe Carriage Work Can Be Better Illuminated

One Truck Equals Six Men

AMONG the extensive equipment found in the Cold Springs shops of the Milwaukee Electric Railway & Light Company is an electrically driven industrial truck which is used for transporting materials from one department to another. The truck used is a Model K-22 Yale, made by the Yale & Towne Manufacturing Company. This model is a self-loading transportation unit with an elevating platform. It is used to lift loaded skids from the floor, transport them to a given place and then either set them down on the floor or raise them to such a height that they may be stacked in piles or loaded upon motor trucks. Two types of skids are used, as shown in the illustrations.

The operation of this truck has been placed under the supervision of the clerk in the shops department, who has arranged the schedule for its use in such a manner that it travels on a regular route, serving the various departments of the shop at scheduled intervals. The operator of the truck punches a time card at the start and finish of each run and must account for any variation or irregularity in the running time.

This Yale Elevating Platform Truck Operates on a Regular Route and Schedule in the Shops Department of the Milwaukee Electric Railway & Light Company



Scrap Material Is Transported by Truck in Containers of This Type. Scrap Iron and Steel Are Removed by an Electromagnet in the Yard

The schedule is arranged so that the entire shop is covered five times a day, while the machine, forge, and storerooms are given four additional trips. This extra service to these departments is necessary because of the quantity of interchange of materials between these departments.

These trips, particularly the short ones, do not take up all of the operator's time, hence he is available for odd jobs during the layover periods. A careful account is kept of the operation of this truck upon a special account number, and it has been found in the period of operation that the truck has displaced six men who were formerly employed in hauling material from one department to another. It is estimated that not only will the truck pay for itself, but it will make a profit for the shops department.

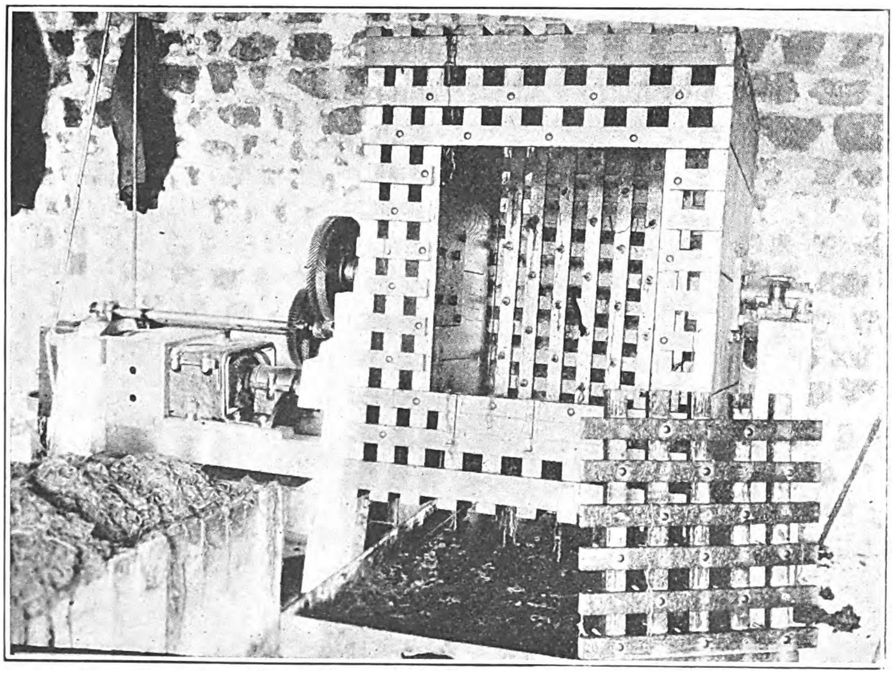
Waste Reclaiming Machine Separates Fibers

As PART of a program for reclaiming old oil and waste which is now being worked out by the Denver Tramway, the machine shown in the accompanying illustration has been built in the company's shop for reconditioning old waste after the oil has been removed and for separating short fibers that tend to pack down and reduce the resiliency of the material after it is put into an oil box.

The machine consists primarily of a box, almost cubical in shape, built of wood slats spaced far enough apart to allow loose short lengths of fiber to drop through. This is mounted on bearings so that it can be rotated by means of an old compressor motor which has been arranged for this purpose. At the front a door, also made of the same type of slats as the rest of the box, is arranged so that it can be readily taken off for charging the box and for removing the reclaimed waste.

Small bolts, projecting into the interior approximately 4 in., are spaced as shown in the illustration so that the waste, as it tumbles about with the rotation of the box, impinges on them and is pulled apart. The short lengths of fiber are allowed to fall through to the pan below. The waste which remains is fluffed up and the fibers straightened out, so that from the standpoint of lubrication requirements it is reported to be practically as good as the new material.

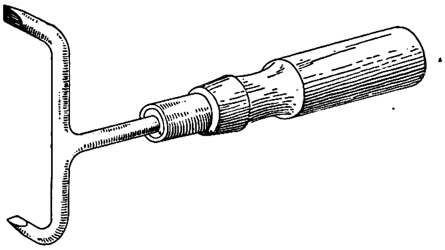
From 50 lb. to 100 lb. of waste is put in for each charge. The box is driven through a reduction gear so that it rotates slowly. Approximately one-half hour is required for this amount of waste to be thoroughly reconditioned.



Waste Is Placed in This Box, Which Is Then Rotated by a Motor

Handy Tool for Removing Inaccessible Screws

A NOVEL type of offset screwdriver is used in the shops of the Illinois Traction System at Decatur for getting at inaccessible screw heads such as those under the insulation on circuit breaker housings and control apparatus. This tool makes it possible to remove the cover from the switch group control apparatus without entirely removing the insulation material which is fastened to the cover. One leg of the offset screwdriver is 6 in. from the other and has the blade set in one direction, while on the other leg the blade is set at right angles to this direction. Thus it is possible, by alternately using one blade and then the other, to remove a screw from an inaccessible place. The advantage of this tool over the ordinary type of leverage screwdriver is that pressure may be applied to the vertical handle at the same time that the leverage action is brought into play.



Handy Tool for Removing Inaccessible Screws

Offset screwdriver has one blade at right angles to the other, while the driver is so designed as to allow pressure to be applied vertically at the same time that a turning effect is produced by moving the other end of the offset.

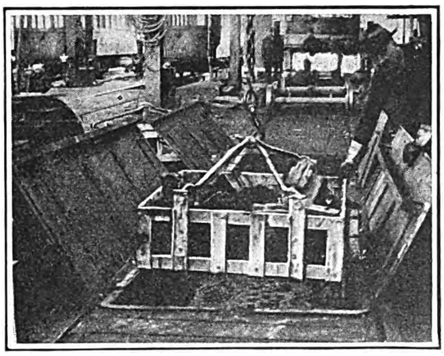
Several of these screwdrivers are in use in the electrical department at the Decatur shops and have proved their worth by speeding up the work of this department.

Underground Cleaning Tanks Save Shop Space

THE arrangement of cleaning tanks used in the shops of the Department of Street Railways, city of Detroit, is of interest because they are located below the floor of the truck shop, where the parts can be readily handled by the overhead crane and where the tanks are near the point at which most of the materials are taken down for cleaning. One usual objection to a location for a tank of this kind in the truck or motor shop is that space is at a premium. For this reason such tanks are frequently located in out-of-the-way corners to save room, but making the cost of handling material to and from the tank excessive.

In the Detroit shops this problem has been overcome as shown in the accompanying illustration. The cleaning tanks are sunk into the truck shop floor and covered by substantial steel trap doors so that when the tanks are not in use the space occupied is available for other purposes. These tanks are used for cleaning both truck and motor parts and are heated by steam coils. The solution is agitated by admitting compressed air and the fumes and steam given off by the hot liquid are taken out with an exhaust blower discharging outside of the building. This eliminates the objection of steam and fumes rising in the shop.

Caustic soda is used as a cleaning material. One tank of the two shown contains the cleaning solution. The second tank contains only hot water for rinsing.



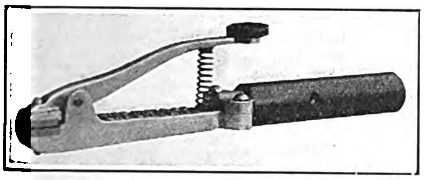
Valuable Space Is Saved in Detroit Shops by Having Cleaning Tanks Underground

The parts are handled in substantial steel baskets. They are dipped into the first tank and allowed to remain for about fifteen minutes and are then removed by means of the overhead crane and dipped into the rinsing tank to wash off the solution thoroughly. When removed from the second tank the parts are transported directly in the baskets to any part of the shop where they may have been removed from trucks or motors. In the event of welding or other repairs being necessary, the parts are transported directly to the points where this work is done. Thus the entire operation is carried out with a minimum amount of handling.

New Equipment Available

Welding Electrode Holder

WITH the object of overcoming heating of the handle, a new type of welding electrode holder has been developed by the Gibb Instrument Company, Bay City, Mich. This holder has heavy aluminum members of high conductivity and an air-cooled fiber handle arranged so that free circulation of air through it will be obtained. The heating of the electrode holder, which is due to the cable connection and is ordinarily a source of trouble, has been eliminated in the new design by the use of outside connections. The light weight obtained with the aluminum castings results in a holder that weighs but 15 oz. and in use does not readily tire the operator. In practice electrode wires are sometimes used up to short lengths and in drawing an arc on the holder the wire may slip and the jaws get burned. The welding electrode holder now developed has removable copper jaws. By depressing the spring under the fiber thumb piece, the copper jaws can be quickly changed when worn out.



Light-Weight Electrode Holder Which Does Not Heat

Danger of Transformer Explosion Eliminated

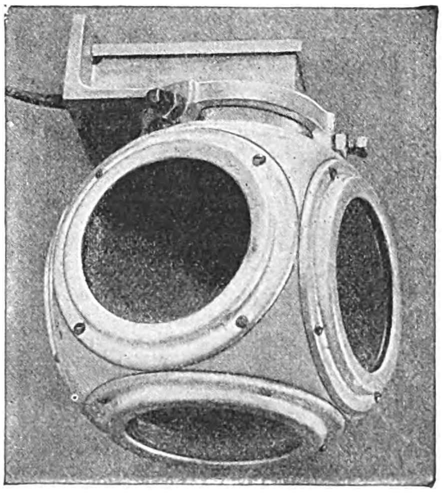
A NEW transformer which eliminates danger from explosions has been developed by the Westinghouse Electric & Manufacturing Company. It has a cushion of nitrogen above the oil surface in place of the air that usually occupies this space. This prevents oxidation of the oil and the risk of fire or explosion of inflammable gas above the oil surface is eliminated.

The oil expands and contracts according to temperature and this expanding and contracting cause what is known as "breathing." When the oil expands it forces some air out, and similarly when the oil contracts, air is drawn in. The air being drawn into the transformer passes through a quantity of deoxygenating and dehydrating chemicals, so that dry nitrogen enters the gas space.

It is possible that some fault under the oil level may result in an explosion of liberated gases, formed when an electric arc causes a breakdown in the oil composition. To prevent them the new transformer has a relief device resting upon the manhole opening in the top of the transformer case. It consists of a diaphragm of thin sheet micarta clamped to a support directly beneath the manhole cover, which rests upon the gasketed surface of the diaphragm support and is free to move upwardly except for its weight and the retarding action of a number of heavy springs. The diaphragm is clamped in position with a ring and a gasket, forming under normal conditions a seal which is gas and oil tight. Thus, if an explosion occurred, the pressure would first rupture the diaphragm and then force the manhole cover open far enough to permit the pressure to be relieved. Then the springs would bring the cover back to its original position quickly, closing the opening. The operation does not permit the discharge of oil or the diffusion of air into the case.

Five-Way Signal Light

A NEW light-weight signal lamp with five lens apertures which allow a variety of directional combinations has just been placed on the market by the Nichols-Lintern Company, Cleveland, Ohio. It is designed to focus a 25 or 40-watt straight filament lamp, but a 50-watt mill type concentrated filament lamp can be used with an extension socket. The lamp socket is fastened to the supporting bracket, so that it is not necessary to remove the lens in order to get at the lamp.



Signal Lamp with Five Lenses

A strong body is provided for the lantern, which fastens to the supporting bracket by set screws. The body can thus be dropped for making replacement. Each lens is fastened with a ring cushioned on a rubber gasket. The body is of cast aluminum and has a weight complete of 6 lb.

The News of the Industry

Municipal Plan Likely

Chicago Mayor Said to Have New Plan Ahead If Present Railway Purchase Negotiations Fail

Mayor William E. Dever has an alternative plan worked out in detail for the city of Chicago's traction needs in the event that all purchase negotiations with the Chicago Surface Lines fail. Whether it means competing lines, a subway built by special assessment or bus lines the Mayor declined to say. His only remark was that he hoped to be able to make a definite public announcement at the next conference as to agreement or disagreement on the price to be paid by the city.

Disagree Over Value of Lines

Thus far there has been no indication that the bankers or the Surface Lines officials have given one inch in their valuation of the lines at $162,000,000. This price the Mayor contends is too high, and he believes it would be rejected by a large majority at the polls. The Mayor would not comment upon the probabilities of a successful appeal to the courts by the lines and the likelihood that the cars would run under the protection of the courts, without reference to whether the city granted or renewed a franchise.

The city and the officials of the Chicago Rapid Transit Company are also at odds in regard to the worth of the lines, the Mayor admitted this week, in the renewed conferences with Samuel Insull, head of the lines, and Patrick J. Lucey, attorney. The Mayor announced that he had invited Mr. Insull to put his ideas about the valuation of the lines into writing.

Legality of Deal Questioned

Whether the city has a right to go into the railroad business outside of its own boundaries was a new question that arose recently in the conference with the officials of the Chicago Rapid Transit Company, operating the elevated lines. A few of the car tracks of the Surface Lines are likewise outside of the city limits, but the question is particularly pertinent because so large a percentage of the elevated tracks are not within the boundaries of Chicago. At present the "L" lines extend through Evanston and Wilmette and the Oak Park "L" and the Douglas Park "L" will, when completed, extend into Forest Park and Oak Park.

The new question which arose necessitated the presence of Corporation Counsel Busch in the conferences. He admitted that at the present time he was not able to give an opinion as to the legality of the city obtaining control of the lines outside of the city. Without these outside traction properties being entirely unified with those within the city, it is difficult to see how either could be operated, and for rate-making purposes the Illinois Commerce Commission placed a valuation of $86,500,000 on the entire system.

Five-Cent Fare Extended by Public Service Railway

The Public Service Railway, Newark, N. J., has filed with the Board of Public Utility Commissioners of New Jersey a tariff rezoning its lines in its central division. The step is voluntary and unless the tariff is suspended by the board, it will give New Brunswick, Perth Amboy, Rahway, Bound Brook, Somerville, Raritan and other municipalities in central New Jersey the same 5-cent fare within their limits as is now in effect in many other cities served by the company.

No transfers will be issued and zones have been shortened, so that on four of the company's principal lines twenty 5-cent zones will take the place of sixteen former 8-cent zones. The company's action follows the request of several of the larger municipalities that the 5-cent fare plan be extended.

"Jolla"fication Edition in Honor of San Diego Extensions

The San Diego Electric Railway and the San Diego *Union* and San Diego *Tribune* made July 1 a red letter day to the San Diego rider and reader by co-operating to issue what is probably the most elaborate transportation edition ever got out by a daily newspaper. The occasion was the opening of the 14-mile high-speed line to Ocean Beach, Mission Beach and La Jolla promptly on the day promised. The project involves some $3,500,000 in all-around extensions and improvements.

Each paper used color plates on two or more pages of a series of sections totaling thirty-two pages with lapovers of traffic material even in the regular news sections. In this record-breaking space the story of the new work and its meaning for a Greater San Diego were told with due emphasis and ability. Scores of pictures showed the map of the new route and its relation to the rest of the system, the catenary construction, the pantograph cars and the various features of the car equipment. A feature was the series of articles from manufacturers of the different items entering into the job, supplemented by the story of how the work was carried out entirely by the company's staff. There were also articles on San Diego railroading in older days and much other matter to give the San Diego car and bus rider a real inside view of the aspirations of the men who serve their traffic needs.

Main Points Settled

Two Issues Still Being Contended by City and Cincinnati Properties—Drafting Franchise Under Way

Several minor points in the proposed settlement of the differences between the city of Cincinnati and the Cincinnati Traction Company and Cincinnati Street Railway remain to be adjusted, but the main issues involved are agreed upon. It is understood that the Cincinnati Street Railway will take back the property from the Cincinnati Traction Company, to which it leased it in 1901 for a period of forty-five years. Work of drafting the proposed franchise has been started.

The existing capital of the traction company, $36,166,050, is to be reduced to $27,230,378 in the event the agreement goes through and the street railway is restored to active operation of the system. Of the existing capital $27,230,950 represents permanent capital and $8,927,100 reducible debt. Under the terms of the proposed franchise the permanent capital will be reduced to $22,761,050, while the reducible debt will be brought down to $4,468,428. The street railway also agrees to expend $1,750,000 prior to 1928.

The agreement also provides for a 7½-cent minimum rate of fare for a period of three years with free transfers as at present. The present rate of fare is 9½ cents.

The two points that still remain unsettled relate to the powers of the Director of Street Railroads and to the repairing of streets between the rails. The street railway has agreed to contribute $15,000 annually toward the maintenance of the Department of Street Railroads. W. Kesley Schoepf, president of the Cincinnati Traction Company, objects to what he has designated the arbitrary powers that would be given to the director and insists that the railway be protected against caprice by the director, so that he could not insist that the company comply with unreasonable demands.

The other objection raised has to do with the interpretation of repairs of streets. Mr. Schoepf insists that the operating company should not be expected to pay for the rejuvenation of the existing "worn-out streets." Under the existing ordinance the operating company is expected to pay only for street restoration. That is, when the traction company is compelled to remove paving to repair its tracks, the paving disturbed must be replaced. The directors of the traction company are in accord with the principle that they assume 50 per cent of the cost of street repairs after the streets traversed by their lines have been rebuilt, but they insist the car rider should not be expected to assume any of the cost of replacing the existing pavements.

Bus Feeders Proposed for New York Rapid Transit Lines

The Brooklyn-Manhattan Transit Corporation on July 23 announced that it was ready to undertake bus operation as supplemental to its subway, elevated and surface service in Brooklyn. In fact G. M. Dahl, chairman of the board of directors, stated that the company had already negotiated for the purchase of ten double-deck buses, to be delivered in two weeks.

The corporation as yet has made no application for franchises for bus routes, but such applications will probably be made as soon as plans can be completed, on the most-needed lines. The rate of fare to be charged and the use of transfers will be matters of individual discussion with reference to particular routes. Until specific bus routes are authorized the B.-M. T. plans to use the new vehicles for carrying picnics and for special trips. Mr. Dahl said:

> We have purchased these buses in order that the public, as well as public authorities, if they deem it wise to authorize us to operate bus lines, may understand that we are in earnest in our desire to render the broadest possible service. Various sections have developed very rapidly in the last few years.
>
> Construction of rapid transit lines into such sections is practically impossible. Such lines would be extensions of existing trunk lines which are already overburdened. Logically any rapid transit construction should be important trunk connections, such as Fourteenth Street and Nassau, so as to allow fuller use in rush hours of existing facilities. Even as to surface railroads, further extensions will take time and need to be carefully considered. The conclusion is inevitable, therefore, that buses should play an important part, in a large system, in extending transportation into growing sections.
>
> It should not be overlooked that houses can be erected and occupied within a year and a new section thus largely populated without adequate transportation. The construction of rapid transit lines is a slow process, taking a good many years from the laying out of a route to the beginning of operation. This company desires to do its part toward securing immediate transit for such sections and thus indirectly encouraging further development of outlying sections.
>
> Bus operation seems the logical and immediate method of furnishing such service. If a transit line is later constructed through a section where buses are operated, the buses can be shifted to another section without loss of capital.

Ticket Rate Increased in Toledo

An increase in fare has been announced by B. C. Adams, president of the Community Traction Company, Toledo, effective on Aug. 3. At that time the cash rate will be 8 cents as at present, but the ticket rate will go to seven for 55 cents. The next jump will be to a straight 8-cent fare.

At the time of the report of operations covering June there was a balance in the stabilizing fund of only $3,475 and it is estimated that the balance has now been wiped out and that the fund is in the red.

The report of Acting Street Railway Commissioner E. L. Graumlich shows a net deficit of $38,497 for June chargeable to the stabilizing fund. Compared with June last year savings of $24,630, due largely to cut in schedules, were shown. It was estimated that one-man cars on the Bancroft line resulted in a cut of $2,000. Feeder bus lines continued to show a loss. A new line was established in connection with the Long Belt serving a territory on Monroe and Central Avenues. In June 4,127,773 revenue passengers were carried, or an average of 137,592 daily. The average for May was 148,708 and for February 182,092.

There is now $180,105 cash in the sinking fund and bonds aggregating $596,000 have been retired.

Suggestions have been made by city authorities that a special election be called to vote upon a proposal to eliminate the sinking fund provision of the Milner ordinance and turn back some $700,000 into the stabilizing, depreciation and maintenance funds. Such a change would have to be approved by the Henry L. Doherty interests.

Abandonment of the Indiana and St. Clair Street tracks with extension of the use of one-man cars is contemplated in the economy program favored by both company and commissioner.

The Common Pleas Court of Lucas County has ruled in favor of the Toledo Edison Company, on its demurrer to the suit filed against it by the city for $200,000 excess power charges paid by the traction company in the last two years. The case will be appealed. The Council may be asked to ratify a power rate of 1.4 cents per kilowatt-hour in place of the 1.7-cent rate now in effect but not being paid due to disapproval by the commissioner.

Buses—Talk of the Hour in Kansas City

Agitation looking toward the installation of buses on the streets of Kansas City, Mo., is becoming louder every day, with the newspapers devoting much space to the subject. A recent editorial in the Kansas City *Star*, entitled "Motor Bus vs. Trolley," calls attention to the advantages which would result from auxiliary bus service under the management of the Kansas City Railways. But it states that if the receivers for the company are not prepared to undertake the project, then some other organization should be permitted to do so.

Answering the suggestion in the *Star's* editorial, Receiver Wilson of the railway said he never had opposed the use of buses as feeders to the railway service. He explained that the company was under the control of the United States court and that the receivers had no jurisdiction. It was his belief that in the plan for reorganization that would follow the termination of the receivership full consideration should be given to bus operation in connection with street railways.

The prospects for the operation of well-organized bus service in Kansas City were referred to in the ELECTRIC RAILWAY JOURNAL of July 5 following the filing of an application for incorporation of the Kansas City Motor Coach Company.

A representative of the Yellow Coach Manufacturing Company on July 22 submitted to the Mayor a survey for the establishment of a bus system in the city. The Mayor said that any such action should start in the Council.

P.R.T. Applies for Eight-Cent Fare

An increase from the present fare of 7 cents with a 6¼-cent ticket rate to an 8 cent cash fare with a 7½ cent ticket fare is sought by the Philadelphia Rapid Transit Company, Philadelphia, Pa., in a new tariff filed with the commission on July 21. The petition states that the reasons for the increase are to enable the company to finance the purchase of 200 new cars, costing about $2,600,000, to replace as many old ones still in service, and to make possible the payment this year of the co-operative wage dividend due the men amounting to about $1,800,000. In return for this grant the company promises free transfers at all junction points where a 3-cent exchange is now needed, except in the central delivery loop—between the two rivers from Pine to Callowhill Street.

INCOME ACCOUNT OF THE PHILADELPHIA RAPID TRANSIT COMPANY

	Six Months to June 30 1924	1923
Operating revenue	$22,596,715	$22,512,399
Operation and taxes	16,317,866	16,448,461
Operating income	$6,278,849	$6,063,938
Non-operating income	260,329	268,374
Gross income	$6,539,178	$6,332,312
Fixed charges	5,201,017	4,996,431
Net income	$1,338,161	$1,335,881

The company has made public a letter sent to Mayor Kendrick and Charles B. Hall, president of the City Council by Thomas E. Mitten, chairman of the executive committee of the company's board of directors. In the communication Mr. Mitten called attention to the fact that the operating income this year probably would be about $2,000,000 less than was expected and further that the increase in the operating revenue for this year would be less than the normal yearly increase in the operating revenue. A comparative statement showing the company's income account and passengers statistics for the first six months of 1923 and 1924 follows:

PASSENGER STATISTICS OF THE PHILADELPHIA RAPID TRANSIT COMPANY

	Passengers Carried		Average Rate per Passenger		Passenger Revenue	
	1924	1923	1924	1923	1924	1923
January	78,297,258	74,857,899	4.79c	4.84c	$3,748,595	$3,625,767
February	73,247,920	68,570,408	4.78c	4.82c	3,501,989	3,305,182
March	79,591,970	79,422,257	4.78c	4.82c	3,802,197	3,827,671
April	78,235,652	76,730,494	4.78c	4.81c	3,743,361	3,694,068
May	81,288,979	82,591,742	4.77c	4.81c	3,880,553	3,973,888
June	75,366,347	77,264,587	4.77c	4.82c	3,591,596	3,723,608
Six months	466,028,126	459,437,387	4.78c	4.82c	$22,268,294	$22,150,187

The company explained the situation:

> Operating revenue for 1924 is short the usual normal increase over 1923 and now bids fair to be more than $2,000,000 less for the year than was anticipated. Men and management have co-operated in making every possible economy, and while there is no doubt that the P. R. T. 6 per cent dividend will be fully earned, a large part of the men's co-operative wage dividend this year must depend upon an increased fare, for which a formal application must now be made.

Injunction Against Baltimore Fare Increase Denied

A permanent injunction restraining the United Railways & Electric Company, Baltimore, from charging a 7½-cent fare was refused the Mayor and City Council of Baltimore by Judge Charles F. Stein in City Court on July 19. The increase in fare was granted by the Maryland Public Service Commission. It became effective on June 1. On May 30 the court refused a temporary injunction and on June 10 heard the application for a permanent injunction.

It was claimed by the city that the increase was unlawful, unreasonable and unjust and that an increase could not be granted without a valuation of the company's property and unless an emergency existed.

In refusing the permanent injunction the court went into all the evidence brought out at the hearing before the commission and found the order of the commission "not unlawful, unreasonable nor unjust, but supported by 'clear and satisfactory evidence.'"

The city officials do not plan to take the case to the Court of Appeals. It was pointed out by City Solicitor Phillip B. Perlman, who acted for the city, that the valuation of the company's property, which was one of the things sought, is nearing completion and an appeal would mean that the case probably would not be finally acted upon before next spring. The increase granted the company is to be in effect until June 1, 1925.

Selma to Have Trackless Car System

Work on installing an up-to-date trackless car system will be commenced within a short time by the Selma Street Railway, Selma, Ala., following permission recently granted by the Selma City Council for the change to a trackless service. According to Hugh Mallory, by this change the railway will not give up any of its franchises.

Two trackless cars will be put into operation to commence with and others will be added to the service later on. It is stated by the company that the fare per passenger will be 10 cents or perhaps less. Each coach will accommodate about twenty persons.

"S. O. S." Week in Chicago Has Encouraging Results

The first week of Chicago's organized fight for safety in the streets—a campaign conducted by the Mayor's safety committee with the slogan "Safety or Sorrow"—has ended with only twelve deaths in the county, as opposed to twenty-two the week previous. The safety drive started with the co-operation of 100 boy scouts who painted the mystic initials "S.O.S." on 5,000 different sidewalk corners. It culminated in the arrest of more than 1,800 motorists in one period of twenty-four hours for various infractions of the newly authorized speed laws.

The Chicago Surface Lines is intent upon doing its share of aiding in safety by the elimination of the left-hand turns. The order of the Illinois Commerce Commission, agreed upon by Surface Lines officials, was embodied in an ordinance recently introduced at the last meeting of the City Council. This ordinance also provides for the extensive rerouting of street cars.

The drive of the city for safer streets has also led to the discussion of a real jay-walker ordinance which would prevent the pedestrian from crossing the street against the direction of traffic. Chief Collins believes that the arrest of a few such offenders would do just as much toward safety as putting the entire burden upon the motorists and the street car motormen.

An ordinance was passed by the park board prohibiting motor buses from passing each other. The park board was convinced that the practice endangered traffic too much, for the ordinary street is nearly monopolized when two buses are traveling alongside of each other. The Illinois Automobile Club strongly supported the ordinance and urged other agencies to pass a similar one. It is its contention that in order for one bus to pass another, it must swing squarely into the center of the street, thereby endangering traffic coming in the opposite direction. Similar action has already been taken by the Lincoln Park commissioners and the ordinance is also being considered by the South Park board.

Competitive Bus Permit Denied

California Railroad Commission Rules No Necessity to Grant Certificate to Pacific Auto Stages—Railway Traffic Declining—Residents Protest Bus Proposal

ANOTHER electric railway has been sustained in its protest against bus operation paralleling its line. This is the San Francisco, Napa & Calistoga Railway, Napa, Cal. A decision of the State Railroad Commission denied authorization to the Pacific Auto Stages, Inc., to operate passenger stages between the town of Calistoga and the city of San Francisco, which as proposed would have paralleled the railway's line between Calistoga, its northern terminal, and Napa, a distance of 28 miles.

The railway company has been involved since the early part of the year in protesting the application of this company. Representative municipal and political subdivision bodies together with promotion organizations generally joined with the company in protesting bus operation in this vicinity.

The Pacific Auto Stages applied for a certificate of public convenience and necessity to operate passenger auto stage service between San Francisco, Napa, Calistoga and intermediate points by way of Sausalito and the Golden Gate ferry, but it did not desire to operate any local service between any two points intermediate between San Francisco and Napa.

"MORE THE MERRIER" POLICY ADVOCATED

Some of the testimony at the hearing suggested a disposition to favor additional competitive operation on the principle of "the more, the merrier," but several of the applicant's witnesses testified that they would not be in favor of the proposed operation by the applicant if this operation would endanger the efficiency, continuity and maintenance on its present schedule of the operations of the electric line, which was regarded by all the witnesses as the main transportation facility and asset of the Napa Valley.

Some of the protesting witnesses showed a sentimental attitude on the part of valley residents against bus transportation. The principal weight of the testimony was directed in support of the adequacy of the existing service provided by the San Francisco, Napa & Calistoga Railway, and as indicative of their concern lest the operation, if allowed, divert such an amount of traffic from the railway that either the continued operation of the railway might be jeopardized or that the present number of scheduled trains in operation daily might be materially reduced. It was pointed out in support of this latter contention that it was by order of the commission that passenger train service of the Southern Pacific Company was reduced in August, 1921, to one train each way per day, since it was shown that additional operation theretofore had been conducted at a serious loss to the carrier.

The principal point of issue related first to the applicant's claim that its proposed operation would provide a considerable saving of time in transportation between Napa Valley points and San Francisco and then to the railway's contention that the proposed operation by the applicant, if authorized by the commission, would seriously damage and possibly jeopardize the value and efficiency of the railway's services to Napa Valley communities, which relied chiefly upon the railway's services and facilities for the transportation of passengers and freight.

The commission stated that from the evidence in the proceeding the applicant had not sustained its claim that public convenience and necessity required its operation, from the standpoint of providing an additional convenience and a considerable saving in time in transportation to and from Napa Valley points from and to San Francisco. The commission then ruled as follows:

> While the commission recognizes that transportation by auto stages has proved to be a matter of public convenience and necessity in many parts of the state. the weight of the testimony offered on behalf of the protesting carrier indicated that a reduction of time schedules would imperil the financial standing of the railway and destroy its ability to maintain its services, which are vital to the community.

C. E. Brown, vice-president and general manager of the San Francisco, Napa & Calistoga Railway, filed exhibits which covered a period of five years to show that 690,732 passengers were carried in 1919 and 397,734 in 1923; that the balance realized in 1919 was $32,952 and in 1923 was $6,850, even though the total expenses had decreased from $271,690 in 1919 to $251,556 in 1923. It was stated that the railway had never paid any dividends, but that it had met all of its interest obligations.

Counsel for the applicant contended that undue weight might be attached to the significance of the railway's declining figures as to earnings and passengers carried in view of the fact that during certain years of that period the abnormal proportion of the traffic was due to Mare Island naval operations.

In conclusion the commission said that with the strong protests from the substantial interests, business and agricultural, of the Napa communities against the proposed operations and against any proposed new transportation which would tend to divert traffic from the railway in its present struggling financial condition and with the evidence tending to show that the applicant's claim to be able to provide a substantial saving in operating time was not well founded, and further, that the applicant's time schedules would not provide for the traveling public the convenience that is now provided by the time schedules of the railway, it did not appear that the Pacific Auto Stages, Inc., had sustained its argument that public convenience and necessity required its operation. The commission therefore rejected the petition.

New Law May Kill Jitneys in New York

That every "jitney" operator is automatically driven out of business in New York State under the provisions of the state-wide taxicab bonding law, which went into effect July 1, seems likely. This will end a long drawn out controversy between traction companies and unlicensed competitors.

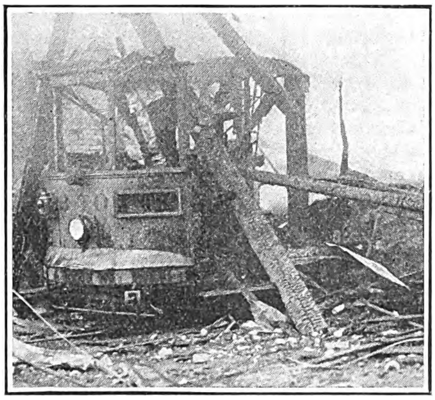
Under the provisions of the new law every person operating a motor vehicle carrying passengers for hire, except a corporation under the provisions of the public service commission law or the transportation corporation law, must file an indemnity bond or insurance policy with the Motor Vehicle Bureau in form approved by the Tax Commission, and the motor vehicle bureau has no authority to issue licenses to jitneys. The driver of the passenger carrying vehicle unless he has the bond or insurance policy will be subject to arrest, fine and imprisonment.

Very few companies doing business in New York State will write insurance or bonds upon jitney operators, and while there are a number of non-admitted companies which do take this class of risks, under a special form of contract, it is stated by the Tax Commission that the bond or insurance policy of a non-admitted company will not be accepted.

Carhouse in Grand Rapids Burned

Fifty-eight Cars Destroyed in a Fire Which Wiped Out Hall Street Plant

Fire on Saturday morning, July 19, wiped out the Hall Street carhouse of the Grand Rapids Railway, Grand Rapids, Mich., together with 58 cars, most of them used in daily service. The loss is estimated at between $400,000 and $500,000 by Louis J. DeLamarter, vice-president and general manager. The company will probably buy thirty one-man, two-man cars at once and hopes to get delivery within from two to three months after the order for the new equipment has been placed. At present the company has 95 cars of its own ready for service, and with eight buses, six of the 25-passenger type and two of the 15-passenger type, and 12 cars borrowed from Saginaw and 3 from Muskegon, it is maintaining regular schedules.

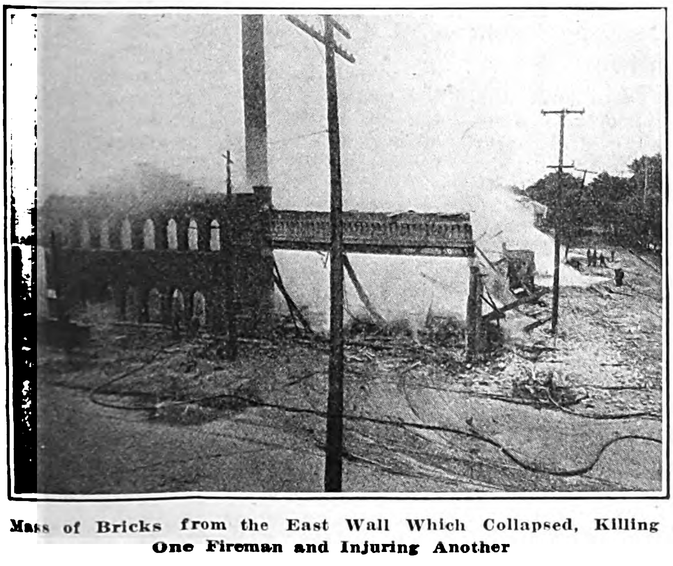


Old 340, the Last of 58 Cars to Be Recognized, the Only One Which Bore Any Resemblance to the Thing Its Maker Had Intended It Should Be

The fire broke out at about 3:30 a.m. By the morning rush hour Mr. DeLamarter and John C. Madigan, traffic superintendent, had established ten-minute service instead of the regular eight-minute service on all principal lines and drivers were obtained for the buses, which had not been in active service for some time. Peak morning service in Grand Rapids requires 102 cars and peak evening 105. By Monday, by using the borrowed cars, the rush hours were efficiently served. The morning of the fire cars in the paint and repair shops, adjacent to the burned carhouse but protected by a fire wall, were put back on the trucks and sent into service. Motor trucks were used to haul these cars to points on the system where the power lines were still in service. By 9 o'clock signs on Division Avenue cars, which pass near the scene of the fire, read: "This Car to the Fire."

For the purposes of narrative the Hall Street carhouse, the largest of the three, faced Hall Street to the south. At the east the building stretched north from Hall Street along Sheldon Avenue about 234 ft. At Hall Street and Sheldon Avenue were the offices, then came the storage yards and at the west side of the building, which was about 139 ft. wide, were the paint and repair shops, protected from the carhouse proper by a fire wall behind which firemen kept the flames and saved the company's valuable repair machinery. In the repair department were stored nine 65-passenger steel cars and two other cars which were dragged to safety.

The Hall Street carhouse was constructed in 1902. Mr. DeLamarter said he did not believe the building would be replaced. Resort will probably be made to storage in the open. Mr. DeLamarter said the loss was fully covered by insurance. It is expected the exact total loss will be determined by adjusters very soon.



Mass of Bricks from the East Wall Which Collapsed, Killing One Fireman and Injuring Another

View of Carhouse as a Huge Section Was Falling. Walls Standing Were Later Torn Down, as Was the Stack

Attempt to Prevent Elimination of Jitney Competition in Akron

Common Pleas Judge L. S. Pardee at Akron, Ohio, has granted a temporary injunction restraining Mayor D. C. Rybolt, Safety Director Carter and other city employees from rerouting jitneys under the terms of a temporary street railway franchise passed by the City Council of Akron on Feb. 25 of this year. The injunction is an attempt to prevent the city from eliminating all jitney and bus competition along the route of the railway lines of the Northern Ohio Traction & Light Company.

Readers of the ELECTRIC RAILWAY JOURNAL will recall that one of the conditions upon which railway service was resumed in Akron last February after a period of suspension of twenty-seven days was that the city would eliminate jitney competition along the street railway and bus lines of the traction company.

Jitney Service Purchased

Buses and service which have been conducted by Yuill & Stiles the past nine years have been purchased by the York Utilities Company, Sanford, Me. The buses will be operated in conjunction with the electric line. The new service will connect with the electric railway.

Judge Sustains Seattle's Suit for Tax Complaint Dismissal

When Judge Jeremiah Neterer of the federal court in Seattle, Wash., recently sustained the city of Seattle's motion for dismissal of the amended and supplemental complaint in suit filed by the Puget Sound Power & Light Company, pending since June 1, the power company lost another skirmish in its battle with the city of Seattle to collect its share of the Seattle Municipal Railway tax for 1919, recently paid to King County.

The power company, under protest, recently paid the tax in full to King County. The company immediately brought action in equity in the United States District Court, in which it attempted to force the city to pay three-fourths of the tax, under an agreement entered into at the time the city purchased the railway from the plaintiff. In a later supplemental complaint, the power company asked subrogation for any liens that the state might have had against the railway property, if the taxes had not been paid. The city entered a motion for dismissal, which the court sustained.

Judge Neterer held, in his decision, that the special railway fund is not liable for the taxes sought. He held also that the tax collectors were within their rights in collecting the tax from the power company, and that the latter still has a right to bring legal action for the tax share.

"Good conscience," said the decision, "does not seem to me, under the circumstances, to dictate subrogation, nor has the court the power so to decree. If the plaintiff so elects, the cause may be transferred to the law side for further proceedings."

Counsel representing the city, state and school district will not map out their plan for action to back up demands for shares of the interest of the delinquent 1919 railway tax until after the next telephone rate case hearing is held, Corporation Counsel T. J. L. Kennedy states. The city has made a demand for its share of $113,725; the school board has filed a formal demand for its share of $48,000, and the state is asking for approximately $34,000.

Action on Buffalo Bus Proposal Again Postponed

Once again the City Council of Buffalo, N. Y., has put off definite action on the applications of the International Bus Corporation, a subsidiary of the International Railway, and the VanDyke Motor Bus Company, Inc., to operate a fleet of double-deck passenger buses in Buffalo at a 10-cent fare. Objections raised by Frank C. Perkins, the Socialist member of the Council of five, forced the adjournment. He has been advocating municipal bus lines.

Melville L. VanDyke, president of the VanDyke Motor Bus Company, which operates a taxi service in Buffalo and the VanDyke International Tours, Inc., between Buffalo and Niagara Falls via the Canadian Boulevard, said his company was ready to invest upward of $1,500,000 in the system and have a fleet of buses in operation within thirty days.

James L. Carpales, speaking for the VanDyke company, informed the City Council that in Detroit, where he managed bus lines, a 10-cent fare is charged and the cost of operation is 9.21 cents for every 10-cent fare. Commissioner Perkins called attention to the fact that only 5 cents was being charged on the New York City trackless lines on Staten Island, but Mr. Carpales said they were losing money.

Sentiment favors the VanDyke company because the International Bus Corporation asks to operate only two lines—Delaware Avenue and East and West Delevan Avenue. The International proposes a 3-cent charge for transfers from buses to connecting car lines and 7-cent transfers from car lines to buses. This would equalize the fare if passengers used buses and cars.

More Buses Purchased by Public Service Railway

Announcement has been made that the Public Service Transportation Company has purchased all of the capital stock of the Gray Bus Lines, Inc., which operates on two lines in Elizabeth, N. J., and on six in Middlesex County as follows:

Elizabeth—Aldene, operating from Bayway to Aldene, five buses.

First Street, operating in Elizabeth, four buses.

New Brunswick—South Amboy, operating through South River and Sayerville, nine buses.

New Brunswick—Perth Amboy, operating over the Lincoln Highway by way of Metuchen, three buses.

Metuchen—Plainfield, two buses.

New Brunswick—Highland Park, two buses.

Lincoln Gardens, operating from Pennsylvania Railroad station in New Brunswick to Lincoln Gardens, two buses.

Livingston Avenue, operating in New Brunswick, three buses.

M. R. Boylan, vice-president and general manager of the Public Service Company, said that the purchase of the Gray Bus Lines was made in accordance with the company's plan of co-ordination of bus and trolley service. It is proposed to combine the operation of these buses with the operation of cars of the Public Service Railway in such a way as to give the traveling public an improved service. He said:

> Our policy is to maintain bus equipment in a high state of efficiency and to substitute the best, most comfortable and latest type of bus for those now in operation as fast as it is economically possible to do so.

Audit Company Believes Fare Increase in Springfield Necessary

At the instigation of the Springfield Chamber of Commerce and with the consent and co-operation of the Springfield Street Railway, Springfield, Mass., the New England Audit Company has conducted an investigation into the affairs of the railway for the purpose of getting light on the justice of its proposal to increase passenger fares from 7 cents to 10 cents cash or 8⅓ cents on the ticket basis, within the primary zone, with corresponding increases for other zones. The move to increase rates followed the arbitration award in favor of a wage increase, and an eight-hour day for the trainmen. The report as submitted to the committee of the Chamber of Commerce sustains in all essentials the position of the railway. The audit company sums up its findings as follows:

> In a word it may be said that the Springfield Street Railway does not suffer by reason of entangling alliances, that it is not overcapitalized, that it has not recently paid excessive dividends (if, indeed, its dividends may be regarded as reasonably sufficient under present conditions), that the management is honestly endeavoring to give the public as good service as circumstances permit; that its overhead expenses are not excessive; that its operating profits have been small; that its present financial condition is not remarkably good; that its expenditures for upkeep of roadway and equipment are above the average; that its operating costs are above and its profits below the average, and that its large operating expenses are not due to mismanagement, but primarily to the high cost of labor, which is a matter beyond the control of the management.
>
> It may be said, also, that if the present quality of service is to be continued a substantial increase in revenue is necessary.

Accompanying the report were diagrams showing how each dollar of revenue was actually distributed by the car company in 1923 and how each dollar will be distributed, according to the estimate of the audit company, if the proposed fare increase becomes effective. The comparison is as follows:

	1923, Cents	Proposed, Cents
Labor	51	54.9
Power, material, paving and other operating costs	28.2	25.8
Dividends	6.8	6.2
Interest	5.7	5.3
Salaries	3.5	3.2
Taxes	3.2	3.0
Surplus	0.8	0.9
Miscellaneous	0.8	0.7

Passenger traffic on the Springfield Street Railway system has declined steadily since April last, according to Herbert M. Flanders, general manager. He says that at the present time passenger traffic averages 12½ per cent lighter than a year ago.

Civic clubs of Springfield opposed to the projected fare increase have appointed a joint committee to investigate the fare proposal in the light of the statement submitted by the New England Audit Company. As a first move the committee requests that any hearing conducted by the Public Utilities Commission on the question be held in Springfield.

Interurban Rates Out of Akron Increased

The Northern Ohio Traction & Light Company, Akron, Ohio, has filed with the Public Utility Commission a new schedule of rates on its entire interurban system, to become effective on Aug. 10.

The new schedule makes no change in fares between Akron and Cleveland and Akron and Canton. Fares on practically all other points on the company's lines are raised from 5 to 40 cents. The average rate of fare now in effect on the interurban system is 2.2 cents per mile. The new schedule provides an average fare of 2.6 cents.

Rate increases from Akron to the following points are:

	Cents		Cents
Bedford	5	Massillon	10
Brady Lake	15	E Greenville	5
Ravenna	15	Navarre	10
Wayland	25	Beach City	25
Newton Falls	20	Strasburg	25
Warren	10	Dover	35
Atwater	20	New Phila.	35
Limaville	15	Midvale	40
Alliance	15	Uhrichsville	40

A new schedule of rates has been filed by the Cleveland-Akron Bus Company and the Northern Transit Company, increasing bus rates between Akron and Cleveland from $1 to $1.40 one way. These rates become effective on Aug. 15.

Another Celebration Sale Helps Railway

During the early part of July a large department store in Galveston, the Clark W. Thompson Company, conducted a sale in celebration of its fourth anniversary. Working along the theory that a large group of prospective customers waiting outside of the store, before the doors were opened to the public, would give the sale an impetus which the management considered necessary for its success, an arrangement was made with the Galveston Electric Company to transport all passengers, between 9 and 11 o'clock of the first morning, free of charge. Car registers were read at the beginning and closing of the period and all passengers hauled were paid for by the department store.

For several days prior to the sale the department store and railway displayed advertisements in the local papers announcing the free ride feature. Cards were distributed by the trainmen to all passengers boarding. On one side was printed:

> Good Morning! No fares collected this trip. Your ride is with the compliments of the Clark W. Thompson Company, whose fourth anniversary begins today. Be sure to drop in and see Galveston's big, modern department store in action.

On the opposite side there was printed:

> The value of our service to you as a shopping convenience is increasing daily. It pays to save. Ride the street cars and you will save the difference. Galveston Electric Company. R. G. Carroll, Manager.

The department store kept an hourly record of sales throughout the day and found that 33 per cent of its business, practically one-third, occurred between 9 and 10:30 o'clock. This was undoubtedly due to a large extent to the free transportation during these hours.

The department store and company inspectors observed three street corners nearest the store and found that, in practically every case, almost the entire load of passengers, after leaving the street car, headed directly for the department store.

The number of passengers hauled during the "free period" was approximately double the number usually hauled during these hours.

From the standpoint of the department store selling its wares and the railway merchandising transportation the plan was highly successful, to say nothing of the advertising both the store and the railway received.

"Public Utility Publicity" Appears

The Public Utilities Advertising Association is getting out a new bulletin called "Public Utility Publicity." The association feels that closer contact is being established between the utility and its users through the printed word and the association's purpose is to extend closer relationship between those responsible for this publicity and advertising for the good of the nation's utilities. In Vol. 1, No. 1, W. P. Strandborg, president of the association, who is connected with the Portland Railway, Light & Power Company, sends a message to the members suggesting contribution to the pamphlet by every member of the association. He says that whenever any member produces an effective piece of advertising copy he should see to it that the secretary of the association or the editor of the bulletin is supplied with a copy of the material in question so that other members may be able to secure and apply it if the copy is pertinent to them. Donald M. Mackie, Jackson, Mich., is the editor of the new sheet. The association is a department of the Associated Advertising Clubs of the World and represents the advertising and publicity departments of all the important public utilities throughout the country with a membership of more than 300.

Moving Billboards Attract Attention

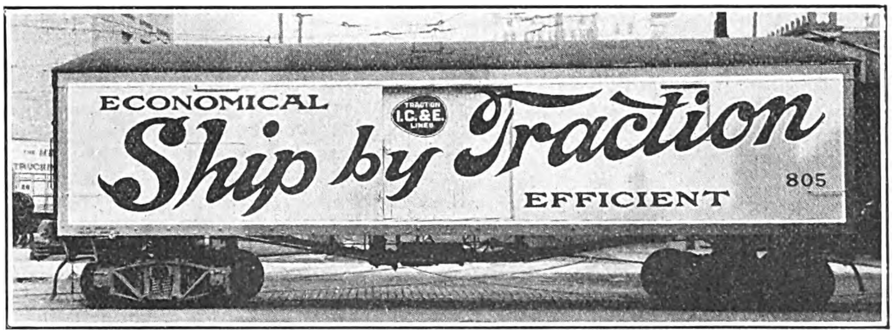
The Indiana, Columbus & Eastern Traction Company and the Columbus, Newark & Zanesville Electric Railway, two of the foremost interurbans in Ohio, have been carrying on an intensive publicity campaign for some time now under the direction of Arthur V. Bland. One day somebody in the public relations department, of which Mr. Bland is the head, asked why freight cars of the companies should be allowed to travel through the country with nothing painted on them but the name of the companies and a few other letters more or less meaningless to the general public. Others in the department could see no reason for it, and then, like all inspirations—good ones—up popped the idea "billboards on wheels."

Arrangements were immediately made for running a "test car." Car No. 805 on the I., C. & E. lines had the distinction of making the first trip in her "novelty" suit of clothes. This was last spring. The freighter hadn't traveled through the country more than a day when testimonials began to pour into the publicity offices of the Red Egg Lines commending the officials on their excellent and feasible idea.

As a result of the practical application of the moving billboard idea the Red Egg Lines have profited by covering a greater amount of territory in their advertising at a very small expense for labor and materials. Instead of twenty or thirty stationary billboards scattered throughout sections of the country which the lines cover, billboards to which the public must come in order to read, the company is now carrying the billboards to the public and covering every inch of territory in which the Red Egg Lines operate.

The billboards on the "test" car—for both sides of the car have been utilized—are 38 ft. long and 8 ft. high. One billboard has an orange vermillion background; the letters are blue and outlined in white, while the border is blue. The other billboard has a yellow background with an orange border and the letters are done in blue.

Before the test car had been on the road a week it was decided to put billboards on every freight car on the system. Work was begun at once on about eighty cars, including motorized freight cars.



Freight Car Converted Into Moving Billboard

News Notes

Syracuse Bus Lines Files Application.—The application of the Syracuse Co-ordinated Bus Lines, Inc., for a certificate of public convenience and necessity for the operation of a motor bus route in the city of Syracuse was filed July 22 with the Public Service Commission. An early hearing will be held by the commission.

Hearing Deferred.—The hearing before the California Railroad Commission on the application of the Peninsular Railway, Palo, Alto, to abandon its franchise has been postponed. It is said that the company is trying to solve the transportation problem itself and that trackless trolleys are being considered.

New Franchise Proposed in Burlington.—A proposed new franchise of the People's Gas & Electric Company and the Burlington Railway & Light Company, Burlington, Iowa, will come before the Council for indorsement soon. The proposal to grant the franchise will be determined by voters of the city in an election that may be held within the next two or three months. The franchises under which the companies are operating do not expire until 1925.

Extension of Wage Scale Approved.—The proposal to extend the present wage scale for all electric light and power, electric railway and bus employees of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for an additional six months has been accepted by the labor adjustment committees of the Employees' Mutual Benefit Association. The present standard of wages will end Dec. 31, 1924.

Bus Connections Planned.—Residents of Glenhaven Community, Portland, Ore., are promoting a plan to establish a bus service from East Eighty-second Street to connect with the new bus line which the Portland Electric Power Company plans to start early in September. At present Glenhaven people who live midway between lines traversed by the Montavilla and Rose City trolley cars have to walk long distances to secure transportation.

Paving Agreement Settled.—The fight of long standing between the Janesville Traction Company and the city of Janesville, Wis., over the question of new track and paving work as outlined in a city ordinance was finally brought to an end when the company agreed to pay for the cost of paving covering that section of its system from Mineral Point Avenue to Highland Avenue, providing it would be relieved of future paving costs upon the same street from Highland Avenue to the end of the tracks, which cost will be borne by the city. The agreement is in accordance with the suggestion made by Lewis E. Gettle, chairman of the Wisconsin Railroad Commission. The Washington line has been operated at a loss and the company applied for permission to abandon railway service and substitute buses, but with the reaching of an agreement the bus plan will be sidetracked and cars will continue to operate.

Efficient Work Rewarded.—For the efficient performance of their duties during the year ended May 31, 1924, 300 conductors and trainmen of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., who operate articulated car units shared in a bonus totaling $11,500. The individual award varied from $75 to $25. Upward of 30,000 inspections of the work of individual men were made and efficiency ratings given each conductor or trainman every time his work was inspected.

One-Man Cars Satisfactory.—Eleven one-man cars, placed in service by the Johnstown Traction Company, Johnstown, Pa., are giving better service than the two-man cars, according to a report by General Manager Shannon. Since one-man cars have been used not an accident has been reported. No complaints have been received by the company relative to safety or service of the one-man cars.

Parking Laws in Effect.—St. Louis, Mo., put into effect limited non-parking on three of the main downtown streets effective June 27. This action was taken after the Associated Retailers and other downtown merchants had protested against complete abolition of parking in Olive Street between Third and Twelfth Streets. Under the new rules no parking is permitted on Olive, Locust or Washington Avenue from Third to Twelfth between the hours of 7 a.m. and 10 a.m. and 4 p.m. and 6 p.m.

Utilities Hearing Deferred.—The rehearing on the petition of the Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col., for the abandonment of certain lines has been continued until Sept. 15.

Fare Petition Filed.—Application for extension of the single city car fare zone along the 1⅜ miles of line between Hillsdale and Lorraine Cemetery, Baltimore, was filed with the Public Service Commission recently by Linwood L. Clark, attorney. The city limits are three blocks beyond the terminus of the line and Attorney Clark alleges this line was discriminated against by the commission in a recent decision. The line is owned by the Lorraine Electric Railway, but is operated by the United Railways.

Bus Permit Granted in Jamestown.—The Public Service Commission recently granted a certificate of convenience and necessity to the Jamestown Motor Bus Transportation Company, Inc., for the operation of a motor bus line in Jamestown, N. Y., in accordance with the terms of the consent granted by the city May 14 last. A contract entered into between the bus company and the Jamestown Street Railway with respect to the issuance and acceptance of transfers is approved. The bus service will not compete with the street railway system but will supplement it. The company is also authorized to issue $50,000 common capital stock, the proceeds of which are to be used for the purchase of eleven auto buses of the pay-as-you-enter type and other equipment necessary for the operation of the line.

Wants Stage Certificate Revoked—The Warren Company, operating the Warren-Bisbee Railway, Bisbee, Ariz., is seeking the revocation of the permit held by the Warren-Lowell Stage Company on the contention that it cannot compete with the lower fares charged by the stage line. The stages serve Bakerville and Cochise. Unless the stage company's certificate is revoked, or unless the railway's fares are increased, the application declares the street car company will be forced to discontinue operation. The pending application resulted from permission granted the stage company some time ago to reduce fares from a basis of 10 cents to 5 cents per passenger. The car rate is 5 cents.

Wants Bus Operations Stopped.—General Manager Page of the Worcester Consolidated Street Railway officially notified the selectmen of Leicester, Mass., recently that the company would cease trolley service between Worcester and Leicester unless the bus line between these points ceased activities.

Divided on Bus Project.—At a recent hearing in Tacoma, Wash., conducted by F. R. Spinning, assistant director of the Department of Public Works, on the application of the Tacoma-Day Island Transit Company for a certificate of public necessity to operate a bus line between downtown Tacoma and Day Island, via Regents Park, University Place and Oakland Station, a division of public opinion was evident. Residents along the route of the proposed loop bus service expressed a desire to have the bus line, but feared that institution of bus service might mean immediate or eventual discontinuance of railway service. W. G. Rounds, superintendent of the Tacoma Railway & Power Company, stated that his company did not plan to discontinue its line to University Place, but that it would not consider any extension of the line. The bus company proposes to install a service of six trips a day on loop service each way; the railway is now operating on hourly schedule with half-hourly service at rush hours. The case was taken under advisement.

Test Case on Bus Ordinance.—To determine the constitutionality of Duluth's new bus regulatory ordinance, a test case will be instituted in the Minnesota Supreme Court by bus owners as an appeal from the order just handed down by Judge H. J. Grannis in which he upheld the bus ordinance in an action brought against the enforcement of it by bus operators. The ordinance requires all city buses to stop operating on the streets of Duluth where cars of the Duluth Street Railway are furnishing service over a double-track system. To facilitate the progress of the proposed test case, one of the bus owners caused himself to be arrested for violating the provisions of the ordinance. The voters of the city recently approved at a referendum election the passage of the bus ordinance, but the buses continued to operate under the protection of a temporary injunction granted by Judge Bert Fesler. Buses ceased operating in Duluth on July 16 on double-track car streets when Judge Grannis, in his decision dismissing the temporary injunction, held that the question involved was one not of city policy but city power. He emphasized the fact that the city was violating no contract right by enforcing the ordinance.

Help Needed in Muscatine. — The Clinton, Davenport & Muscatine Railways system in Muscatine, Iowa, will be turned over to the bondholders and creditors unless an increase in fares is granted, according to a communication which the company prepared for the City Council. The company applied six weeks ago for an increase in several classes of fare but a compromise was reached by which the only increase was to be from 50 cents to $1 for the identification cards issued monthly which permits the holder to ride for 5 cents. This ordinance was passed, six to two, on the first two readings but at the final reading an unexpected deadlock occurred which was broken by the negative vote cast by Mayor Joseph Miller. In its communication to the Council the company says that unless remedial action is taken the entire system will be immediately turned over to the creditors.

Interurban Depot Ready.—The Pacific Northwest Traction Company will shortly open its new interurban depot at Mount Vernon, Wash. The depot is complete, having large waiting rooms, ticket offices, administrative offices, restaurant and check rooms. A covered arcade between track and waiting room is provided for the stages.

Bus Permit to Parallel Railway Denied.—The New York Transit Commission has issued an order denying the application of the Nassau Bus Line, Inc., for a certificate of convenience and necessity to operate a bus line between Beach Twentieth Street and Coronado Beach, Borough of Queens. The Board of Estimate of New York City recently granted the company a new franchise covering a route which differed greatly from the route previously operated. A part of the new route parallels the line of the Ocean Electric Railway and the commission refused to issue a certificate of convenience and necessity on the ground that the bus line would duplicate unnecessarily the service provided by the Ocean Electric Railway.

Fare Increase Denied.—The Tennessee Railroad & Public Utilities Commission has declared void, effective July 1, 1924, the demand of the Memphis Street Railway for the right under a formal order of the commission to increase its rate of fare to 10 cents cash or 8 cents where tickets are purchased. By another decree of the commission which reduced the rates of the Memphis Power & Light Company to commercial users the Memphis Street Railway was benefited to the extent of about $40,000 a year. Back taxes due the city from the Memphis Street Railway are settled on an 85 per cent basis, bringing $132,000 into the city treasury.

Seven Buses Operating.—The Ottawa Electric Railway, Ottawa, Canada, has at present a fleet of seven buses operating from the end of its line to serve Ottawa East, Eastview and Beechwood Cemetery.

Foreign News

A Collection of 13,000 Tram and Bus Tickets

At one time or another everything under the sun has been collected—birds' eggs, stamps, coins, furniture, prints, autographs and cigar-bands—but it has remained for a doctor in Berlin, Germany, to collect street car tickets.

The collection comprises 13,000 different street car, motor and horse-bus tickets from every country in the world, collected in twenty-five years of travel and correspondence. The tickets are now mounted in eight large albums. They cover a period of seventy years, or as long as traffic has been organized.

A view of the albums gives a most comprehensive picture of the world's traffic. The tickets are in every conceivable shape, oblong, square, round, hexagonal and octagonal. The gayest colors, bright reds, greens and yellows, are from the Latin countries. Italy strikes an original note with bi-colored street car tickets. The dullest colored tickets are those of the Berlin buses.

One interesting index to the psychology of a nation and its officials is found in the varying sizes of the tickets. For years and years Germany and Austria were content to use street car tickets of a normal size. But with the period of money inflation, when the million and billion mark notes were as common as pennies in America, the size of the street car tickets increased to double and triple former sizes.

The vagaries of the war are often noted in the tickets. During the war Warsaw street car tickets were printed in German and Polish, supplanting the former Russian and Polish print. Then, after the war, the original languages returned.

The Only Fair Way for Traction Magnates

Type large and bold should really be used to record the fact that on July 12, on the historic old St. Andrews Golf course of Scotland, James Dalrymple, general manager of the Glasgow Corporation Tramways, was defeated by a narrow margin by William F. Ham, president of the Washington Railway & Electric Company, Washington, D. C., at the ancient and honorable game that has made Scotland famous for three reasons, two being golf and poetry.

Cable reports indicate that notwithstanding a high wind and other disturbing factors, including a huge gallery, both players appeared fresh at the end of the gruelling match as they trudged off arm in arm to adjourn to a quiet little lodge adjoining the course to partake of the newly imported American orange juice. There they joined in a toast to "The States and All Good Traction Men" and the "Bonnie Heather and All Good Tramway Men."

Washington advices indicate that Mr. Ham's handicaps at the Chevy Chase Club at Washington will be considerably revised because of his international victory at St. Andrews.

Electrification in the French Pyrenees Progresses

The Pyrenees district of southwestern France seems likely to be the next in line for electrification, following the projects in the Alps. The work will be largely in connection with the steam lines of the Chemin de Fer du Midi, running from the western Mediterranean to the Bay of Biscay. The hydroelectric power now being developed in that district as a part of what is commonly referred to as the "general electrification" of France is to be employed as the source of energy. In the Departments of the Haute-Garonne and the Tarn several interurban or feeder lines formerly operated by steam have been converted. Where already applied, the company's annual report states, running time has been reduced and traffic and receipts increased.

The work of general electrification on the main lines is advancing rapidly. In the valley of the Ossau the central station of Hourat is ready for operation. On the lines designed for 150,000 volts there is 60,000 volts in use awaiting the installation of the high-tension transformers. The equipment of the line from Dax to Toulouse is completed and all trains running between Montrejeau and Pau are run electrically. The service is to be extended as the 100 electric locomotives on order are delivered.

The equipment of the line running to the Spanish frontier from Bordeaux to Hendaye will be completed during the present summer and that from Dax to Bordeaux in 1925. The branch lines to Pierrefitte, Bagneres de Bigorre and Arreau are already operated electrically and that to the celebrated watering place of Louchon will be in operation during the present summer.

To dispose of its excess current the company has entered into an agreement with the Société des Producteurs d'Energie des Pyrenees-Orientales for its partition among industrial users of the region.

Single-Deck Cars in Glasgow.—Single-deck cars have recently been introduced on an extension of the Glasgow Tramways, where, on account of low overhead bridges, it is impossible to use the usual double-deck cars. Some of the new cars are of one-man type.

Wants to Extend. — The Compania Americana de Luz y Traccion, which operates a tramway service in Asuncion, Paraguay, South America, will petition the government for a concession to extend its service to the town of Ita, a distance of 44 km. from Asuncion.

Financial and Corporate

Michigan Line Reports Increase in Gross

Reorganized Property Reports for Year —First Five Months of 1924 Not Up to Expectations

The Michigan Electric Railway, Jackson, Mich., has been operating only since Dec. 1, 1923, it having purchased the property of the Michigan United Railways at foreclosure sale. In order that the stockholders may be more fully informed as to the property owned and its earnings, the directors decided to submit a report showing results from operation for the full year of 1923 compared with the year 1922. This they did on June 27. The earnings for 1922 and 1923, after giving effect to the reorganization of the property and the purchase of equipment formerly operated under lease, are as follows:

	1922	1923
Gross Earnings:		
City divisions	$1,548,204	$1,566,072
Interurban divisions	1,187,976	1,154,070
Total	$2,736,180	$2,720,142
Operating expenses and taxes	2,123,668	2,200,408
Gross income	$612,512	$519,734
Interest and other fixed charges		408,542
Net income available for depreciation and dividends		$111,192

The volume of business done during 1923 as a whole compared favorably with the previous year. The number of passengers carried showed an increase of 394,016 on the city divisions and a decrease of 121,942 on the interurban division. The result is a net increase on all divisions of 272,074 passengers. The freight hauled showed an increase of 68,071 tons over the 1922 tonnage.

Comparative figures showing the volume of passenger and freight traffic handled during the past five years are as follows:

REVENUE PASSENGERS CARRIED

Calendar Year	City Divisions	Interurban Divisions	Tons of Freight Carried
1919	28,316,990	2,819,617	82,499
1920	26,197,444	2,670,422	97,646
1921	22,079,871	2,248,326	63,046
1922	22,987,533	1,818,134	91,482
1923	23,381,549	1,696,192	159,553

President G. R. Cottrelle says that the freight business provides a source of revenue capable of considerable development owing to the industrial growth of the territory served and the demands for fast freight service. Joint freight tariffs and through rates have been established with other lines east and south. These have opened a field for developing a very large freight business originating at or destined to western Michigan points and Chicago and eastern Michigan points. It is expected that the tonnage handled during 1924 will be considerably in excess of that handled during 1923.

Efforts are being made by the management to improve earnings through the further development of freight business, and arrangements have been made recently to extend the interurban passenger and freight service between the cities of Owosso and Flint by operation in connection with motor bus and freight trucking companies. It is hoped that these steps will bring about some favorable results, but it is unlikely that earnings will greatly improve unless more rigid legislation is adopted with respect to the indiscriminate parking of automobiles in the business sections of the cities served, and to the operation of competing motor buses between points now furnished with adequate transportation facilities by the company's interurban lines.

Under the plan for the reorganization of the former Michigan United Railways and the purchase of the property of that company by the Michigan Electric Railway $600,000 principal amount of twenty-five year first and refunding mortgage 5 per cent gold bonds were sold at 85 and accrued interest and the proceeds thereof largely provided for the cost of additions and improvements.

Mr. Cottrelle says that the passenger business of the company during 1923 suffered from the effects of the increased use of private automobiles and 'unregulated bus competition. These factors, together with wage increases granted to maintenance of way employees on April 1 and to trainmen on June 1, resulted in a decrease in gross income. He explains that the capital structure of the company was formed early in 1923 at the time negotiations were begun for the acquisition of the Michigan United Railways property and says that it was based on the thought that the maximum effect of competition and high operating costs had been reached and it was expected that the company would experience no difficulty in earning its interest and other fixed charges by an ample margin. These expectations, however, have not been fully realized.

A further decline in passenger business took place during the first five months of 1924. Gross earnings for that period, as compared with the same period of the previous year, decreased $60,064, while operating expenses and taxes increased $41,428, making a decrease of $101,493 in gross income. The total gross income for the five months' period amounted to $179,658 while interest and other fixed charges were $179,883, leaving a deficit of $325 before allowance for depreciation, and nothing for the financial requirements of the company.

The sum of $443,028 was expended during 1923 for additions and improvements, principally expenditures for passenger equipment formerly leased by the company.

The properties of the Michigan Electric Railway are made up of four city systems, viz.: Kalamazoo, Battle Creek, Jackson and Lansing, a line between Owosso and Corunna, and two interurban divisions which operate between Kalamazoo, Battle Creek and Jackson, known as the Southern Division, and between Jackson and Lansing, Lansing and St. Johns, and Lansing and Owosso, known as the Northern Division. The total distance measured as single track is 258 miles, of which 107 miles comprise the city systems and 151 miles the interurban systems. The majority of the interurban mileage is high-speed third-rail operation.

Plans Ahead for Reorganizing Another New York City Road

An extension for one year of the terms of the five-year deposit agreement with holders of receiver's certificates of the Second Avenue Railroad, New York, has been requested for the holders by the committee for receiver's certificates. The agreement expired on July 15 and the committee desires to extend it to July 15, 1925. Plans for the reorganization of the company and the termination of the long-standing receivership have virtually been completed, and may be effected in the late summer or early fall. For the fiscal year ended June 30 the company will report net earnings of approximately $75,000, or practically three times the income reported for the previous year. The company operates 27 miles of track.

Receiver for Kaw Valley Line Operating in Kansas

Harry C. Jobes, Kansas City, Mo., investment broker, has been appointed receiver of the Kansas City, Kaw Valley & Western Railway, a 40-mile line which operates between Kansas City and Lawrence. He was named on July 18, following the announcement made some time ago by J. J. Heim and Col. Karl D. Klemm that the company would be unable to meet the principal of mortgage bonds that come due on Aug. 1. The situation confronting the company was reviewed at length in the ELECTRIC RAILWAY JOURNAL for July 19, page 103.

Brooklyn Income $4,000,000

For the year ended June 30, 1924, the net income of the Brooklyn-Manhattan Transit System and affiliated companies, Brooklyn, N. Y., was $4,022,065. The comparative statement of earnings and expenses for the first year of operation since the lifting of the receivership is as follows:

	—Year ended June 30—	
	1924	1923
Total operating revenues	$40,072,326	$36,899,294
Total operating expenses	26,499,408	23,841,876
Net revenue from operation	13,572,917	13,057,417
Taxes on operating properties	2,738,946	2,596,505
Operating income	10,833,970	10,460,912
Net non-operating income	950,455	*
Gross income	11,784,425	*
Total income deductions	7,762,360	*
Net income	4,022,065	*

* Figures omitted afford no comparison on account of receivership and reorganization.

Earnings of Chicago Surface Lines Up for Six Months

The earnings of the Chicago Surface Lines showed a sharp falling off during June, both in comparison with May and with the corresponding month of last year. Earnings for the six months of 1924 are considerably above the similar period in 1923.

Gross for the six months was $29,309,810. This compares with $28,319,890 in 1923, according to a compilation of the monthly figures for the period. The residue receipts for this year to date totaled $5,777,537, against $6,654,932 in 1923. The company's 45 per cent of divisible receipts shows the most drastic shrinkage. For six months of this year that item has run $621,440, or almost half the $1,012,766 in the corresponding period of last year. For June gross earnings declined and expenses increased over last year. Residue receipts for the month were $927,970, against $1,032,947 in May and $1,099,202 in June, 1923.

Confident $5,000,000 Will Be Refunded

At a recent hearing on an agreement between the city of Philadelphia, Pa., and the Philadelphia Rapid Transit Company, whereby the city undertook to attempt to recover more than $5,000,000 of Federal income and excess profits taxes paid by the company, Thorpe D. Nesbit, counsel for the railway, stated that under the new Federal income tax law public service corporations in which municipalities have an interest were no longer exempt from the payment of income taxes.

The city entered into an agreement with the company some time ago to make every effort to collect upward of $5,000,000 which the company has paid, with the stipulation that if the money is recovered it would be used for extensive improvements to the transit company's service. Commissioner Clement expressed approval of the agreement and confidence that the city could recover the $5,000,000 taxes. Commissioner Clement said he understood that if the city recovered the taxes the company would thereafter be relieved of the payment of income taxes, but Mr. Nesbit said that the law had been amended so that it no longer contained the tax-exempt provision. It was Mr. Clement's deduction that Congress believed a mistake had been made in including the exemption in the 1916 act. The new work that is proposed, should the taxes be refunded, includes extensive track and line improvements and over-passage and connecting platforms.

Elmira Company Carried More Passengers in 1923

The year 1923 was the best in the history of the Elmira Water, Light & Railroad Company, Elmira, N. Y., both in point of gross and net earnings and in general expansion of property and the territory served. This statement was made at the annual meeting on June 5. The company's city lines carried more passengers in 1923 than in either 1922 or 1921 and there was not a single serious accident to any passenger. In addition, a great deal of construction work was accomplished during 1923. The city's paving program compelled the company to do extensive trackwork and to permit better service to a large and rapidly growing section. South Main Street was changed from a single-track to a double-track system. The gross revenue of the railroad department in 1923 was $495,509, against $510,646 in 1922 and $502,951 in 1921.

Abandonment Date Advanced

The Public Utilities Commission of Ohio has advanced to Aug. 1 the date for abandonment of the lines of the Cleveland & Eastern Traction Company. The first date set was July 1, but the road continued to operate. Robert D. Beatty, general manager, has explained that the road may continue to operate after Aug. 1 by asking for another extension. He is reported to have said:

> It merely covers our present position, in which we are operating full service, although we have been permitted to quit. We can't really say what we will do. Of course, we will not keep on indefinitely.

The interurban line gave service in the morning and evening for a few days, but the Utilities Commission ruled that service would have to be given on full schedule or not at all. So the line has been operating as usual. The road is 40 miles long. It runs from Cleveland to Gates Mill, Chardon and Middlefield.

Payment of Stock Dividend by Brooklyn Road Approved

The New York Transit Commission, in an order made public on July 18, will permit the Brooklyn City Railroad to issue $4,000,000, par value, of additional capital stock for the purpose of acquiring rolling stock worth that much which the company has been using, but which belonged to the Brooklyn City Development Corporation, organized a few years ago for the purpose of buying the cars involved.

The action of the Transit Commission was based upon the recommendation of Gen. John F. O'Ryan, member of the commission.

The Brooklyn City Railroad operates surface lines independently of the Brooklyn-Manhattan Transit Company (subway lines). In explaining the effect of the issue of this additional $4,000,000 of capital stock, Gen. O'Ryan said:

> So far as the car-riding public is concerned, certainly it is beneficial to have the petitioner (Brooklyn City Railroad) acquire these cars. So far as the stockholders are concerned, there is no claim that the stock is not worth the amount paid for it. There is no question involved as to the protection of shareholders or investors.
>
> Both in form and substance as well as in effect the $4,000,000 was spent for the purchase of cars and the stock is to be issued for the $4,000,000. If the stockholders were to buy $4,000,000 of stock for that much cash and the railroad bought the cars direct, there would be no question as to the propriety of the transaction. As it is, the petitioner is accomplishing precisely the same thing by another means and I fail to see any legitimate objection, either legal or practical, to the method taken. The effect of the transaction is to use money which might have been paid to the petitioner's stockholders in dividends, to purchase new equipment.

The transfer of the rolling stock to the Brooklyn City Railroad includes the plan to dissolve the Brooklyn City Development Corporation, thereby simplifying any future financial transactions of the Brooklyn City Railroad.

The stock will be issued pro rata in

Conspectus of Indexes for July, 1924

Compiled for Publication in this Paper by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	July 1924 **6.98**	June 1924 **6.97**	July 1923 **6.92**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	June 1924 **158**	May 1924 **161**	June 1923 **171**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	June 1924 **221**	June 1924 **220**	July 1923 **212**	Sept. 1920 **232**	Apr 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	June 30 1924 **3.26**	May 31 1924 **3.63**	June 30 1923 **6.39**	July 31 1920 **11.12**	June 30 1924 **3.26**
U.S. Bank Clearings Outside N. Y. City (Billions)	June 1924 **15.26**	May 1924 **15.83**	June 1923 **16.12**	Mar. 1920 **16.54**	Feb. 1922 **10.65**
Business Failures Number Liabilities (millions)	June 1924 **1,561** **38.05**	May 1924 **1,744** **70.04**	June 1923 **1,366** **51.71**	Jan. 1924 **2,258** **109.1**	Sept. 1923 **1,280** **27.50**

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Eng. News-Record Construction costs 1913 = 100	July 1924 **214.4**	June 1924 **216.8**	July 1923 **222.1**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	June 1924 **144.6**	May 1924 **146.9**	June 1923 **153.5**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	July 1 1924 **12.23**	June 1 1924 **12 29**	July 1 1923 **13.09**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	July 1 1924 **185.5**	June 1 1924 **183.8**	July 1 1923 **188.7**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	June 1924 **142**	May 1924 **141**	June 1923 **144**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	June 1924 **161.7**	May 1924 **161.4**	June 1923 **160.1**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

the form of a dividend to present holders. The stock is $10 par value and the number of shares will be increased from 1,200,000 to 1,600,000. Thus the distribution amounts to a 33⅓ per cent dividend.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week $1,000 of Manhattan Railway, New York, 4 per cent bonds, due 1990, 62½ per cent.

Jersey Properties Merged. — The Board of Public Utility Commissioners of New Jersey recently approved the merger of the Central Passenger Railway and the Venice Park Railroad, both of which operate in Atlantic County. The amalgamation will be known as the Central Passenger Railway.

May's Return Falls Short. — The Seattle Municipal Railway's total receipts in May were $512,028. This amount took care of all operating expenses and fixed charges, but fell short some $40,000 of the amount due to be set aside for bond redemption. Rolling stock and roadbed repairs made heavy inroads on the receipts. With an allowance of $57,093 for depreciation, operating expenses totaled $428,902 and interest payments aggregated $63,069.

Trust Notes Sold.—Putnam & Company, Hartford, have sold at 100 and interest $450,000 of 6 per cent equipment trust gold notes of the Connecticut Company known as series "G." The notes were dated June 15, 1924. The equipment for the payment of which these notes were issued consists of fifty convertible steel passenger cars each with a seating capacity of fifty-six passengers, and twenty convertible steel passenger cars each with a seating capacity of thirty-two passengers. The equipment was purchased in 1918 for the company with funds furnished by the United States Housing Corporation. By the payment of the loan to the United States Housing Corporation, the interest charges of the company will be substantially reduced.

Sale of Property Announced. — The property of Buffalo & Lake Erie Traction Company will be offered at public sale in Buffalo on Aug. 27. The road has been in receivership for several years. It is said that one syndicate of bondholders composed of Erie, Pa., men will bid for the lines in that city and that another syndicate headed by New York men will bid for the company's interurban lines, which extend for more than 100 miles.

Alabama Line Files Petition for Abandonment.—The Alabama Traction Company, Albany, Ala., petitioned the Alabama Public Service Commission on July 15 for authority to discontinue railway service in Decatur and Albany. It is set out in the petition that the revenues from the railway are not sufficient to meet the operating expenses. Before filing the petition officers of the company and citizens of Decatur and of Albany met with A. G. Patterson, president of the Alabama Public Service Commission, and disdiscussed ways and means of continuing the railway service, but failed to arrive at any definite conclusion. The railway system consists of 7.65 miles of line connecting Albany and Decatur, Ala., with local lines operating in both towns.

Abandonment Allowed. — New York State Public Service Commission has authorized the Peekskill Lighting & Railroad Company, Peekskill, N. Y., to abandon its railway line from Peekskill to Five Mile Turnpike near Lake Mohegan, owing partly to unprofitable operation. The public will be served by a bus line which already parallels this route. The application has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Financing Approved.—At a meeting of the stockholders of the Detroit United Railway, Detroit, Mich., stockholders ratified a $10,000,000 five-year, 6 per cent bond issue. The bonds under this issue, as previously indicated in the ELECTRIC RAILWAY JOURNAL, have all been sold.

Southern Pacific Reported After Phoenix Railway.—One of the local papers at Phoenix, Ariz., said recently that rumor had it that the Southern Pacific Company intends to buy outright the Phoenix Railway and put the property in first class shape as a feeder for the Southern Pacific in reaching territory in the valley now not covered by that railroad. The belief was expressed that the electric railway lines would be extended to include territory not now covered by any railroad operating into Pheonix. The local system at Phoenix includes 32 miles of track.

Farmers Buy Illinois Line.—A deal was closed on July 9 by which Kendall and Grundy County farmers will probably buy, for $89,000, the Fox & Illinois Union Railway, Aurora, Ill. At a hearing before the State Commerce Commission auditors for the commission reported that the road had made $8.35 above operating expenses in seven months. Out of that amount was to come interest on the investment, on borrowed money and taxes. The owner of the road, Arthur Evans, Aurora, had sought permission of the commission to cease operations and to sell the railroad for junk.

Net Income Decrease.—For the twelve months ended June 30, 1924, the Brooklyn City Railroad, Brooklyn, N. Y., had a net corporate income of $2,052,119, against $2,256,025 for the period ended June 30, 1923. Passenger revenue advanced from $11,715,964 to $11,774,929 for the twelve months ended June 30, 1924. Operating expenses and taxes advanced from $9,315,234 to $9,610,002 for the period ended June 30, 1924.

Final Rites in Behalf of Interborough-Metropolitan Holders. — The protective committee representing the holders of the 4½ per cent bonds of the Interborough - Metropolitan Company, New York, is notifying holders of receipts for certificates of deposit that on July 22 it will make a final distribution of $3.85 for each $1,000 principal amount of bonds represented by series A receipts for certificates of deposit, and $1.54 for each $1,000 principal amount of bonds represented by series B receipts. The notice marks the final step in the winding up of the affairs of the protective committee, and virtually also those of the old Interborough Consolidated Corporation, which went into bankruptcy. Since the Interborough Consolidated, as the old holding company for the Interborough Rapid Transit Company properties, went into receivership and the assets were sold under foreclosure, the preferred shares which before the war were worth around $90, and the common shares, which were sold at about a third of this figure, dropped to virtually nothing.

Creditors Will Share in Sale Receipts. —Recognized creditors of the defunct Lorimer & Gallagher Construction Company, Chicago, Ill., builders of the Southern Traction line from East St. Louis to Belleville, Ill., are to share pro rata in approximately $250,000 according to an order of distribution handed down by United States District Judge English in East St. Louis on July 9. The bulk of the money was derived from the sale of part of the traction line in 1919. This amount represents about one-third of the sum originally sued for by the contracting firm in 1914 when it filed its claim against the traction company for construction work. Both construction company and traction line subsequently passed into the hands of receivers.

Additional Million Offered. — The National City Company, New York, N. Y., is offering at 98½ and dividend to yield 7.10 per cent an additional $1,000,000 of 7 per cent cumulative prior preferred stock of the Portland Electric Power Company, Portland, Ore. The stock is known as series "A." The proceeds of the sale will reimburse the company for construction expenditures including those made in connection with its new hydro-electric station, the first unit of which is expected to be in operation on or about Aug. 1, 1924. The company supplies electric light and power to the city of Portland, operates the city and interurban railway lines in Portland and adjacent territories.

Coatesville Road Sold. — Jacob V. Pennegar, Coatesville, has sold the property of the Coatesville Trolley Company, a little more than 1 mile in length, on First Avenue, Coatesville, to Charles E. Cooke, William P. Kelly and Thomas L. Hodge, Philadelphia, for $6,500. The rails were laid several years ago but the road never was operated and finally the court appointed a receiver from whom Mr. Pennegar purchased the line. It is said that the purchase really means the acquiring of the road by the West Chester Street Railway, which will establish a connection with its line at Coatesville and operate the branch to the Bethlehem Steel Mills at Hustonville.

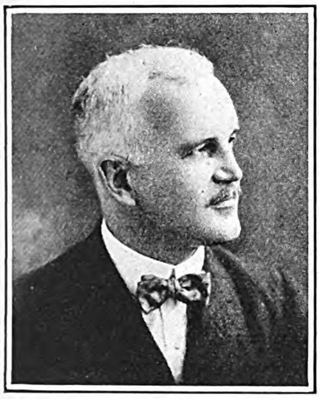
Balance Decreased.—Gross earnings of the Virginia Railway & Power Company, Richmond, Va., during the first six months of 1924 were $5,248,508, an increase of $49,013 over a similar period a year ago Operating expenses and maintenance, taxes and rentals reached $3,283,174 and the balance after subtraction of interest and sinking fund charges was $593,347. This balance is $92,670 less than it was a year ago. For June the balance was $75,581, a decrease of $23.572 compared with June, 1923.

Personal Items

Horatio Bigelow Advanced

Company at Charleston Appoints Its Former Publicity Agent New Superintendent—Career of Twenty Years

Horatio Bigelow has been appointed to the position of superintendent of railways of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C. He has been connected with this company since November, 1922, when he took the position of publicity agent. In August, 1923, he was appointed superintendent of transportation and in January, 1924, he assumed the duties of acting superintendent of railways, replacing F. A. Bailey, resigned.



Horatio Bigelow

Mr. Bigelow began his street railway career with Stone & Webster in 1900. After he was graduated from Harvard University in 1899 he went to work as a chainman for the Seattle Electric Company. After filling various minor posts with this company he rose to the position of assistant superintendent at Seattle.

But early in 1903 a better opportunity presented itself with the resultant assumption by him of the managership of the Ponce Electric Company, Ponce, P. R., which was also under the Stone & Webster management. After a year's experience at Ponce he returned to the United States to manage the three independent companies operating the street railway in Norwich, Montville and New London, Conn. He remained in this capacity after these companies were taken over by the Connecticut Company and together with additional lines were made the New London division of that company.

At this time Mr. Bigelow served as vice-president of the New England Street Railway Club. He severed his connection with the Connecticut Company in 1908 and was instrumental in organizing, building and operating the Thames River Specialties Company, in which he served as vice-president and treasurer. This company manufactured paper board. In 1917 he moved to the South and bought a plantation near Charleston, S. C., which he operated as a stock farm.

James P. Argersinger, Johnstown, N. Y., has been elected vice-president of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., succeeding the late John G. Ferris.

B. S. Jerman was recently elected president of the Carolina Power & Light Company, Raleigh, N. C. He succeeds the late Col. Charles E. Johnson. The Raleigh company operates 14.33 miles of railway and does general lighting, power and gas business.

Capt. Francis J. Sinnott has been appointed to the post of secretary to the Board of Transportation of New York City. He was named by John H. Delaney, chairman of the board. The captain won his rank during the war while serving with the 302d Engineers of the Seventy-seventh Division. He was associated as an engineer with Frederick Cranford, New York, from 1913 to 1917. The new board, a city body, is charged with the work of planning and carrying out future rapid transit construction. Its functions are not regulatory in their nature.

Malcolm M. Inglis, who has been manager of the public utilities of Port Arthur, Ontario, for nine years, is leaving that position to become assistant to the vice-president of the Brazilian Traction, Light & Power Company, at Rio de Janeiro. The utilities at Port Arthur are under municipal control. They include the Port Arthur Civic Railway, a system of 19.5 miles, operating in Port Arthur and connecting with Fort William.

John H. Ryan, a member of the staff of the insurance firm of Johnson & Higgins, was recently appointed a member of the Westchester County Transit Commission. This commission was organized for the purpose of collaborating with the commissions of New York City and New Jersey charged with the work of supervising transit affairs and the various railroad officials in working out a plan to provide improved facilities for the commuters to New York City from Westchester County, New Jersey and Long Island. Mr. Ryan a few years ago was a division superintendent of the Brooklyn transit system. He entered the service of the Brooklyn Heights Railroad in 1897 as a conductor. He received many promotions becoming assistant superintendent at Ridgewood, Bergen Street and East New York Depots. Following his transfer from the operating department to the position of shop foreman at the East New York surface shop he resigned to join the insurance firm of Marsh & McLennan. Here he was assigned the task of investigating railroad properties in all parts of the country. Following his attachment to the United States Shipping Board during the war he became associated with Johnson & Higgins.

A. C. Moorhaus Enters on New Duties at Cincinnati

After serving with the Scioto Valley Railway & Power Company, Columbus, Ohio, as secretary and purchasing agent for twelve years, A. C. Moorhaus left that utility on July 1 to become purchasing agent for the Union Gas & Electric Company, Cincinnati, Ohio, and its subsidiaries. Mr. Moorhaus is a Cincinnatian by birth. He was graduated from the University of Cincinnati. As purchasing agent for the Union Gas & Electric Company, he also will have jurisdiction over the purchases of the Union Light, Heat & Power Company and the Cincinnati, Newport & Covington Railway, Covington, Ky., Ohio Gas & Electric Company, Dayton Gas Company, Dayton, Ohio, Hamilton Service Company, Hamilton, Ohio, Columbia Power Company, Columbia Gas Company and the Columbia Gas Supply Company. Mr. Moorhaus has his headquarters in Cincinnati. He succeeded C. J. Bauer, who died several months ago.

A. C. Moorhaus

Obituary

Charles J. Jones, chief engineer and superintendent of way and structures of the Chicago, Aurora & Elgin Railway, died at Wheaton, Ill., on July 10. Mr. Jones was sixty-two years of age. He was formerly chief engineer of the Lorain Steel Company, but resigned in 1899 to become chief engineer for Cleveland interests which purchased the local and the interurban electric railways in and around Aurora and Elgin, Ill., and which later built the double-track, third-rail, high-speed interurban line between these cities and Chicago. Mr. Jones was in charge of the surveys and construction. He was for a time both chief engineer and superintendent in charge of operation.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Brill Service Car Operated by Boston & Maine Railroad

The J. G. Brill Company, Philadelphia, has built a gasoline motor car which was recently put into service by the Boston & Maine Railroad on the Ashburnham branch, between South Ashburnham, on the main line of the Fitchburg division, and Ashburnham, a distance of 2.64 miles. It is a single-unit car with a seating capacity of forty passengers and a baggage department. It is of all-steel construction, lighted by electricity and heated by a hot water system. Another type gasoline motor car has been ordered by this road from the Sykes Company, Kenosha, Wis. This car is expected to be delivered within a few weeks. The car will accommodate thirty passengers. If the Boston & Maine Company finds this method of operation economical or profitable more of the gasoline cars will be used instead of steam trains.

New Reo Sedan Type of Cross-Country Bus

Completely equipped in every respect and planned for utmost comfort to the slightest detail, the new Reo sedan type of cross-country bus has just been announced by the Reo Motor Car Company. It adds to the equipment designed for long-distance bus travel.

Long and low in lines and brightly finished in body coloring and trimmings, this new model is the latest addition to the Reo line. The same special bus chassis is used for the new Reo bus as is used in connection with the pay-enter type which was announced by the Reo company a few months ago. This chassis was especially designed for use in passenger transportation. The only change is the fact that 32x6 single tires are regular equipment on both front and rear wheels in this latest model, whereas dual tires are standard on the pay-enter type.

The body of the new de luxe Reo sedan bus is divided into three compartments—driver's, passenger's and smoking compartment. Exclusive of the driver's compartment, the bus has a minimum seating arrangement for sixteen passengers and is, therefore, the rated capacity of the bus. However, when permissible under the law, a maximum load of twenty passengers may be carried on the seats. It is not intended to carry any standees, and no provision has been made for them.

A bus of the new type started from New York on July 22 on a run from coast to coast.

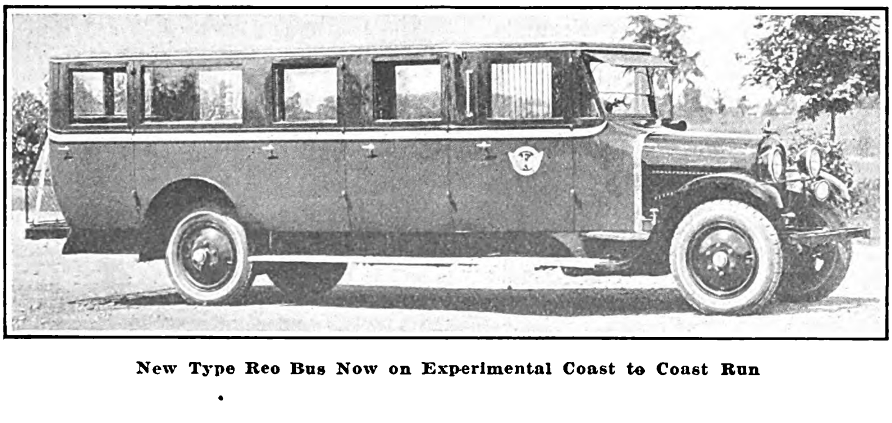
Metal, Coal and Material Prices

Metals—New York	July 22, 1924
Copper, electrolytic, cents per lb.	12.80
Copper wire base, cents per lb.	14.50
Lead, cents per lb.	7.05
Zinc, cents per lb.	6.27
Tin, Straits, cents per lb.	48.50
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	2.00
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.70
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons.	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.00
Weatherproof wire base, N. Y., cents per lb.	17.00
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.03
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.625
Turpentine (bbl. lots), N. Y., per gal.	$0.83

Rolling Stock

Seattle, Wash.—The Board of Public Works will take bids until Aug. 15 for furnishing not less than 75 nor more than 125 cars in accordance with plans and specifications approved by the board on June 27. Bids must be accompanied by a certified check or bond in an amount equal to 5 per cent of the total bid.

Grand Rapids Railway, Grand Rapids, Mich., suffered the loss of sixty-five cars on July 19, when its largest carhouse took fire. The company will purchase new cars to replace the loss. Among the cars which burned were eight large steel cars made by the St. Louis Car Company, nine Birney one-man cars, ten 30-ft. maximum traction truck cars, three 30-ft. Kuhlman cars, five St. Louis 28-ft. double-truck cars, seven old Brownell cars, four open cars, three single-truck box cars, a private car, the "Honolulu," used in the old days for advertising purposes, four snow scrapers, two sand cars and two snowplows.



New Type Reo Bus Now on Experimental Coast to Coast Run

Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, has replaced its old bus equipment, consisting of Studebakers, with a fleet of eight Fageol intercity model safety coaches. Six have arrived and have been placed in service on the Springfield and Columbus run. As soon as the two remaining coaches arrive, through service will be completed to Dayton, Ohio. The bus subsidiary is known as the Dayton & Columbus Transportation Company.

Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, has purchased two intercity Fageol safety coaches for use in limited service from Columbus, Newark and Zanesville. They will be operated in addition to the present fleet of seven Studebaker cars out of the new bus terminal. The bus subsidiary is called the Columbus & Zanesville Transportation Company.

Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., has ordered ten double-deck buses. Delivery is expected about Aug. 1. The details of the proposed service in which the new vehicles will be used have not been definitely determined, but as indicated in the article elsewhere in this issue it is the intention of the company to use the buses in the rapidly developing outlying sections.

Morris County Traction Company, Morristown, N. J., will receive some time next month the ten cars referred to in the ELECTRIC RAILWAY JOURNAL, issue of July 5, 1924. The detailed specifications of the cars are as follows:

Date order was placed	June 3, 1924
Builder of car body	Osgood-Bradley
Type of car	Double-truck safety
Seating capacity	48
Total weight	3,000 lb.
Bolster centers, length	21 ft. 4½ in.
Length over all	41 ft. 10 in.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 4½ in.
Height, rail to trolley base	11 ft. 1½ in.
Body	Semi-steel
Interior trim	Cherry and white mahogany
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Roller
Axles	A.E.R.A. Standard E2
Bumpers	Non-climbing
Car signal system	Faraday
Car trimmings	Natural mahogany
Control	G.E., K 35
Curtain fixtures	Crown
Curtain material	Fabrikoid
Destination signs	Hunter
Door operating mechanism,	National Pneumatic
Fenders	Pilot type
Gears and pinions	General Electric
Hand brakes	Peacock staffless
Heater equipment	Consolidated
Headlights	Golden Glow
Journal bearings	M. C. B.
Lightning arresters	Aluminum
Motors	G.E. 258, outside hung
Exterior finish	Enamel
Registers	Ohmer
Sanders	Air operated
Seats	Heywood-Wakefield
Seating material	Rattan
Step treads	Kass
Trolley base	Ohio Brass
Trucks	Osgood-Bradley
Ventilators	Osgood-Bradley
Wheels	26-in.
Special devices, etc.	Full safety equipment
Power-saving device	Economy meters

New York, August 2, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

Henry W. Blake and Harry L. Brown, *Editors*

Volume 64
Number 5

Co-ordinated Effort Furthers Modernized Freight-Handling Program

MODERNIZATION in facilities for handling freight by electric railways took a long step forward with the completion of the new consolidated freight terminal in Indianapolis, which is described in this week's issue of ELECTRIC RAILWAY JOURNAL. This terminal represents the results which can be accomplished by co-operative effort on the part of the electric railways entering an important community. The improved facilities will allow the roads entering this terminal to handle shipments with more dispatch and at a lower cost.

Lack of proper terminal facilities has been one of the factors which have received most careful consideration by those roads which have been endeavoring to increase their freight business. A consolidated terminal, furnishing facilities for the various electric railways entering a given community, would offer a solution in many other cities where conditions are comparable with Indianapolis.

A terminal of this kind offers the opportunity for favorable financing. In the case of the Indianapolis development, the combination of several railways made possible a separate terminal company which issued securities, which were sold readily on favorable terms to cover the cost of the buildings and grounds. It is to be hoped that the example of the Indianapolis roads will inspire others similarly situated to consolidate their efforts. The result will be twofold; first, in increasing terminal facilities, thereby increasing the speed and reducing the cost of handling shipments, and, second, in raising, in the eyes of shippers, the general status of electric railways as freight carriers.

Joint Interurban Tariffs Needed to Get Business

THE need for establishing a joint class rate freight tariff over all connecting electric railway lines, to be issued by the Central Electric Traffic Association, becomes more apparent with the completion of the new consolidated freight terminal in Indianapolis, which was described in the article referred to above.

The success with which such tariffs have been put into effect for passenger traffic over the lines in the central interurban territory, comprising the roads in Indiana, Ohio and Michigan, serves to emphasize the lack of published joint freight tariffs in even this progressive interurban district.

Shipment of freight is a profitable source of revenue for electric roads. This has been repeatedly demonstrated. The lack of joint tariffs is a serious obstacle to the normal growth of this business, while, on the contrary, establishment of such tariffs will stimulate its general development.

In many industries the advantages of co-operative effort have been repeatedly demonstrated. The electric railway business is no exception. In addition, a shipper will be far more interested in the possibilities of shipping to various points on an extensive network of lines covered by a joint tariff than in the facilities offered by any one of the lines individually.

For a number of years most of the electric railways in this territory have issued joint freight tariffs, naming class rates to points on other lines, but in many instances rates are not the same in the opposite direction. This results in more or less discrimination. Furthermore, when a large distributing concern located in such a center as Detroit, Louisville, Columbus, Cleveland or Indianapolis wishes to obtain rates on inbound traffic it must secure the individual tariffs from some 20 or 30 roads, with rates compiled in various ways and often on different bases.

A joint class rate tariff issued by the Traffic Association would be a great help in placing through electric railway freight service before the shipper to its best advantage. The publication of such a tariff, while slightly greater in cost than the present individual publications of the lines, would be worth many times the price. The plan, which has been recommended by the Central Electric Traffic Association, certainly deserves the support of all the interested roads.

Protecting Passengers' Eyes from Injurious Glare

GOOD car illumination pays and it is worth while for a railway to spend money to secure it. Although the duration of the exposure is shorter the eyes of the street car riders should if possible be as carefully protected from injurious glare as are the eyes of a man working in a factory. This danger, of course, did not exist to any great extent when carbon filament lamps were used. But with the substitution of bare tungsten filament lamps the situation was altered, and the need of improved lighting is becoming more widely appreciated.

Authorities on optical hygiene agree that the human eye cannot be exposed to light sources much brighter than 5 candlepower per square inch without strain and perhaps permanent injury, if the exposure is prolonged. This is about the brightness of a clear sky, at which no one cares to look for any continuous period. Since the brightness of a bare lamp filament is on the order of 1,000 cp. per square inch, it is obvious that some shade or diffusing accessory is desirable.

It has been suggested several times lately that frosted lamps be used in place of the clear glass lamps, as it is claimed that frosted lamps are more artistic in appearance and easier on the eyes of the passengers. There is undoubtedly a certain amount of truth in this contention, because the lights in a street car are more or less in the line of vision of the passengers, but there is also something to be said on the other side of the question. In the first place, the actual amount of illumination furnished by a lamp with a frosted bulb when new is about 7 per cent less than that furnished by the same lamp with a clear glass bulb.

Frosting would cost an additional 5 cents per lamp. The expense resulting from the adoption of such a plan would be a continuing one. Not only would it cost more so to equip a car in the beginning, but every lamp for replacement would be more expensive than a clear glass lamp. Moreover, frosted lamps deteriorate more quickly than those of the ordinary type because the rough surface collects dirt more quickly and is harder to clean than a smooth surface.

Considering the total number of lamps replaced for one reason or another, during the course of a year, the additional cost of using frosted lamps would be practically prohibitive. The money which it would take to make this change might better be spent in other ways to make the cars more comfortable and attractive as, for example, by installing shades or reflectors to direct the light from clear lamps properly, so that adequate illumination without glare is accomplished.

The bowl enameled or frosted type C Mazda lamp has a brightness of about 15 cp. per square inch and the clear lamp in the average diffusing globe, for example a 75-watt in an 8-in. diameter globe, has a brightness of about 3.6.

Strange as it may seem, the bowl frosting or bowl enameling of the lamp bulb increases the downward candlepower, even though the total light output be reduced. About 20 per cent absorption loss may occur in the average diffusing glass globe, although the useful light, i.e., that in the lower hemisphere, may be only a very few per cent less when using the diffusing globe than when using the clear lamp. As regards lighting efficiency, there is not much difference between the clear lamp in the glass globe and the frosted lamp in the enameled metal reflector. Perhaps the final solution will not be the use of the bare or frosted lamp bulb, but will be the clear lamp bulb in the deep and protecting metal or glass reflector.

Cheap Taxicab Fares and the Electric Railways

AS THE result of a price war between different operating companies, many taxicabs in New York City have now reduced their fares to a so-called rate of 20 cents a mile, although in practice this means 27 cents for the first mile and 20 cents for the second and succeeding miles. With the advent of such cheap taxicab fares some of the old familiar prophets of evil have again envisaged the doom of the electric railway. Experienced transportation men are not much alarmed by this prospect, however.

It seems rather doubtful whether a cab rate of 20 cents per mile can be maintained with reasonable profit to the operator. A private automobile of average size costs 10 cents per mile or more to operate, without including interest on the investment or driver's wages. If these items are added we have a total well over 15 cents per mile. Obviously a taxicab cannot always be carrying passengers. There will be many occasions when the vehicle is returning empty from a trip or "cruising" in search of a fare. If three-quarters of the total mileage operated were revenue mileage, which seems a liberal allowance, the income would be 15 cents a mile, or less than the expenses.

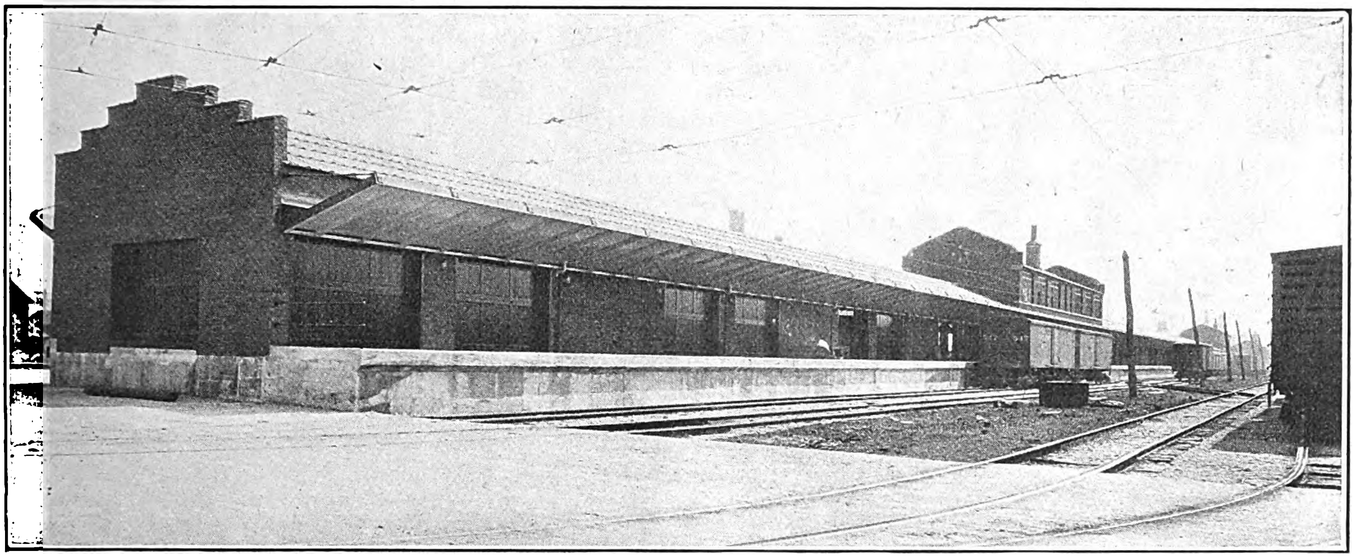
Regardless of whether or not the taxicab owners can make a living by charging 20 cents a mile, the electric railway retains its economic superiority by a wide margin. Five passengers, a capacity load for a taxicab, costing, let us say, 15 cents a mile to operate, travel at a cost of 3 cents per passenger-mile. Forty passengers in a street car, costing 30 cents a mile to operate, ride at a cost of $\frac{3}{4}$ of a cent per passenger mile. In the end economic laws will determine the outcome. Visionaries may be able to picture the taxicab tackling the job of mass transportation, but sensible people don't want to see the rails torn up just yet.

Is There Any Way to Stop "Man Failure"?

THE disastrous accident on the Long Island Railroad electric division, occurring on Wednesday of this week, was evidently a case of "man failure." An attempt will undoubtedly be made at the hearing on this accident to get from the assistant engineer the reason which led him to throw a track switch before a loaded electric train had completely cleared it. But probably he had no reason. He was thinking of something else. The case is not unlike that which recently happened on a trolley line where an operator in broad daylight deliberately ran into another car, although in that case the damage caused was slight except to the cars involved. The man had a good record. A visit to his home by a welfare worker immediately following the accident showed no family troubles or financial difficulties, though a later more thorough investigation showed that the night before he had had no sleep because of a sick child. Obviously, there is more to the prevention of accidents than the question of whether employees are in good physical condition and can pass intelligence tests when they are engaged.

This is the problem which modern industrial psychologists are attempting to solve. Psychology, which is the science of the mind, is one of the oldest branches of learning, but it is only within the last few years that an extended attempt has been made to apply the science to industrial problems. The first extended application to the electric railway field, in this country at least, was made about twelve years ago, largely at the instance of Martin J. Insull, now president of the Middle West Utilities Company. Then, as now, the properties under Mr. Insull's direction included some electric railway lines, and several instances of man failure on these lines impressed him deeply. Assisted by General Bancroft, then president of the Boston Elevated Railway, he induced Professor Münsterberg to conduct some tests at Harvard University to determine the mental qualities desirable in motormen. These experiments ceased with the beginning of the war and have not been resumed by electric railways.

During the war the application of the principles of psychology to the choice of men for responsible positions received a great stimulus because of their application to the choice of army officers. It is also known that foreign electric railway companies have pursued the study of this matter in a much more extended way than has been done in this country. It is planned that in an early issue an account of the methods followed in Paris will be published in this paper.



The Flush Platform Facilitates Loading and Unloading of Cars at the New Indianapolis Freight Terminal

Indianapolis Has Largest Electric Railway Freight Terminal in World

Four Interurban Roads Entering City Have Joined in This Large Terminal Development to Meet the Need of Expanding Freight Business—The Design Facilitates Quick Loading and Unloading Both of Cars and Vehicles—Further Extensions Are Planned

TO MEET the requirements of the continually growing electric railway freight business over their lines in the central interurban territory centering in the city of Indianapolis four roads have completed what is probably the largest electric railway freight terminal in the world. These are the Terre Haute, Indianapolis & Eastern Traction Company, the Indianapolis & Cincinnati Traction Company, the Interstate Public Service Company and the Union Traction Company of Indiana. The design of this terminal represents the cumulative experience of 18 years in the use of freight houses in Indianapolis for traction purposes, and also includes ideas developed from careful studies of steam railroad freight buildings as well as interurban freight terminals in other cities. Thomas B. McMath, chief engineer Indianapolis Street Railway Company, was consulting engineer in general charge of the work and T. H. David, principal assistant engineer Indianapolis Street Railway, was the supervising engineer on the terminal. The architect was F. S. Cannon of Indianapolis and the Service Construction Company of that city had the general contract.

An accompanying illustration shows the general layout of the completed terminal. The buildings consist of one structure which had been built previously by one of the companies and a new building 928 ft. long. The tracks form a loop through the property, and as the approach to the yard is over a double-track street railway the layout was designed so that trains can arrive and leave in the proper directions. There is a main vehicle driveway between the two buildings, and in addition team tracks are provided with space for trucks and teams to reach these tracks without congestion.

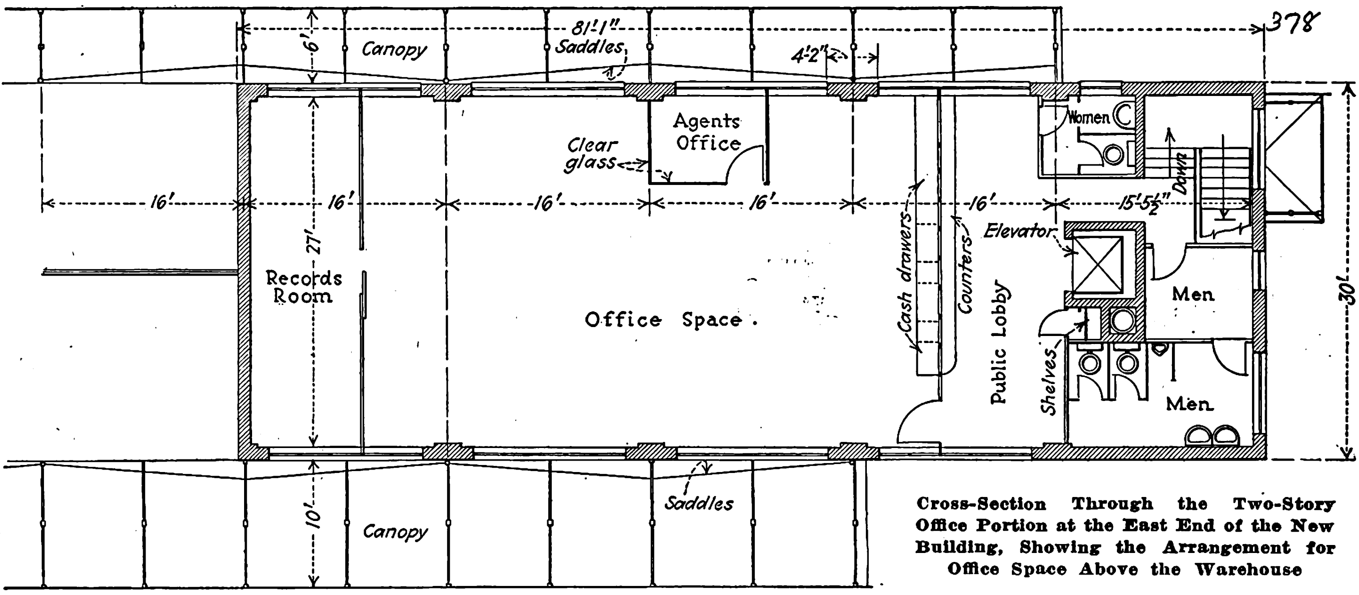
The terminal has been built on ground acquired adjoining the original 400-ft. building, which was completed in January, 1918, by the Terminal Realty Company, whose common stock was owned by the Terre Haute, Indianapolis & Eastern Traction Company. A new holding company, called the Terminal Realty Corporation, and representing the four electric lines concerned, purchased the interest of the T. H., I. & E. in the original development and acquired the necessary land to complete the entire project. The original terminal thus became a unit of the enlarged plan.

Following generally the same type of construction which was used in the original T. H., I. & E. building, the new freight house parallels the original structure and is separated from it by a granite paved driveway 75 ft. wide. South of the new building four tangent tracks, each 832 ft. long, can be reached from the loading dock. A 50-ft. granite paved driveway serves as an exit at the west end of the main drive.

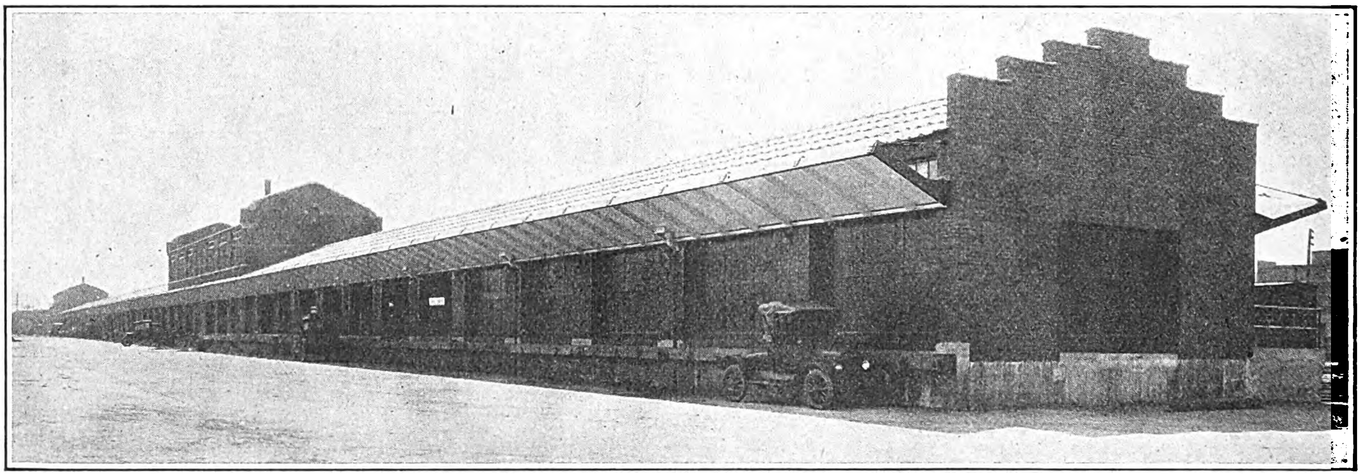
CONSTRUCTION OF BRICK AND CONCRETE

All of the buildings are of brick and concrete foundation and are erected in panels of 16 ft., with a 12-ft. door in practically every panel. These doors are provided on both the truck and vehicle sides of the house. At the Kentucky Avenue end of the new building a two-story section is carried back 80 ft. to give office space on the second floor above the freight house floor. A second two-story section is constructed near the center of the building to provide additional office space.

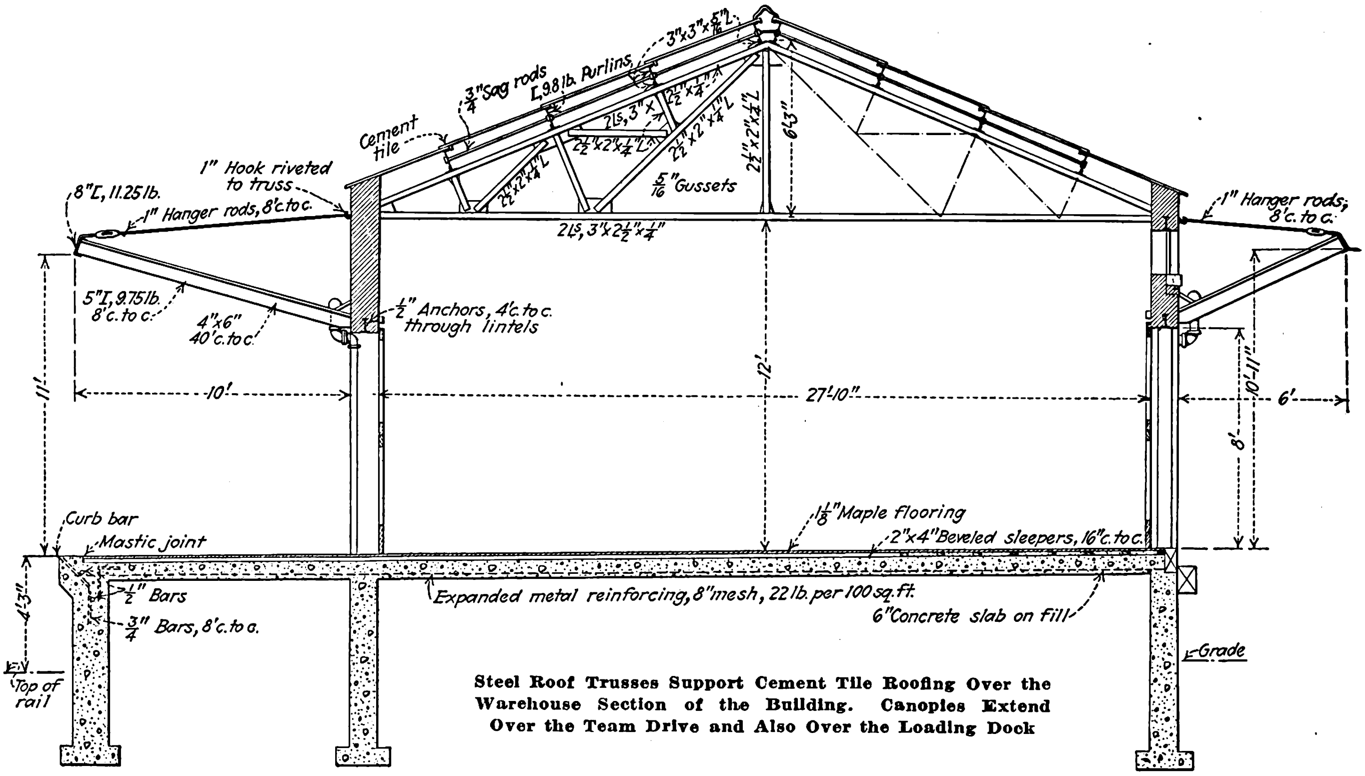
In the design of the new building, its length was determined by the length of the property. The width of 30 ft. was selected after careful study of this subject. For electric railway purposes, the comparatively


81'-1"
Saddles
Canopy
6'
4'-2"
Agents Office
Clear glass
Women
Down
16'
16'
16'
16'
16'
15'-5½"
Elevator
27'
Records Room
Office Space
Cash drawers
Counters
Public Lobby
Shelves
Men
Men
30'
Saddles
10'
Canopy

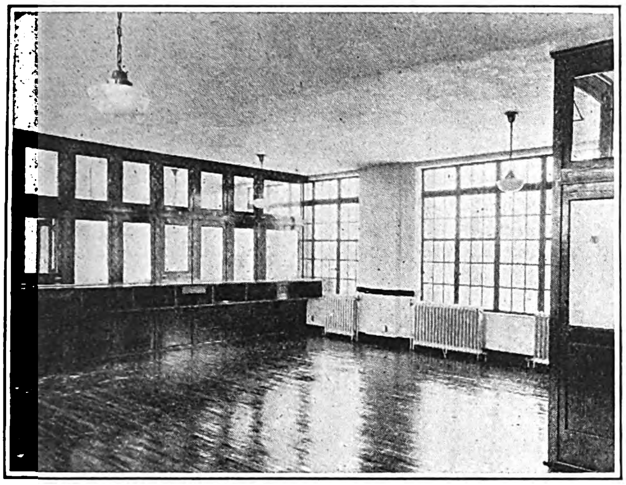
Cross-Section Through the Two-Story Office Portion at the East End of the New Building, Showing the Arrangement for Office Space Above the Warehouse

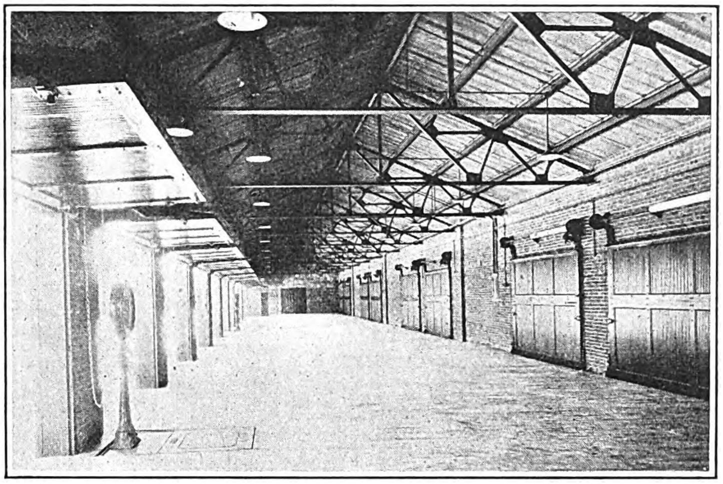


View of the Terminal Building from the Truck-Loading Site


3"x3"x5/16" L
¾" Sag rods
L,9.8 lb. Purlins
Cement tile
1" Hook riveted to truss
8"[, 11.25 lb.
1" Hanger rods, 8'c. to c.
2[s, 3"x
2½"x2"x¼" L
2½"x2½"x¼" L
2½"x2"x¼" L
2½"x2"x¼" L
2½"x2"x¼" L
6'-3"
5/16" Gussets
2[s, 3"x2½"x¼"
1" Hanger rods, 8'c. to c.
5"I, 9.75 lb. 8'c. to c.
4"x6" 40'c. to c.
½" Anchors, 4'c. to c. through lintels
11'
10'
12'
27'-10"
10'-11"
6'
8'
Curb bar
Mastic joint
1⅛" Maple flooring
2"x4" Beveled sleepers, 16"c. to c.
½" Bars
¾" Bars, 8'c. to c.
4'-3"
Top of rail
Expanded metal reinforcing, 8" mesh, 22 lb. per 100 sq. ft.
6" Concrete slab on fill
Grade

Steel Roof Trusses Support Cement Tile Roofing Over the Warehouse Section of the Building. Canopies Extend Over the Team Drive and Also Over the Loading Dock





At Left—Interior of the Office on the Second Floor of the Terminal Building. At Right—This View of the Freight House Shows How Ample Provision Has Been Made to Facilitate Access for Cars and Vehicles

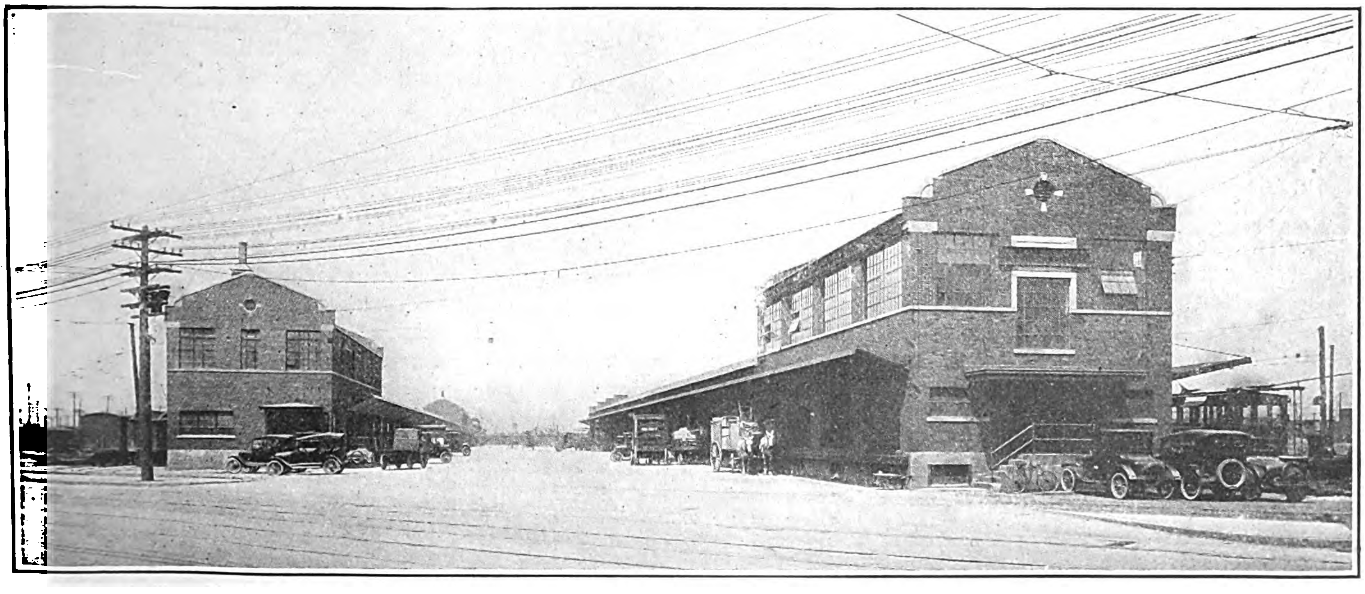
narrow house was adopted as most suitable to the conditions encountered. In an interurban terminal freight must be handled rapidly. Trains come into the station at frequent intervals in comparatively small units and they must be unloaded, reloaded and dispatched again on schedule within a few hours. In this respect the conditions differ materially from those obtaining on steam roads, where an excess of cars is available. Another essential characteristic of interurban freight movement which influenced the design of the terminal buildings is that a considerable proportion of the tonnage handled is moved in motor cars that must be unloaded promptly in order to avoid tying up expensive equipment.

In general, the speed of operations at a freight terminal was held to depend on the number of doors available. For a given floor area, a long house with increased number of doors was considered to meet the requirements for rapid movement of shipments better than a wider house. The same conditions obtain on the vehicle side of the house as on the track side. A long narrow structure with maximum number of door openings has been found to expedite the handling of shipments and to reduce the congestion of trucks and drays. These conclusions were based on experience in the operation of the freight house, 30 ft. wide, which composes the original unit of the present terminal, and which was operated by the Terre Haute, Indianapolis & Eastern Traction Company from 1918 to 1923.

The floor of the freight house is carried at the same height as the floors of the cars. A 10-ft. loading dock extends along the track side of the building for its entire length and is carried at the same floor level. The head room between the floor and the lowest part of the roof trusses in the new house is 12 ft. Trusses for the roof are of steel, carrying a Federal cement tile roof. Canopies extend 10 ft. over the team driveway and similar canopies also cover the loading dock.

Seven Toledo "Seco" scales are placed in the building and are arranged so as to be convenient for weighing trucks. A small elevator is located in each of the two-story office sections and extends from the second story to the basement. These elevators are available for handling records and supplies to the storage space provided in the basement.

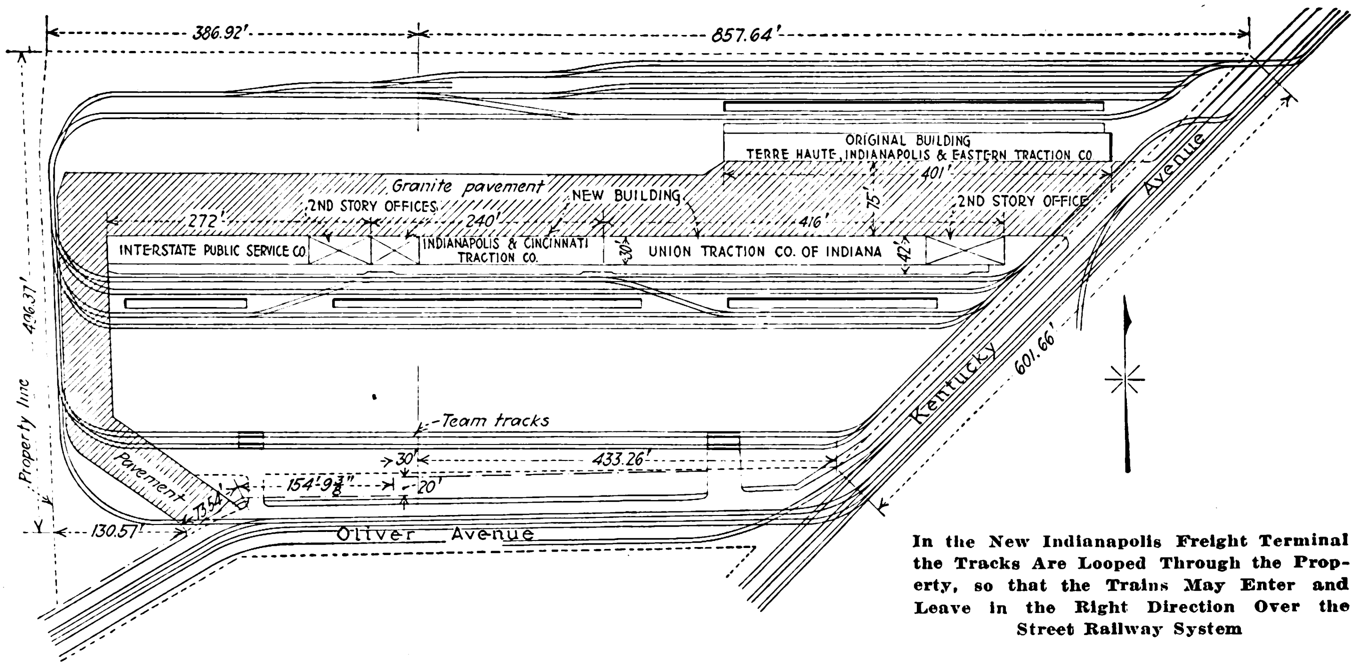
Under the two-story portions of the building the basement contains toilets, wash rooms, steam heating boilers, coal bins, lockers and storage space. An accompanying illustration shows a cross-section through one of the two-story sections, and also shows the arrangement for dumping coal directly into the storage bins from a car on one of the tracks. Ashes and trash can



The New Freight Terminal Is Shown at the Left and the Old One at the Right of This View Taken from the Kentucky Avenue End of the Buildings

be removed and dumped directly into carts by means of large buckets and hoists provided for this purpose.

The occupancy of the new house is divided so that the Union Traction Company of Indiana has 416 ft. beginning nearest to the entrance of the station and including the two-story office section at this end. The Indianapolis & Cincinnati Traction Company occupies the middle 240 ft. and the Interstate Public Service Company has the west 272 ft. These latter two companies have office space in the middle two-story section.



In the New Indianapolis Freight Terminal the Tracks Are Looped Through the Property, so that the Trains May Enter and Leave in the Right Direction Over the Street Railway System

This arrangement is temporary, as it is planned to extend the present Terre Haute, Indianapolis & Eastern house approximately 600 ft. in the immediate future. When this is done, it is expected that the Interstate company and the T. H., I. & E. will jointly use one house and the Union Traction and the I. & C. will jointly use the other.

Even after the contemplated 600-ft. extension to the present north building is made there will still be room on the property for future expansion. Whether this future expansion will take the form of additional building space or whether additional team tracks will meet the requirements will depend largely on the results of further experience with the present arrangement.

This new terminal in Indianapolis represents the latest move in a long period of development of the interurban business in Indianapolis. With the formation of the Indianapolis Traction & Terminal Company in 1903, the first step in meeting the need for terminal facilities for the lines entering the city was taken. At that time nearly three-quarters of a city block was purchased close to the heart of the city, and on this space the present large passenger terminal was built. This consists of a nine-story office building, approximately 66 ft. x 185 ft., on one of the main business streets in the downtown section of the city. A 38-ft. x 185-ft. waiting room and a 245-ft. x 195-ft. train shed covering nine passenger tracks were included. This passenger station occupies slightly more than a quarter of a city block and was completed and put into service in the fall of 1904.

A freight terminal was subsequently added on part of the adjoining property. It originally consisted of three freight houses, 24 ft. wide by 195 ft. long, each house being served by two loading tracks. This freight station was put into service in 1905, and a fourth building was added in 1911. By this time, however, it was evident that the freight business was increasing at a rate which would soon make the existing facilities inadequate, and during the next few years various projects for increasing them were considered. The use of this old freight terminal rapidly became intolerable as the freight business continued to increase. The operation of city cars on the exterior tracks and the increasing vehicle traffic in this vicinity increased the congestion. The move to the Kentucky Avenue location was the ultimate result.

In its present location the new terminal is in the heart of the wholesale and shipping district, is within a radius which makes pick-ups by trucks serving various railroad freight houses convenient and is also within a very short distance of a new large terminal warehouse development in the city, which has included facilities for handling electric railway as well as steam road and truck shipments.

Railways Distribute 10,000 Folders per Week

A JOINT timetable, in which are featured many beauty spots and other points of interest along their lines, is published by the Columbus, Newark & Zanesville Electric Railway and the Indiana, Columbus & Eastern Traction Company. These companies, known locally as the "Red Egg" lines, have recently adopted orange and black as the standard colors for their equipment, and the present folder is made up with black printing on a single sheet of orange paper, 12¼ in. x 13½ in., folded to a size of 3 in. x 6 in. Attention is called to the summer resorts in this territory, to the fishing, boating and camping facilities, as well as the attractions of the various cities touched by these railways.

Included in the information given is a map showing all the lines of these companies, together with connecting electric railways in Ohio, Indiana and Michigan. The reverse side of the folder is taken up entirely with the timetables of the railway and bus lines, together with various connections to other interurban lines at Dayton. Springfield, Columbus, Lima and Zanesville.

The idea of the management was to make the folder as attractive as possible and, by avoiding the use of more than one color, to keep the expense at a minimum. It has been found that giving the folder a dressy appearance aids in the distribution. Approximately 10,000 folders a week are now being distributed through hotels, ticket offices and racks on the cars.

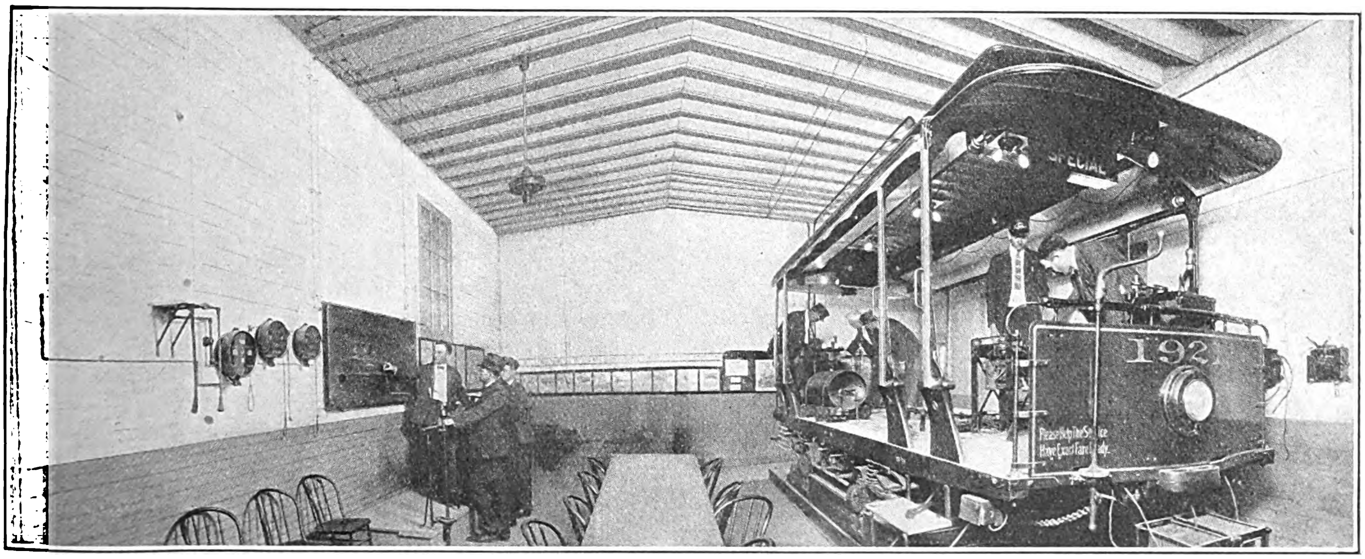
Training Carmen to Give Better Service

New Orleans Motormen Are Taught to Locate Minor Defects and to Handle Equipment Carefully—Instruction of Conductors Has Reduced to a Minimum Complaints of Discourtesy

BELIEVING that the employee's ability properly to perform his duties and his attitude toward the public are largely responsible for the good or bad feeling that prevails toward the railway, the New Orleans Public Service, Inc., New Orleans, La., has established a thorough course of training for all its platform men. Teaching motormen to locate minor defects and to make temporary repairs has made it unnecessary during the past year and a half to pull in any car during a trip and ask its passengers to change to another car. Training conductors has greatly reduced the number of complaints of discourtesy and impoliteness.

The training school was established in 1921 by A. B. Paterson, vice-president and general manager. It is under the supervision of D. C. O'Dowd, superintendent of transportation, with E. J. Murphy as superintendent of instruction. To aid in the work there are also three assistant instructors or follow-up men.

All applicants for work as trainmen are first carefully investigated to ascertain whether they possess the necessary qualifications. The disposition of the man is considered particularly important, and if investigation discloses that he is ungovernable, impulsive, or easily irritated, he receives no further consideration. After the applicant has been accepted for employment he is sent to the company's surgeon for a physical examination. If successful in passing this examination he reports the following morning at the training school for preliminary instructions. During his training period special emphasis is laid on courtesy and politeness, cleanliness, truthfulness, loyalty and honesty.



Teaching Student Motormen and Conductors in the Training School of the New Orleans Public Service, Inc.

A student motorman is first placed on a stationary platform, equipped with three G.E.-K 11 controllers and three gooseneck hand brakes. These are set up in position similar to that which they would have on an ordinary single-truck car. One of the controllers is connected electrically to a cluster of four groups of five incandescent lamps, each group being arranged in the form of a square. This arrangement is used to impress upon the student the functioning of the resistance as the controller is advanced from point to point. Each square of lights represents a set of resistance grids and the lights are extinguished as the controller handle is advanced.

When the instructor thinks that the student has acquired sufficient knowledge of handling the controllers and brakes the instruction is continued on a blackboard located on the wall alongside the dummy controllers and brakes. The instructor illustrates the course of the current leaving the power house, through feeders and feeder taps, through the trolley wire, and trolley pole and the various parts of the equipment of the car, down to the wheels and rails and thence back to the power house. Ordinarily several applicants are under instruction simultaneously and the questions which they ask of the instructor and his answers serve to make clear any doubtful points.

Following this the class is assigned to a school car set up on a stationary platform above a short section of track. An old open car has been mounted on a framework of heavy timbers so arranged that the wheels have 3 in. clearance above the rails. Two 3-in. x 12-in. x 15-ft. sills are used as longitudinal supports with two 3-in. x 12-in. x 6½-ft. cross sills 2 ft. from the ends. The cross sills are reinforced by four round wrought-iron tie rods, bolted to the outside face of the longitudinal sills.

The car is completely equipped and ready for operation. At one end a G.E. type K-36-J controller has been installed and at the other end a Westinghouse type K-68-A. Overhead circuit breakers and an automatic line breaker are part of the equipment. The resistance is mounted on a stand on the floor in front of the dash, so that all the leads are in plain view of the student. The leads can be connected or disconnected at will.

Air brakes and hand brakes have been installed, together with an air compressor, tank, governor, gage, brake cylinder and general brake rigging. This equipment is placed on the floor in the car where its operation can be observed by the men under instruction. In addition to the ordinary electrical equipment of the car a voltmeter and an ammeter have been connected up to indicate the difference in the amount of current used when the car is properly handled and when it is improperly handled.

An arrangement of levers makes it possible to cause various defects in the equipment. These are: Open circuit in the controller, open circuit in the resistance, open circuit in No. 1 motor, open circuit in No. 2 motor, grounded resistance, grounded No. 1 top field, grounded No. 1 motor, and grounded No. 2 motor. Ordinarily these defects are created one at a time in the order stated, to teach the student to study his controller and ascertain what the matter is. After he has attained a satisfactory state of efficiency in this, the defects are introduced two at a time, or even three at a time. The prospective motorman is expected to be able to tell the instructor exactly what is wrong with the car, and how to repair it.

The car is equipped also with Hunter route signs, headlights and trolley catchers. A trolley base has been set up and attached to the floor of the room so that the student can observe how the apparatus works when the trolley pole is turned around. The student is taught the proper method of sanding track by operating a sand bin on the school car. On the wall of the school are three International cash registers used in the instruction of conductors.

PRACTICE AND THEORY COMBINED

After the preliminary instruction has been completed, the student is assigned to an experienced trainman for a period of fourteen to eighteen days instruction on the road. During this period the student is relieved for two trips a day and sent back to the school in order to prepare himself for a qualifying examination. These examinations are conducted by the superintendent of instruction and the student must at that time be able to locate and repair all the defects, explaining to the examiner the nature of the defect and how to remedy it. If he passes the examination successfully he is assigned to a carhouse and his name is placed on the extra list.

Thirty days later he is sent back again to the training school, to take another examination consisting of 81 questions pertaining to his work. The knowledge which he acquired during the training period is thoroughly tested, and he must be able to answer 75 per cent of the questions correctly. Thereafter the three follow-up men watch his performance on the road for sixty days and make reports concerning his progress.

An applicant for the position of conductor undergoes the same preliminary investigation as does an applicant for the position of motorman. Instruction begins with the proper way to make out a trip sheet, punch transfers, make change, and ring up fares on the register. Other men in the class under instruction simulate passengers and the student is required to go through the regular process for them. After doing that he makes out his trip sheet. He is then instructed as to his duties in case of accident, the necessity of making out accident reports and the proper way to do it. After the student has completed this preliminary instruction he is assigned to a competent conductor for the same period of experience on the road as it required of the motorman. He too must come back later for a final written examination. Emphasis is laid throughout this instruction on the necessity of courteous behavior toward the public.

Since the establishment of the school three years ago, all of the old trainmen of the railway, both motormen and conductors, have been called back to the training school and instructed in the same way as the new men.

Street Car Courtesy in Washington

BY C. MELVIN SHARPE
Executive Assistant Washington Railway & Electric Company

THE city of Washington, D. C., with its population gathered from the forty-eight states and from many foreign countries, being the seat of Congress, the home of the executive and administrative agencies of the government, presents a complex problem of street railway transportation. There are probably more tourists who do their sightseeing by trolley in Washington than there are in any other city of the United States. The railway platform men must therefore be specially trained to answer politely questions from the great number of strangers constantly visiting the city, and must be particularly well informed concerning the location of the various points of interest about the town.

In the training of its men the Washington Railway & Electric Company proceeds upon the assumption that the average man wants a superior over him who believes in, and practices, fair dealings in all matters. The company does not believe in paternalism nor in the hothouse method of coddling men with sweet phrases and frequent pats on the back for doing their duty to the public. It has been found that a course in ballroom ethics and the training in voice culture sometimes thought necessary to complete the effectiveness of a conductor's "Please Move Forward," as well as the idea of hollow over-thankfulness to the public, is a mockery and a delusion.

The company demands that civility shall be extended to every man, woman or child who shall pay fare and become a passenger on the cars, regardless of color, manner or general state of mind and position in life. The slogan is "Give every passenger more than a ride—make it a pleasant trip." When trainmen are imbued with that thought, it follows logically that they are carefully and attentive to the welfare, comfort and general interest of the passengers. In brief, the railway instructs its men to waste a minute of the schedule if a motorman or conductor can render an accommodation to a passenger that will bring to that passenger a sense of the unusual in service. It has been proved that the pleasant things in life are remembered and cherished. To see a conductor of the Washington Railway & Electric Company get off his car to conduct safely an aged or infirm person or child to the sidewalk out of danger is no uncommon sight, or to see a motorman lift a heavy suitcase from the car and carry it to the curb for a woman. In this way it is felt that the smartly attired trainmen of this company are rendering the entire industry a real service by the pleasant impression they give to the many thousand annual visitors to the capital.

Making and Erecting Concrete Poles

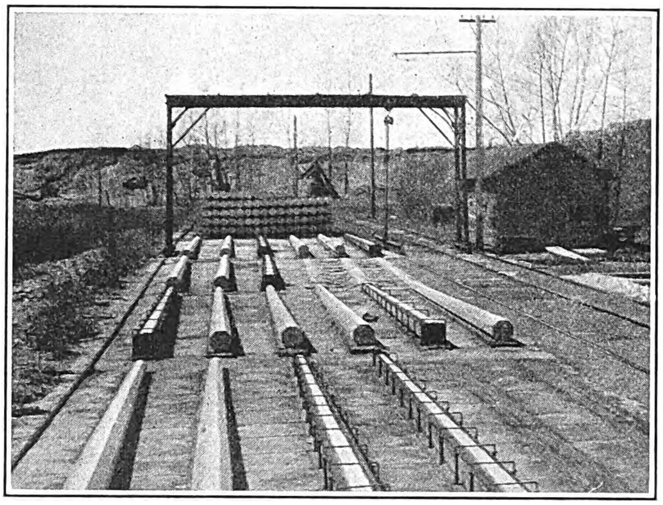
Casting Is Done in Horizontal Steel Forms with Reinforcing Rods Wired to Cast-Iron Rings and Suspended in Place—Portable Derrick Is Used for Erection

By Leon R. Brown
Office and Field Engineer New York State Railways

THE New York State Railways has been manufacturing and using concrete poles since 1910. This company operates in Rochester, Syracuse and Utica approximately 600 miles of track, of which 100 miles is third rail construction and the remainder overhead trolley. Tubular steel, concrete and wood poles are used, but recently nearly all new installations and replacements have been of concrete. The railway has two concrete pole manufacturing plants, one at its Eastwood yards, near Syracuse, and another just outside of Rochester. Poles for use on the Utica lines are made at Eastwood and shipped to Utica on flat cars.

In Rochester the concrete poles are octagonal in shape and are cast in steel forms. The bottom of the form is anchored to a concrete base as shown in an accompanying drawing. Reinforcing rods are securely wired to cast-iron rings and supported in the center of the form from clevises spaced about 2½ ft. center to center. Pieces of round iron are placed wherever holes will be needed for crossarm bolts or other purposes. Dates, numbers and other distinguishing marks are cast on the poles by raised numbers and letters secured to the forms.

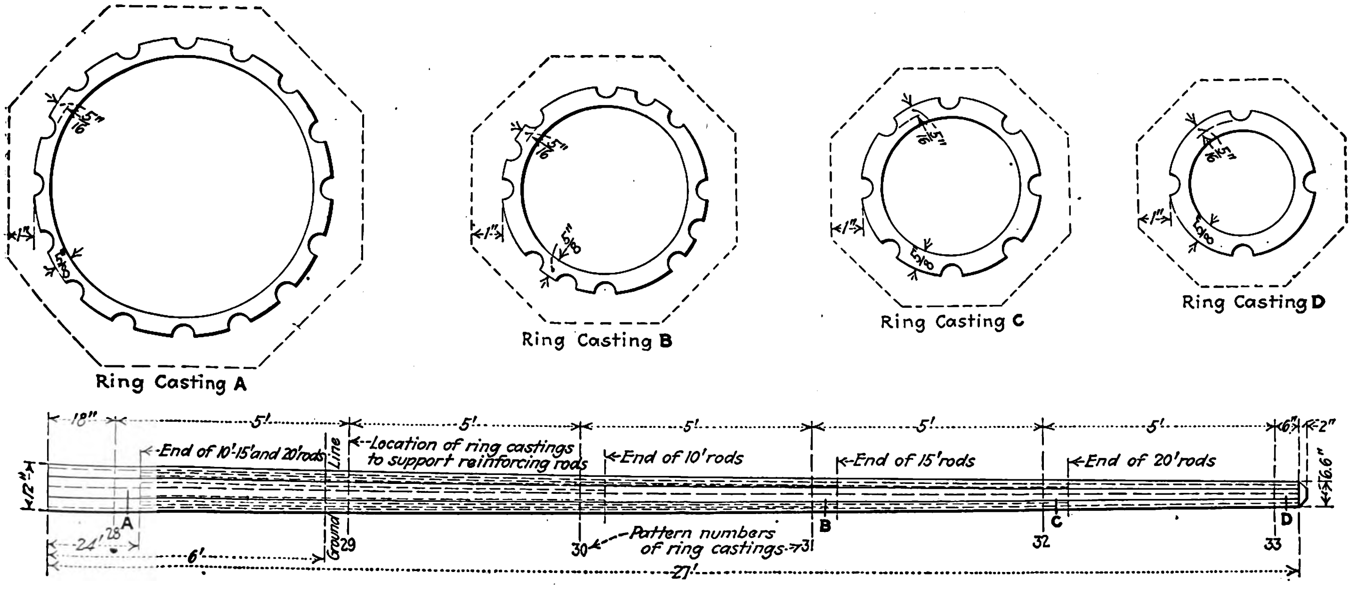
Concrete consisting of one part of cement, two parts of sand and two parts of gravel is mixed by hand in a mixing basin. A coating of light oil is applied to the inside of the forms before the concrete is poured. After 12 hours the auxiliary rods used to provide bolt holes are taken out. The sides of the form are removed at the end of 24 hours and after three days the pole is rolled aside to make room for another pole. After seven days it is placed on the pile of finished poles.



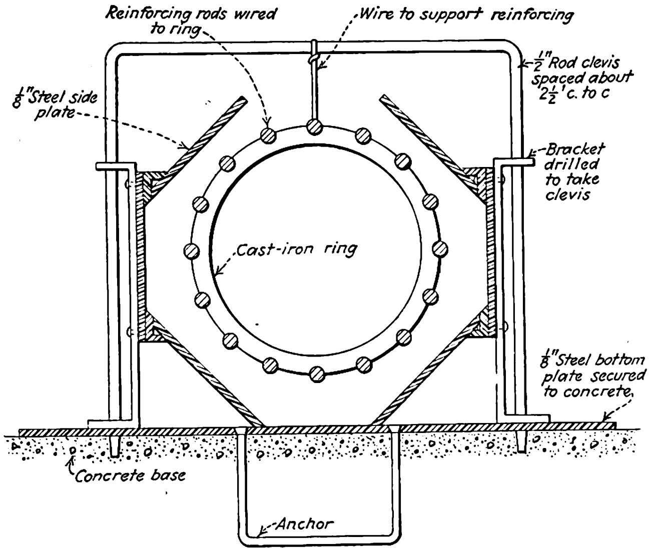
A Gantry Crane Spans the Pole Yard and Includes a Service Track and the Storage Pile

A gantry crane serves the entire pole yard at Rochester, including the storage pile and a service track. By this means poles are easily moved from the casting platform to the pile and from there to a flat car to be transported wherever needed. However, in the city when only a single pole is to be replaced it is sometimes hauled by motor truck. The output of the pole yard is six poles a day, and with six men employed the rate of production is a pole per man per day.

Poles manufactured for use on the Syracuse and Utica lines are of square cross-section with corners chamfered above the ground line. Four standard sizes of these poles are made. The standard trolley pole for



Ring Castings Support the Reinforcing Rods in the Type of Concrete Pole Used in Rochester


Reinforcing rods wired to ring
Wire to support reinforcing
$\frac{1}{2}$" Rod clevis spaced about $2\frac{1}{2}$' c. to c
$\frac{1}{8}$" Steel side plate
Bracket drilled to take clevis
Cast-iron ring
$\frac{1}{8}$" Steel bottom plate secured to concrete
Concrete base
Anchor

Method of Supporting Reinforcement in Steel Forms

city construction, either bracket or span, is 30 ft. long with a 7-in. top. Interurban poles are 35 ft. long with a 7-in. top. For heavy city construction a pole 30 ft. long with an 8-in. top is used and for feeder lines the company uses the same size pole 45 ft. in length.

Wooden forms made of three 2-in. Georgia pine planks clamped in position by means of 2-in. x 4-in. notched sticks are used in Syracuse. Strips of triangular cross-section nailed inside the planks provide the chamfer of the corners. The gains are made by blocks nailed to the forms.

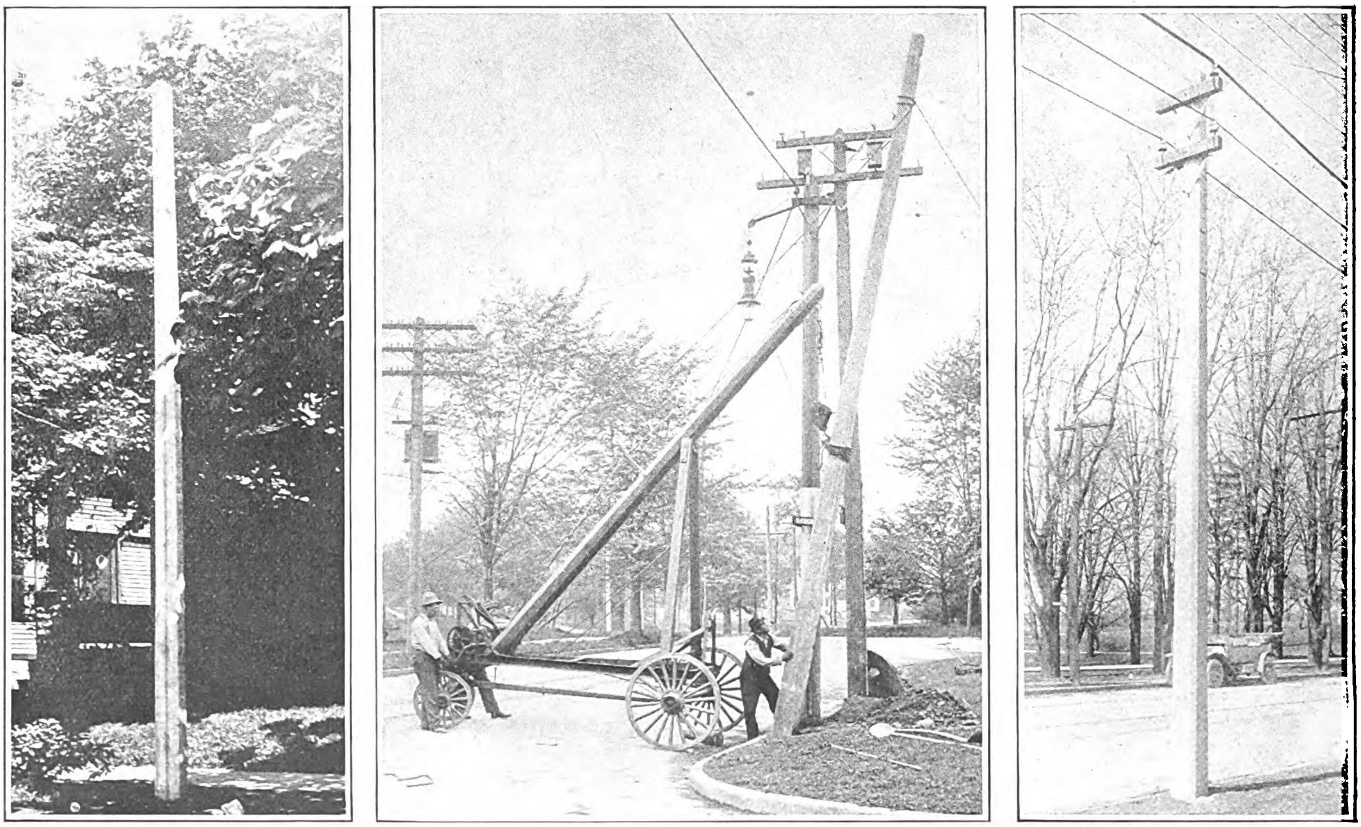
Concrete is mixed by machine and transported in a 1-ton hopper handled by a gantry crane. The forms are assembled on several blocks of sills to give a level bearing. After the form has been given a coat of old transformer oil a layer of concrete 1 in. thick is laid on the bottom throughout its length. Then four reinforcing rods properly spaced are laid and more concrete filled in until the form is one-third full. Two more rods are then placed about 1 in. from the side and an additional 2 in. of concrete is poured. Next two more bars are placed and the concrete filled to within 1 in. of the top of the form. Lastly four more bars are placed and the remaining space filled with concrete, the top being given a float finish.

While the form is being filled the concrete is carefully troweled and spaded, but no other ramming is done and no surface finish is used. The round irons which are run through the form to provide holes for the crossarm and other bolts are taken out eight hours after casting. The pole itself is taken out of the form three or four days after casting and is allowed to cure for two weeks before being used. After being removed from the forms the poles are sprinkled by an automatic sprinkler for several days.

The materials used in the construction of one pole consist of 4½ bags of cement, ⅓ cu.yd. of sand, ⅓ cu.yd. of ⅜-in. to ¾-in. broken stone, 118 ft. of ⅝-in. steel rods weighing 156.7 lb., and 190 ft. of ½-in. rods weighing 161.5 lb. The weight of a completed 30-ft. pole is 2,550 lb. It is estimated that a load of 985 lb. can be carried safely by such a pole. Labor costs are about 45 per cent of the total, materials 45 per cent and overhead 10 per cent.

The poles are erected with the assistance of a derrick wagon of unusual design. This was constructed by the railway using the frame of an old road scraper and a boom made from a wooden trolley pole. An accompanying illustration shows the derrick in operation.

In 1921 the New York State Railways placed 475



At Left—Octagonal Concrete Pole Used by New York State Railways in Rochester. In Center—This Derrick Used for the Erection of Poles Was Built on the Frame of a Road Scraper. At Right—In Syracuse Square Poles with Chamfered Corners Are Used

concrete poles, in 1922 the number was 359 and in 1923 it was 407. The decrease in the number of concrete poles set in the last two years has been due primarily to the fact that replacements are fewer as the percentage of concrete poles increases. On the Syracuse lines only about 100 wood poles now remain, and they are gradually disappearing on the other lines also. The difficulty of securing suitable wood poles because of the scarcity of timber has been the chief reason for using concrete poles. The first cost is about the same for the two types. While it is somewhat more expensive to install a concrete pole, fewer renewals are necessary. More than 6,000 concrete poles are in use on the property.

Public Reacts Favorably to Advertising Campaign

Memphis Street Railway Reaping the Reward of Consistent Program Involving Use of Paid Newspaper Space, Company Paper and Movie Films

REGULAR newspaper advertisements appearing in each of the daily papers of the city are being used each week by the Memphis Street Railway, Memphis, Tenn., an interesting little folder entitled "Trolley Items" is being distributed through the cars, and recently a news reel film, about 600 ft. in length, has been shown in some of the larger motion picture houses in the downtown section. The use of these media to reach the public are all developments of the last four months.

The picture film has been the cause of considerable attention on the part of individual citizens, among whom it has been a source of conversation on cars and the streets. The title of the picture, as flashed on the screen, is:

"The Public's Partner—the Street Car."

Introducing the scenes that are shown, appear these thoughts:

"The street car is a constant, faithful, necessary public servant. The public can aid in better street railway operation and service by co-operation with the company's efforts."

Some of the sub-titles, suggestive of the scenes that are shown, include the following:

"Boarding car promptly with exact fare helps to speed up the service.

"Blocking aisles or exit causes inconvenience to other passengers.

"Facing forward, and holding with the left hand, is the safe way to alight.

"The motorman has his trials to prevent accidents; especially do children playing near tracks cause him anxiety.

"Congested traffic is a factor in delaying schedules.

"Autoists who pick up passengers effect a reduction in the number of street cars and tend to reduce service.

"Street cars cause outlying fields to be converted into residence sections.

"Street cars help to keep factory wheels turning, as these employees show 'when the evening whistle blows.'

"Street cars are a dependence of the shopper in getting to town and back home."

The end of the picture shows a large group of employees, some at work laying tracks, others repairing overhead work and some in the shops, and after these separate scenes, a general one, that closes out with these words:

"We are partners with you. Co-operate with us."

Being run as a news reel, and distinct from any direct advertising, the picture was first shown in a house where no advertising of a direct nature is ever allowed on the screen, and afterward other houses used it readily.

WORKING TO PROMOTE SAFETY

The newspaper advertising of the company has featured in many ways its constant efforts to reduce accidents and solicited the co-operation of the people in this consistent campaign.

A novel part of the company's efforts is its plan to divide with the men the amount of the savings that can be effected through a reduction in the cost of accident claims and damage suits.

Under the caption "Street Car Men Get Neat Safety Bonus" the morning paper of the city recently carried a story telling of the fact that the platform men, on that day, were to have $4,381 distributed among them. The paper explained the plan for the benefit of the public in these words:

"The company instituted the plan, effective six months ago, of dividing on a 50 per cent basis the entire amount that could be saved through increased carefulness on the part of the men in reducing costs of accidents. During the first three months the men earned for themselves in this way the sum of $6,122. This added to the sum being distributed today makes a total of $10,503 by which they have increased their regular incomes within six months. The money is divided among the men on the basis of the hours which each has worked within the period, and for the past three months represents an increase of 1.27 cents an hour for each. During the first three-month period they earned 1.76 cents an hour additional pay through the operation of the plan.

"This bonus to the men, it is pointed out by officials, in no way adds to the cost of service, but, on the other hand, effects savings for the company, as one-half of the savings are applied to operating costs, the remaining 50 per cent going to employees.

"The money, as one of the officials expressed it, is just so much 'salvage,' as it would otherwise have been spent in satisfying damages and claims which were prevented by the carefulness of the men. 'We know this,' he added, 'because over a long period of years our damage claims have "averaged" a certain portion of the gross revenues, which we still set aside before calculating what we are saving by the present plan.'"

The leading afternoon paper, in commenting editorially upon this plan of the company, commended it cordially and pointed out that the people, through co-operation with the company, can work effectively in the interest of the men and assist them, while benefiting themselves at the same time in better and perhaps cheaper cost of service.

COMPANY ACKNOWLEDGES BENEFITS

The company realizes the beneficial effects from its consistent advertising campaign. It has acknowledged this by some of its own publicity. Several weeks ago there appeared in all the papers for a period of one week a word of thanks to the public, expressing cordial appreciation of the kindly co-operation manifested by the public toward the company.

The advertising appearing in the newspapers is printed under the caption "The Truth." Each installment deals with some particular phase of a subject. Recently a series of nine advertisements appeared on different phases of the subject "Picking up street car passengers." Some people were inclined to object to the company's suggesting that autoists refrain from this practice, but others wrote the company stating that they had been guilty in the past, but were through, and would allow the company to get its rightful revenue—a point to which they had not previously given much thought.

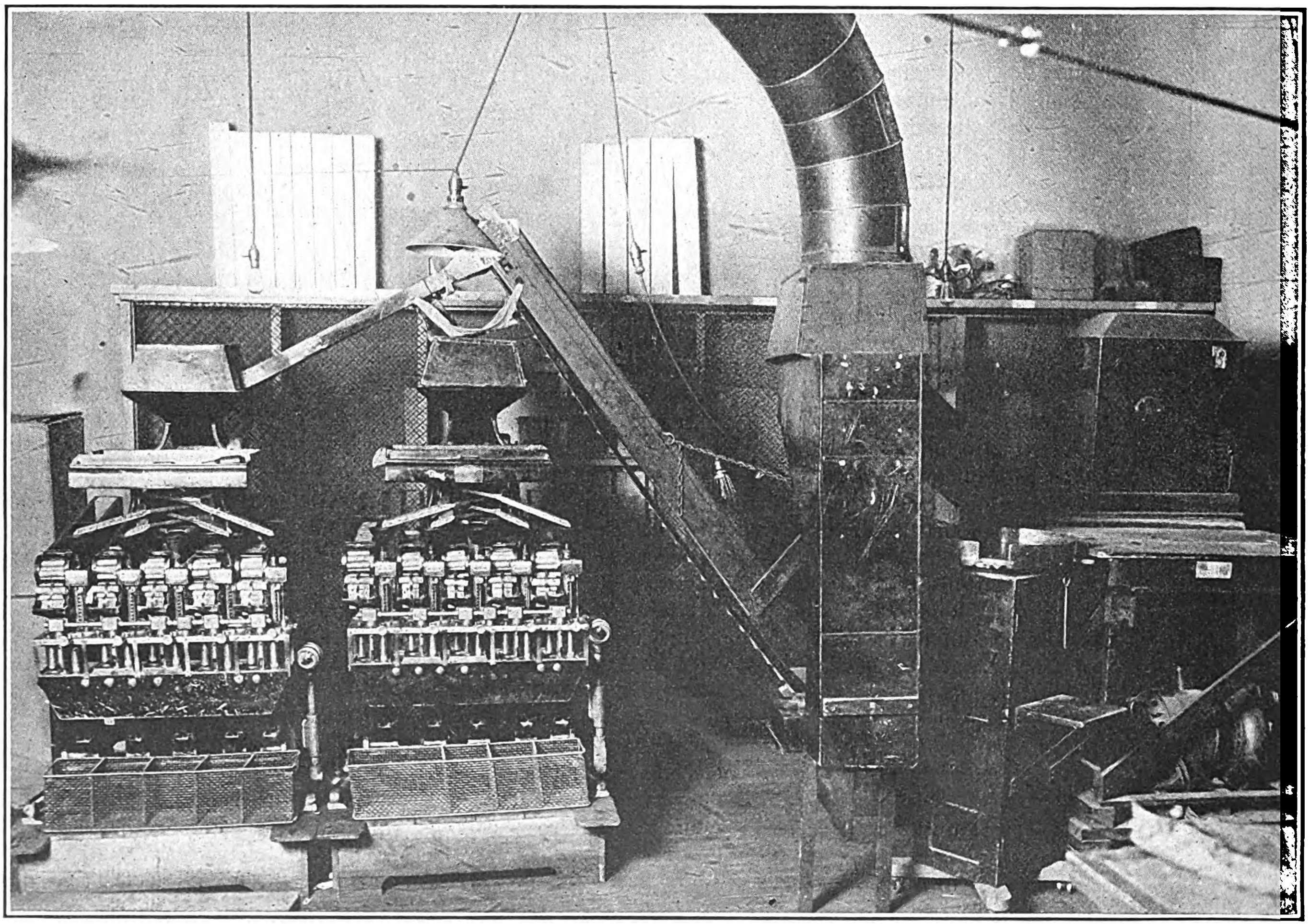
Fares Handled by Machine in East St. Louis

IN CONNECTION with the use of locked type fare boxes on the East St. Louis & Suburban Railway, East St. Louis, Ill., a system of turning in receipts has been adopted which insures minimum handling of money by employees. It also increases the speed and accuracy of sorting coins and separating the large variety of zone fare paper tickets in use on some of the lines.

To accomplish the result desired, a special receiving machine was designed and built in the company's shop. This machine is operated in conjunction with two Sattley motor-driven coin counters and is so arranged that the contents of the fare box vaults are automatically dumped when they are unlocked. The housing shown at the extreme right in the accompanying illustration receives the vaults. They must be put into position in this housing and inverted by means of an outside crank before they can be unlocked, as the vault key is padlocked to the metal housing in such a position that it will not reach the lock on the vaults until the latter have been inverted. The key is padlocked in position by the assistant cashier at the beginning of the day's work and is replaced in the safe by him as soon as the last vault has been emptied. The appearance and general arrangement of the machine are shown in the accompanying illustration.

Money and tickets drop directly into the receiving machine when the vault is unlocked. A blower fan is mounted so that the paper tickets are immediately separated from the coins and are blown into a sack mounted at the bottom of the rectangular chute shown in the illustration. The coins drop on a heavy screen shaker, which separates the large from the small coins before they drop on an endless belt conveyor which elevates them to their proper counting machine.

The money is then sorted, counted and wrapped by machine. From the time the receipts drop out of the fare box vault until the coins are wrapped they travel entirely under glass and are not touched by the employees. The wrapped packages of coins are sacked, weighed and checked against the meter readings of the machine before being forwarded to be deposited in the bank.

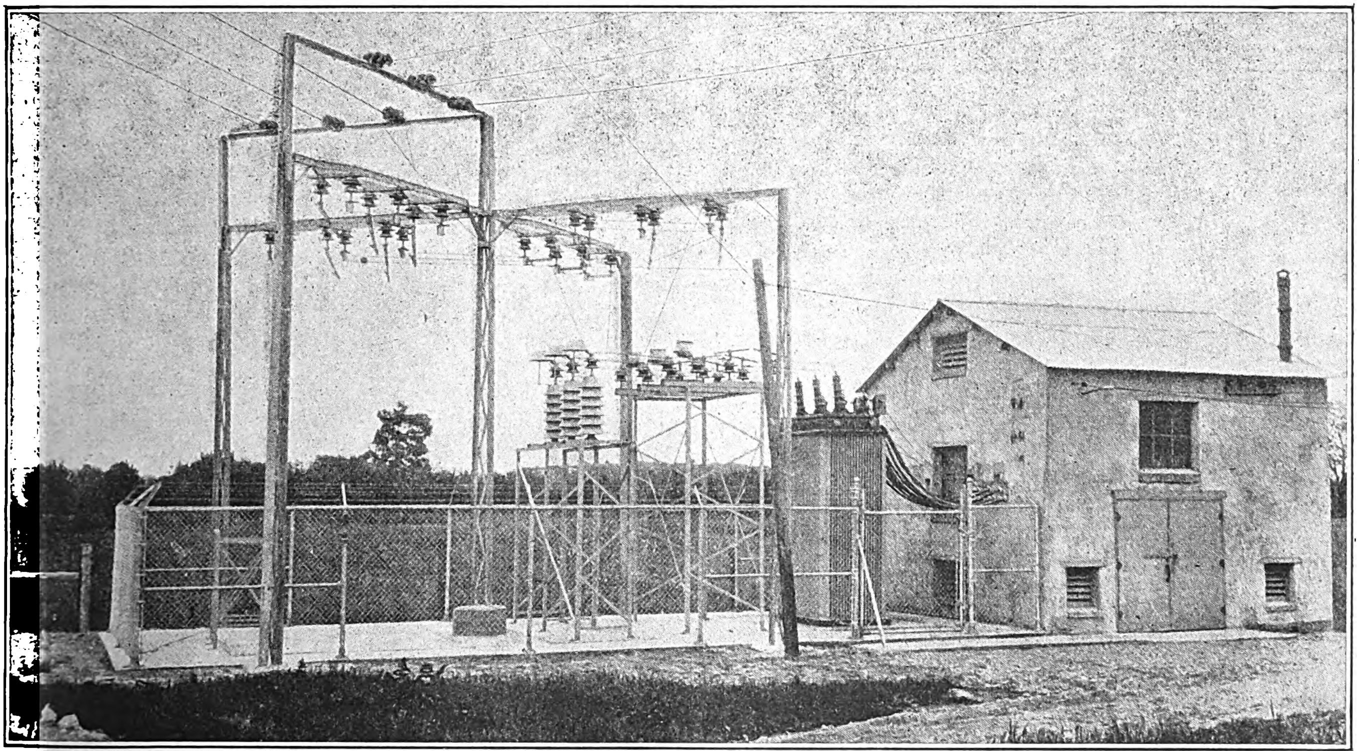


Receiving Machine Designed by East St. Louis & Suburban Railway for Sorting and Recording Cash and Paper Tickets Eliminates Handling of Receipts by Employees

How the Indianapolis & Cincinnati Line Was Rehabilitated

Second Article

Nine Full Automatic Substations, One of Which Is a Portable, and One Semi-Automatic Substation Supply 100 Miles of Single-Track Line on This Recently Rehabilitated System—The D.C. Feeders Are Sectionalized to Insure Continuity of Service



The Automatic Substations Have Been Built a Short Distance Off the Railway Right-of-Way on Land Owned by the Equipment Trust. The Outdoor Sectionalizing Installation at Hoffman Substation Is Typical

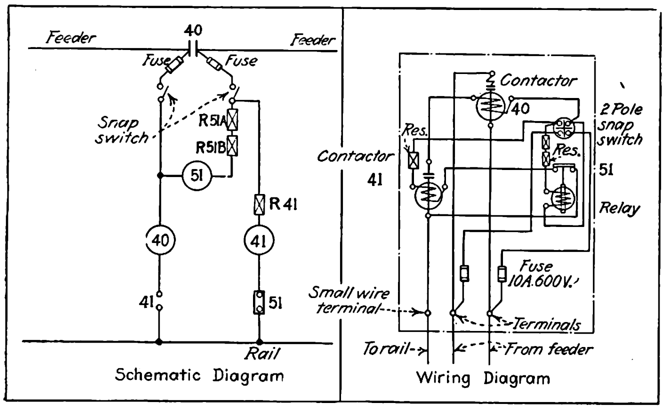
IN THE first article of this series, published in ELECTRIC RAILWAY JOURNAL for July 26, page 113, was given the general features of the changeover of the Indianapolis & Cincinnati Traction Company's system from 3,300 volts a.c. to 600 volts d.c. Following the present article, which deals with the substations and feeder system, will be a third article treating of the new cars with which the system has been equipped.

All of the substations and the new feeder system have been put in with these various conditions and future requirements in mind. Automatic substations were dictated by the saving shown in comparison with manual stations of the same capacity.

Manufacturers' estimates showed that a 500-kw. station with full automatic equipment would cost approximately $5,400 more than a station of the same capacity with manual switching. In making the comparison between manual and automatic stations, therefore, an allowance of $810 per year per station was made for interest, depreciation and taxes on the additional investment required for automatic switching equipment. An additional allowance of $500 per station per year was made to provide for the cost of high-grade inspectors to look after the automatic station apparatus. This gave an annual cost of $1,310 per year which was chargeable to the automatic installation, which would not obtain with manual operation.

In manual stations, however, the cost of operators was estimated at $100 per month for a 12-hour shift, making an annual cost per station of $2,400 for attendant's wages. An obvious saving of $1,090 per year per station was thus shown in favor of the automatic installation. This is exclusive of any saving to be expected as the result of eliminating the no-load losses which occur with manual stations in this class of service, due to the stations being allowed to operate continuously during periods when the power demand is only intermittent. Reduction of the problems connected with substation labor was held to be an additional advantage in favor of the automatic switching apparatus.

Automatic switching equipment for a 300-kw. station



Direct-Current Sectionalizing Contactor Equipment Is Mounted on Poles Along the Line. A Grounded Feeder Is Automatically Cut Out and Is Restored When the Ground Is Cleared

40, 41 main contactors
51 automatic reset relay
R41 resistance, 5,000 ohms
R51A, R51B resistance, 600 ohms

was found to cost approximately $4,600 more than hand switching. The hand-switching equipment cost for a 300-kw. station was almost as much as for a 500-kw. station. The automatic equipment, on the other hand, was less for a 300-kw. station than for one of 500-kw. capacity, primarily because smaller contactors are used in the smaller station. Since the saving in labor is the same on the 300-kw. station as on the 500, the saving for 300-kw. automatic equipment was found to pay an even higher percentage of return.

STATIONS LARGER ON RUSHVILLE DIVISION

The distance between substations on the Rushville division is 10.8 miles average, with a maximum of 11.88 miles. With a No. 0000 trolley and a 500,000-circ.mil copper feeder the maximum drop between substations is estimated at approximately 170 volts with two cars passing midway between stations. Assuming alternate stations out of service on this division, the maximum drop which would result with two cars passing midway between operating substations was estimated to be approximately 305 volts.

One 500-kw. synchronous converter is installed in each of the substations on the Rushville division, except Martin, where a 300-kw. converter was considered sufficient. Although 300-kw. converters might have been used in the other substations on this division to handle the existing traffic, they were not considered adequate for the service contemplated after making the extension to Cincinnati. There was also reason to expect development of freight traffic with heavier and more frequent trains. Since the 500-kw. substation cost was only 25 per cent more than that of a 300-kw. station, the use of 300-kw. converters was considered questionable, even if the extension to Cincinnati were not contemplated.

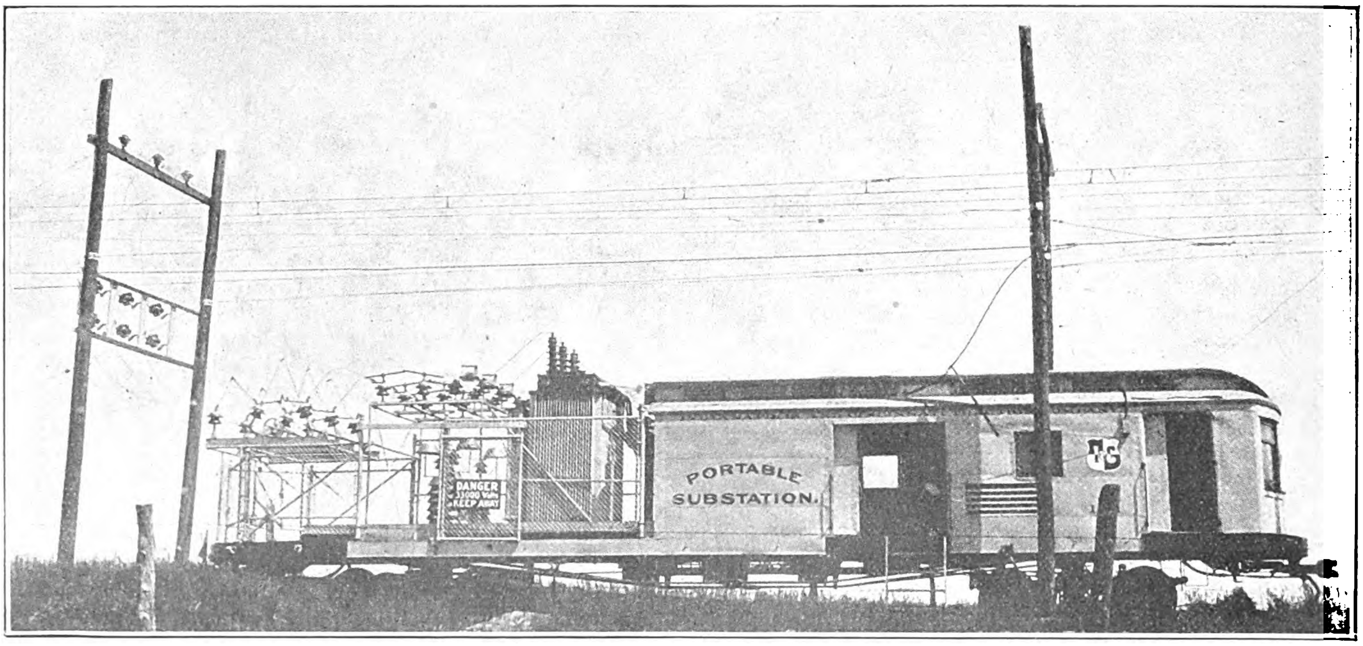
With single-unit substations such as were installed, it was considered desirable to make the conversion and distribution layout such that operation at a reduced schedule could be carried out with any substation out of service. The new system was designed to provide for such operation.

On the Shelbyville division, the average distance between the four substations is 11.8 miles average and 11.96 miles maximum. It was considered that 300-kw. capacity would be sufficient for the load that would be thrown on these stations.

BUILDINGS SMALL AND SIMPLE

All the substation buildings are practically identical in construction. They are made as small as possible, consistent with good ventilation and ample clearance for the apparatus. Hollow tile is used for the walls, and is covered both outside and inside with rough cement stucco. The roof is of corrugated transite, supported on 4-in. channel roof rafters. A concrete platform outside of the building supports all of the outdoor apparatus, which is protected by Cyclone steel fencing.

Each building is equipped with a telephone communicating to the central dispatcher located at the junction. It is the practice to clear all substation trouble reports through the transportation dispatcher, so that inspectors and trainmen's reports will all be



The 500-Kw. Portable Substation, Which Was Built on the Underframe of an Old Passenger Car, Has Full Automatic Apparatus. The Inclosed Portion Contains a Cabin with Sleeping Accommodations

centralized at one point in order to facilitate the work of clearing up power trouble.

A small stove has also been installed in each station. This was put in for use by inspectors or repair men, who may be required to spend a considerable time in a station during severe weather, when making repairs.

FULL PROTECTION IN AUTOMATIC STATIONS

The full automatic stations start up on reduced voltage and shut down on reduced load, in accordance with general practice. The under-voltage d.c. relays in the trolley circuit are set to cut in at a voltage reduction of 20 per cent. The time-delay motor-operated relay then makes the first of the sequence of starting contacts, provided the voltage reduction continues. This time adjustment may be varied from about 2 seconds to approximately 5 minutes and is normally adjusted for 30 seconds. A magnetic clutch in the time relay acts to reset it after voltage reductions of short duration, so that they do not have a cumulative effect in starting the station.

This and most of the other apparatus in the stations is standard Westinghouse automatic substation equipment. Series grid resistances are used to prevent prolonged d.c. overload on the station.

For protection, the stations are locked out in starting if the machine fails to fall into step before the converter starting time-limit contacts are closed in the triple function motor-operated time-delay relay. This relay, in addition to fixing the time for starting under voltage reduction and the time allowance for the converter to fall into step, also controls the time for shutting down the station after the load falls off. As installed, these relays are set to shut down a station after 5 minutes if the load remains below 20 per cent of full load.

Phase unbalanced current will lock out a station during the starting period, or will shut it down during the running period. Hot bearings, a.c. overload or flash-over of the converter will also lock out a station. A station will be temporarily shut down, or prevented from starting, by overheating of the grid resistors. This will also occur by reversal of the direct current.

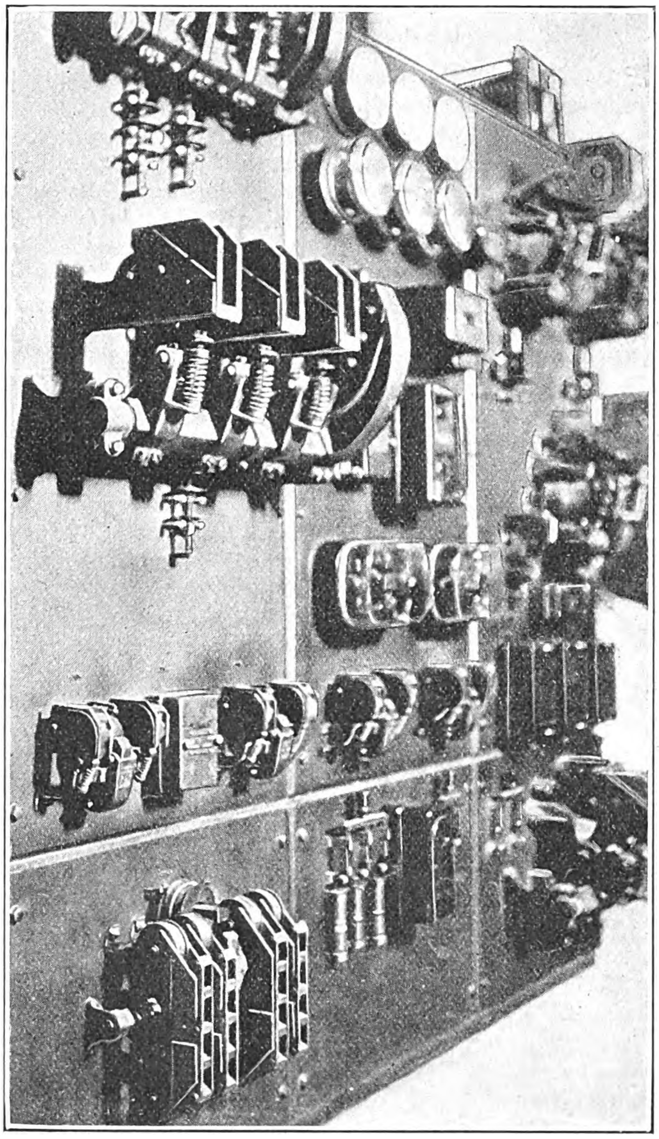
If a reverse phase exists a station cannot start up. In the case of loss of field the machine is disconnected from the d.c. end. After a station has been shut down temporarily for any cause, it cannot start up again until the field current has died down. An overspeed device shuts down a station when the machine speed becomes excessive. Low a.c. voltage also prevents starting.

The combination of a short-circuit detector with the d.c. feeder contactor is another feature of interest in connection with this installation. This is accomplished by a relay arranged so that rapid rises in the direct current causes it to function, whereas a steady increase in load, even considerably above full load, only causes the series resistance of the station to be cut in. This relay is also combined with a reset relay, so that after the main feeder contactor has been tripped out on account of a short circuit, it is reclosed when the feeder resistance becomes such as to give half load on the machine.

SEMI-AUTOMATIC STATION STARTED BY HAND

The semi-automatic station must be started up by hand in a manner similar to that used in starting a wholly manual substation. The operator starts the converter by throwing a three-pole double-throw hand-operated breaker to the starting position, waits until the converter has come up to speed, reverses the polarity if necessary by means of a hand-operated field switch, and then throws the breaker to the running position. From then on, the automatic equipment assumes control and the operation is almost identical with that of the full automatic station.

To shut down the semi-automatic station by hand, the operator opens a single-pole knife switch in the circuit of the d.c. machine contactor relay coil. He then trips the three-pole double-throw oil circuit breaker. In the event of an automatic shut-down, the sequence of these operations is taken care of automatically.



Typical Automatic Substation Control Panel. All the Substations Except Rushville Have This Type of Control Equipment

This station is provided with protective features very similar to those in the full automatic stations. Phase unbalanced current during the running period will lock the station out. Hot machine bearings, reverse direct current and flashing over of the converter will lock out the station. Overload on the a.c. side will trip the oil circuit breaker. Overheating of the grid resistors in the d.c. circuit, or overheating of the machine windings, will temporarily disconnect the station from the d.c. feeders, or will prevent it from being connected to the d.c. bus when starting up. Loss of field disconnects the machine from the d.c. end. Overspeed results in disconnecting the machine from both the d.c. and the a.c. ends. The short-circuit feeder detector on the semi-automatic station operates similarly to that on the full automatic stations, except that the d.c. feeder contactor opens in the event of a feeder short circuit on the semi-automatic station, whereas the d.c. bus contactor opens under like conditions on the full automatic stations.

THE PORTABLE STATION IS FULL AUTOMATIC

In addition to the permanent stations, a portable full automatic station has been provided. This unit has a capacity of 500 kw. and may be moved to any point on the system where sidings are available to help out in the event of trouble with any of the permanent stations, or unusual loads at any given location. It was constructed from an old passenger car which was heavily reinforced by means of steel plates across the car under the original framing, and a duplicate set of truss rods installed full length in order to reinforce the longitudinal sills.

Power wiring under the body is carried in conduits of sufficient size to take the necessary cables. A number of large special junction boxes were required and these were made from sheet steel by welding them together in the company's shop.

As shown in the accompanying illustrations, the car was long enough to permit all the outdoor high-tension apparatus to be installed with sufficient clearance, without increasing the height much above that of the inclosed body. As a precaution against fire, the interior of the inclosed portion forming the converter room is lined with sheet metal, including the roof. On the floor, large rubber mats protect employees who may have occasion to work on the interior while the station is in operation. There is a cabin at the front end of the car, equipped with a small stove and bunks for employees who may be required to remain with the station during emergencies.

SECTIONALIZING FEEDER CONTACTORS MOUNTED ON POLES

An interesting feature of the d.c. feeder system is the installation of feeder sectionalizing contactors at eight important points. This equipment functions to disconnect a short-circuited section of feeder from the rest of the system, and to restore the connection automatically as soon as the trouble has been removed. Each unit consists of a combination of relays with a contactor mounted in boxes on poles at certain points along the right-of-way.

Referring to the schematic diagram on page 164, the operation of this equipment may be readily analyzed. Assuming that the contacts of the main contactor 40 are open, and that the feeder is energized on both sides of the contacts, with relay 51 de-energized, relay 41 will pick up and close the circuit to contactor 40 coil. This contactor picks up and closes its contacts, thus joining the two sections of the feeder. This is the normal condition existing when the feeders are in regular service.

If a short circuit occurs between the trolley or feeder and ground, on the side to which 40 is connected, the small size of the feeder cable will cause a very large drop in voltage so that both contactors 40 and 41 will drop out. As soon as contactor 40 has opened normal voltage is restored to relay 41, which starts to pick up. If the contacts of 41 close, 40 will not close, since the coil is on the short circuited side of its own contacts. Meanwhile, as soon as the 40 contacts open, relay 51 is subjected to the difference in voltage between the two sides of the feeder. A difference of about 300 volts will cause this relay to pick up, thereby de-energizing relay 41, which in turn closes the circuit to the coil of 40. This closes the contacts of 40.

On the other hand, if the short circuit occurs on the side of the feeder to which relay 41 is connected, the contactors will drop out because of under-voltage as before, but with the opening of 40 contacts the voltage situation is reversed from the previous case. Normal voltage is available for the coil of 40, but this contactor cannot close because 41 remains open due to the low voltage imposed by the short circuit continuing. Relay 51 functions as before, and when the voltage difference drops sufficiently this relay drops out and thereby energizes relay 41, which in turn energizes the coil of 40 and allows the contactor to close.

The operation of this sectionalizing equipment depends on the high resistance of the feeder circuit so that a short circuit will cause sufficient voltage drop to make the contactors drop out. The voltage at which this occurs is approximately 30 per cent of normal. This reduction is made quite large to prevent the sectionalizing equipment from functioning under ordinary overloads.

SERVICE MAINTAINED DURING CHANGE

Service was maintained on both divisions of the property throughout the period of changing over to 600-volt operation. The work was carried out so that the d.c. zone was gradually extended from station to station, as the new automatic substations were set up and made ready for service.

In carrying out this program it was also necessary to carry out the change in the transmission system to correspond with the extension of the d.c. zone, as the high-tension lines were changed from 25-cycle, single-phase power to 60-cycle, three-phase.

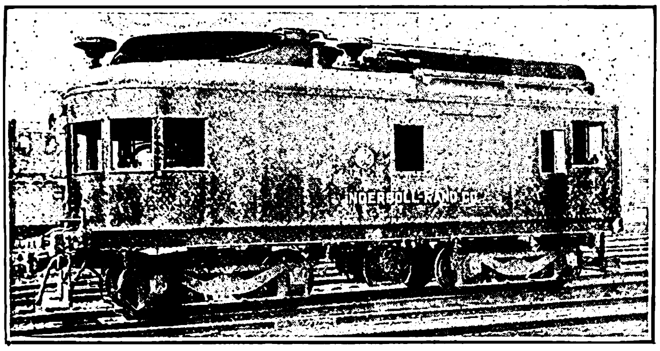
On each division, the work of changing over was started at the junction and progressed from station to station until the end of the division was reached. During the process of changing, the d.c. area was fed from the junction switching station while the a.c. area was fed from Rushville power house.

The old cars, equipped with single-phase motors, were operated over both a.c. and d.c. sections until an entire division had been completed. New cars with d.c. equipment were then put in service. As each new substation was connected to the distribution system, the trolley in that section was changed from a.c. to d.c. Consequently it was necessary to make all taps from feeders to trolley in that section during the night before commencing d.c. operation.

Paper Matches Promote Traffic

THE Union Street Railway, New Bedford, Mass., recently purchased 10,000 paper match folders advertising the attractions of Lincoln Park, owned by the railway, half way between New Bedford and Fall River.

These folders were placed in cigar stores, drug stores, summer hotels, etc., within a radius of 50 miles, to promote traffic to the park.



Oil-Electric Locomotive for Freight Service on Tenth Avenue, New York

Oil-Electric Engine in New York

THE New York Central Railroad has put in operation on its Tenth Avenue freight extension, New York, a 60-ton oil-electric locomotive for hauling freight cars through the streets of New York City. The locomotive was built jointly by the General Electric Company and the Ingersoll-Rand Company, and carries a 300-hp. oil engine with six cylinders, operating at 600 r.p.m. and driving a 600-volt, 200-kw. generator, with separately excited shunt fields and differential compound series winding to give a voltage variation of from 200 to 750 volts. There are four HM-840 General Electric motors, one geared to each of the four axles. The control is automatic, to the extent that the power is controlled by a throttle lever similar to that on a steam locomotive. Opening the lever increases the engine speed from idling to full speed within the limits set by the overspeed governor, and the current passing through the differential series field gives an output of the generator equivalent to the input of the engine. The locomotive then automatically accelerates without any loss of power in the rheostat.

The oil engine is of the Price-Rathbun type using solid fuel injection. The consumption of fuel is about 0.45 lb. per horsepower-hour. Owing to the absence of smoke or visible exhaust, this locomotive is particularly adapted for street service in New York City.

Demand for De Luxe Service Increases in Michigan

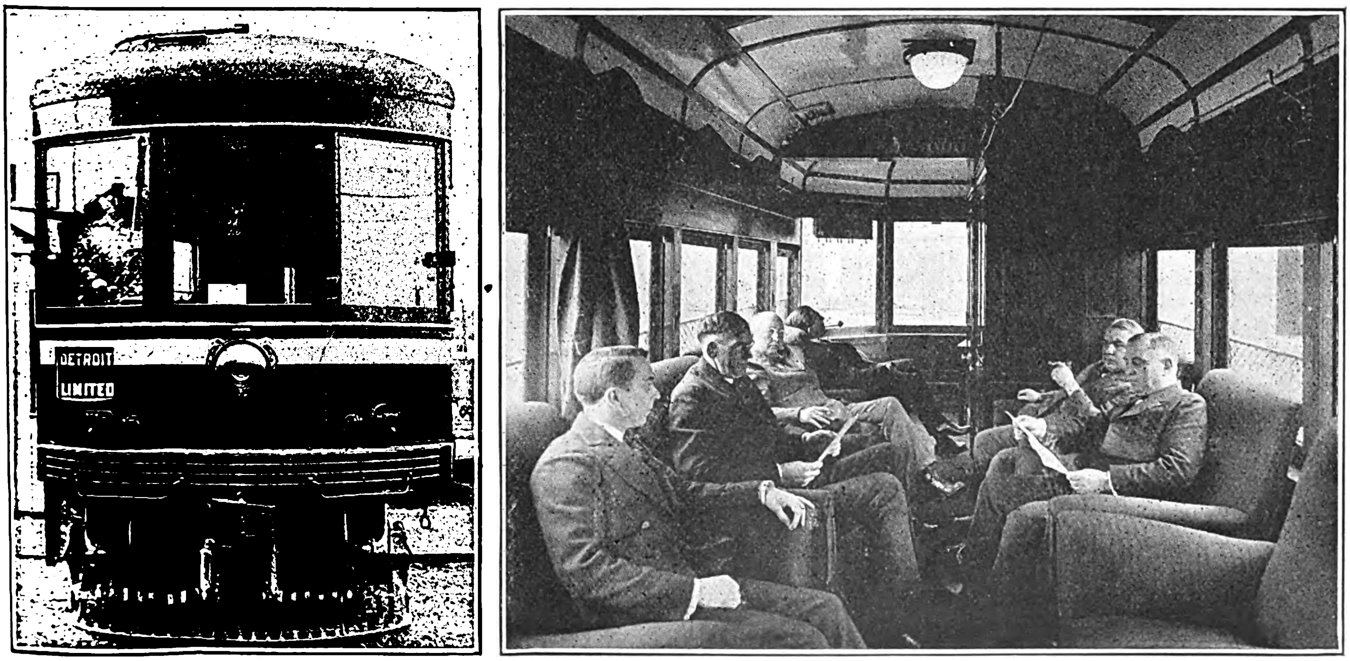
OWING to the increasing demand for high-speed de luxe interurban service out of Detroit, the Detroit United Railway has added chair cars to several of its interurban lines.

One of these lines is that between Detroit and Flint, on which two new chair cars have been running since the end of last May. These cars are fitted with multiple-unit control and M.C.B. couplers and operate sometimes singly and sometimes in a train with another type of car, but the chair car is always used as a lead car. Three runs are made each day from Detroit and from Flint, and the charge for a chair is 50 cents. Each car carries thirty chairs, ten in the smoking compartment and twenty in the main compartment. These seats are not stationary but can be moved about to suit the convenience of the passengers.

The bodies for these cars were built in the shops of the Detroit United Railway. They have an over-all length of 58 ft. 3½ in. and an over-all width of 8 ft. 7¼ in. The interior trim is mahogany. They are mounted on C-80-P-Standard trucks with 36-in. wheels and are equipped with Westinghouse 303 motors. Each car weighs complete 85,700 lb. The car carries a roller destination sign covered with glass. Two views of this car are given below. Further particulars of the equipment will be found on page 188.

A somewhat similar car but of a lighter type, also built in the shops of the company, has been put in service on the Pontiac division. Two of these cars are required to give the service. The interior finish is somewhat different, the side posts and headlining being of ivory enamel and the wainscot paneling of dark green burlap. The chairs are of wicker, upholstered.

For additional coach service, the company has recently purchased from the St. Louis Car Company ten attractive cross-seat cars, seating 16 passengers in the smoking compartment and 38 in the body of the car. This car is ~~2~~56 ft. 1¼ in. over all and weighs 63,000 lb. It is mounted on Brill No. 27 M.C.B.-2 trucks, each truck carrying two G.E.-275-A motors.



Front End and Interior of Smoking Compartment of New Chair Cars Operating Between Detroit and Flint

Association News & Discussions

Paris Congress Largely Attended

The Topics Discussed at the Meeting on June 16-20 Included City Planning, Car Design, Engagement of Transportation Employees, Track Construction and Bus Operation—About 400 Delegates and Guests Were Present

THE sessions in Paris on June 16-20 of the International Tramway, Light Railway & Bus Association (Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles), were preceded by an event of great personal interest to the members of the association. This was the presentation of a testimonial to Mr. de Burlet, who retired as president last year after an administration of more than ten years. The presentation took place at a reception to the members on the evening of June 16, at which about 400 delegates and guests were present. The president of the association, Mr. de Lancker, expressed the regret of the members that Mr. de Burlet, after so many years devoted to the interests of the association, had felt obliged, owing to his advancing years, to retire from the office of president. He then referred to the distinguished career of his predecessor, pointing out that it was largely owing to Mr. de Burlet's ability and devotion that the association had won such prestige, not only in Europe but elsewhere throughout the world. Mr. de Lancker also referred to the action of Mr. de Burlet during the war in succoring French refugees hunted into Belgium from the north of France and in protecting the women and children against the enemy's soldiery, for which action he had had to spend a number of months in a German prison. Mr. de Lancker then presented to Mr. de Burlet, in behalf of the association, a bronze figure representing "Protecting the Hearthstone."

Mr. de Burlet replied gratefully, attributing, in his modesty, the success of the association to the assistance of his associates on the executive committee and said that while he could no longer serve as president, it was his greatest pleasure to see the association prosperous and marching on toward a brilliant destiny.

TRANSPORTATION AND CITY PLANNING

The first technical session of the association was held on Tuesday, June 17, and was devoted to a consideration of the relation of transportation to city planning. The paper on this subject, prepared by G. Delavenne of the Paris Municipal Council, was read by Mr. Labussière of the Paris Tramway. This paper appears in abstract in this issue. By a series of charts, the author showed the development of transportation lines in the city of Paris and its environs from 1861 to 1924, also the total rides and rides per inhabitant by years for Paris since 1889, for Düsseldorf and Berlin since 1904 and for Chicago since 1885. There was no discussion.

CAR CONSTRUCTION

The afternoon session was devoted to the subject of car construction and equipment, discussed in three reports, the reports being presented respectively by Messrs. Dubath of the Swiss Industrial Company at Neuhausen, Harmel of the Liége Tramways and Ricaud of the Marseilles Tramways. Abstracts of these reports will appear in an early issue of this paper.

F. de Lancker
President Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles

In the discussion which followed, several delegates testified to the satisfactory results secured with roller or ball bearings. A greater difference of opinion developed over the advisability of the use of radial trucks. Mr. de Croes of the Belgian National Light Railway system said that eighteen cars on that property had been equipped with the radial truck, but had not been in operation long enough to give definite results. The truck had been installed on this line because of satisfactory results reported to have been obtained in Ostend.

The discussion then developed along the lines of the proper wheelbase to use with curves of different radii, with both rigid and radial trucks. Mr. Bacqueyrisse, superintendent of rolling stock of the Paris Tramways, declared that he had lost interest in the radial truck. He said that it had been on the market for twenty-five years and had been used by a number of French companies, but had in practically all cases been abandoned in favor of a rigid truck with the long wheelbase, even as long as 3.6 m. (11 ft. 10 in.) for a single truck car. The Paris tramway system has 700 cars of this type and wheelbase and has had no difficulty in operating them around curves with 18-m. (59-ft.) radius. In his opinion it was as easy to get cars with a 3.6 m. wheelbase around such a curve as if radial trucks were used. The fact must not be forgotten that both radial trucks and short wheelbase trucks have a nosing movement which is injurious to straight track. Personally he would prefer to wear out a few feet of curve with long wheelbase trucks than to wear out an equal number of miles of straight track through the nosing effect of radial trucks or short wheelbase trucks. He was equally skeptical about the benefits to be derived from ball bearings, at least so long as it costs as much as it does at present to install them.

Mr. Castaing, chief engineer of rolling stock, Paris Tramways, said that the motor cars with the long wheelbase and parallel axles in Paris made about 35,000 km. (22,000 miles) before the wheels had to be re-turned. On T-rail construction the mileage of the tires before re-turning was 40,000 km. (25,000 miles). The cost of maintenance for double trucks per car was from 15 to 20 per cent more than for the long wheelbase single-truck cars and radial truck maintenance cost was at least 10 per cent higher than for trucks with rigid axles.

After a brief discussion on electric brakes, Mr. Gasquet called attention to the subject of storage battery cars, which, he said, although completely abandoned in France, had come into a certain use in Germany. He pointed out that several German companies had recently ordered thirty-nine new storage battery cars. Other delegates expressed themselves as not seeing much future for the storage battery system.

There were no technical sessions on Wednesday. Instead the delegates made a trip by motor cars to Versailles to visit the Château and the Trianon. They lunched at Versailles and in the afternoon visited the park of St. Cloud. In the evening they held their annual banquet. Mr. Peytral, Minister of Public Works, presided and Mr. Mariage, general manager Paris Tramways, welcomed the delegates to Paris in behalf of the transportation interests.

ENGAGEMENT AND DISCIPLINE OF TRANSPORTATION EMPLOYEES

The first topic at the meeting on Thursday was the engagement of transportation employees, as presented in reports by Mr. Bacqueyrisse of Paris and Mr. Prins of Brussels. An abstract of the report by Mr. Bacquerisse will appear in an early issue of the ELECTRIC RAILWAY JOURNAL. An abstract of the report by Mr. Prins was printed in the issue of this paper for June 21, 1924.

In his oral introduction to his report, Mr. Bacqueyrisse pointed out that motormen who have been with the company a short time are much more liable to accidents than those with a long period of service. He also said that railways give a great deal of scientific attention to the selection of their equipment and they should do likewise with their personnel. He believes, in choosing men, that the object sought should be normalcy. A motorman who is overcautious is about as bad as one who is careless.

TRACK CONSTRUCTION

The next subject discussed was that of track, on which four reports were presented. Abstracts of three of these papers have already been published in this paper. (See ELECTRIC RAILWAY JOURNAL for July 5, page 20; July 12, page 58; July 19, page 97. The fourth, by Mr. Bouton, appears in abstract in the following pages of this issue. In presenting his report, Mr. d'Hoop took occasion to explain a confusion which had crept into it, owing to his reference to the three standard grooved rail sections proposed by the Swiss Commission on Standardization (and reproduced on page 97 of the issue of this paper for July 19, 1924). Mr. d'Hoop said that he brought these sections to the attention of the association as a matter of general interest and not necessarily for action in the way of adoption at the present session.

Mr. Bouton, Paris, said that a study on rail standards was being conducted by the French Tramways Association and that it was hoped a recommendation would be made before long. Mr. Badesco, Bucharest, made certain suggestions in regard to dimensions which he thought were desirable in standard rails, notably a thicker base than that recommended. The subject of the desirability of the future adoption of rail standards was then referred to a committee.

In continuing the discussion on the reports presented, Mr. Gagne said that he was not in accord with the statement in one of the papers that only those parts of special work subject to great wear should be of manganese steel. Parts subject to slight wear should also be of wear-resisting material. Otherwise, inequality in wear of such installations would result and be bad for the rolling stock. After outlining the soil and traffic conditions with which solid and flexible track construction were respectively more desirable, Mr. Gagne explained a statement made in the report in the July 5 issue, page 20, saying that rails 24 m. (78.7 ft.) had been used by the Paris Tramways. Mr. Gagne said that a few 24 m. rails had been laid in Paris, but no new rails of this length were being laid. The longest now being used were 18 m.

In the discussion on inspectors, as considered in the paper by Mr. Prins (ELECTRIC RAILWAY JOURNAL, June 21, page 990), Mr. Barthelemey said that while the number of inspectors on the Paris system was high as compared with other systems, a reason can be found in the variety of fares charged, and he considered the expense justified.

INDEPENDENT UNITS FOR BRANCH STEAM LINES

The session on Thursday afternoon was given up to a consideration of the use of independent motor cars on trunk line branches and light railways. The report on this subject related largely to various possible economies in steam locomotives, such as feed-water heaters, superheaters and oil burning. There was no discussion.

BUS OPERATION

Mr. Bonhomme, manager of the Société des Transports Automobiles Industriels et Commerciaux of Paris, presented a report on bus operation in Paris. An abstract of this report will appear in an early issue of *Bus Transportation*. Considerable space in this report was taken by a discussion of various substitute fuels which are being tested in Paris for gasoline. One of the speakers pointed out that it was very desirable to develop a motor for commercial vehicles capable of using a second-grade fuel which owners of private cars decline to purchase. Of these substitutes, alcohol in various combinations seems most promising. In the discussion on storage battery buses, the Paris delegates gave rather a doleful account of their experience and said storage battery buses had practically disappeared from that city.

Mr. Bacqueyrisse gave some comparative operating expense figures applying to buses and trolley cars. Those for the buses were for all the buses operating out of a certain depot in Paris with a capacity of from 80 to 100 buses and consequently corresponding to the equipment of an average line. Those for the trolley cars are the averages for the entire system and consequently include a considerable lot of old equipment. With the latest type of cars the figure given below for trolley cars, he said, will drop to fr. 2.50 per car-kilometer (20 cents per car-mile). The figures are for February last and (with the franc at 5 cents) are as follows:

OPERATING EXPENSES ONLY—AVERAGE FOR FEBRUARY, 1924, PARIS

	Francs per Car-Kilometer	Cents per Car-Mile
Motor cars	2.86	22.88
Trail cars	1.44	11.52
Buses	2.43	19.44

In the evening the delegates in a party attended the opera.

BUSINESS SESSION

The session on June 20 was devoted to the business of the association. The report of the treasurer was read and approved. Members of the executive committee elected were: Messrs. Vanden Broek, Thonet, Salvadori, Barth and Rochat (re-elected) and Noirfalize and Tomicki (new members).

It was decided to hold the 1926 meeting in Barcelona, Spain.

Track Switches for Electric Railways in Paved Streets*

The Tendency Is Toward Manganese Steel with a Switch in Each Line of Rail Instead of a Switch in One and a Mate in the Other—Other Phases of European Practice Described

By G. BOUTON
Vice-President East Paris Tramway Company

TWENTY-NINE electric railway properties replied to the data sheet on track switches, sent out by the author. A number of these systems, including those in Bordeaux, Havre, Orleans, Glasgow, London, Naples, The Hague, Buenos Aires and Paris, have replaced all of their built-up switches with switches made of cast steel. Strasbourg, Rotterdam and Utrecht hold to built-up work, but the majority of the systems reporting have a great variety of types, including manganese steel. The use of cast steel, particularly of manganese steel, for this purpose, is spreading, because of its low maintenance cost, and in spite of its high first cost. In addition to manganese steel, tests have been made with high carbon steel for this purpose and (in America) with chrome nickel steel. A switch of manganese steel, with average traffic, should last about 12 years. Though manganese steel is satisfactory as regards wear some companies have found that cupping occurs at the points where the switch is joined to the rail, and these points have to be built up by welding.

In general, the practice is to use a tongue switch in each side of the track rather than one tongue switch and mate, in spite of the added complication of connections. The tongues of these two switches are connected by a rod under the pavement, so that they move in unison. Where a switch with a single tongue is used, the tongue is usually on the inside of the curve, but Glasgow has obtained better results by using it on the outside. Most companies have found, however, that with a single switch, with mate, the point of the latter becomes worn in the direction of the greater traffic, and cars going in the direction of less traffic may be derailed. The use of the single switch and mate should be confined to special cases, such as lines but little used, entrance tracks to depots, etc.

A few companies, among them the company in Paris, are using switches with immovable tongues for both rails on turnouts. This is accomplished by eliminating the curve at the entrance to the turnout, as shown in Fig. 1. Such switches can also be used in other places, as on the exit tracks at carhouses where all of the exit tracks lead in to one ladder track.

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*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

Switch tongues should be fairly long, say from 2 m. (79 in.) to 2½ m. (98 in.). They may be straight or curved. When curved, the radius is generally 20 m., 30 m. or 50 m. The use of a curve on the tongue reduces the blow from the wheel when it enters and leaves the switch. Formerly the outer end of the tongue was sharp. Now it is generally flat or rounded, say from 7 mm. to 8 mm. (about $\frac{5}{16}$ in.) across, or preferably more. To prevent the tongue from rising, a horizontal bolt can pass through the tongue or preferably through a lug on its lower side, or the lower part of the point can be held down by an extension of the bed of the switch, as in Paris (see Fig. 2). In Buenos Aires the novel construction is used of having a groove in the tongue for the passage of the wheel flange (Fig. 3). This means that at its point or outer end the tongue has a width at the base of 65 mm. ($2\frac{9}{16}$ in.) and nearly the same width on top.

In built-up switches the heel of the tongue is always carried on a pivot (Fig. 4) and this practice is followed in many of the cast-steel switches installed. In other cast steel switches, the heel is mounted on a stud (Fig. 5), or it may be held in place by a keeper or lug. In some types of cast-steel switches, there is provision for taking up the wear on the under part of the heel by wedges.

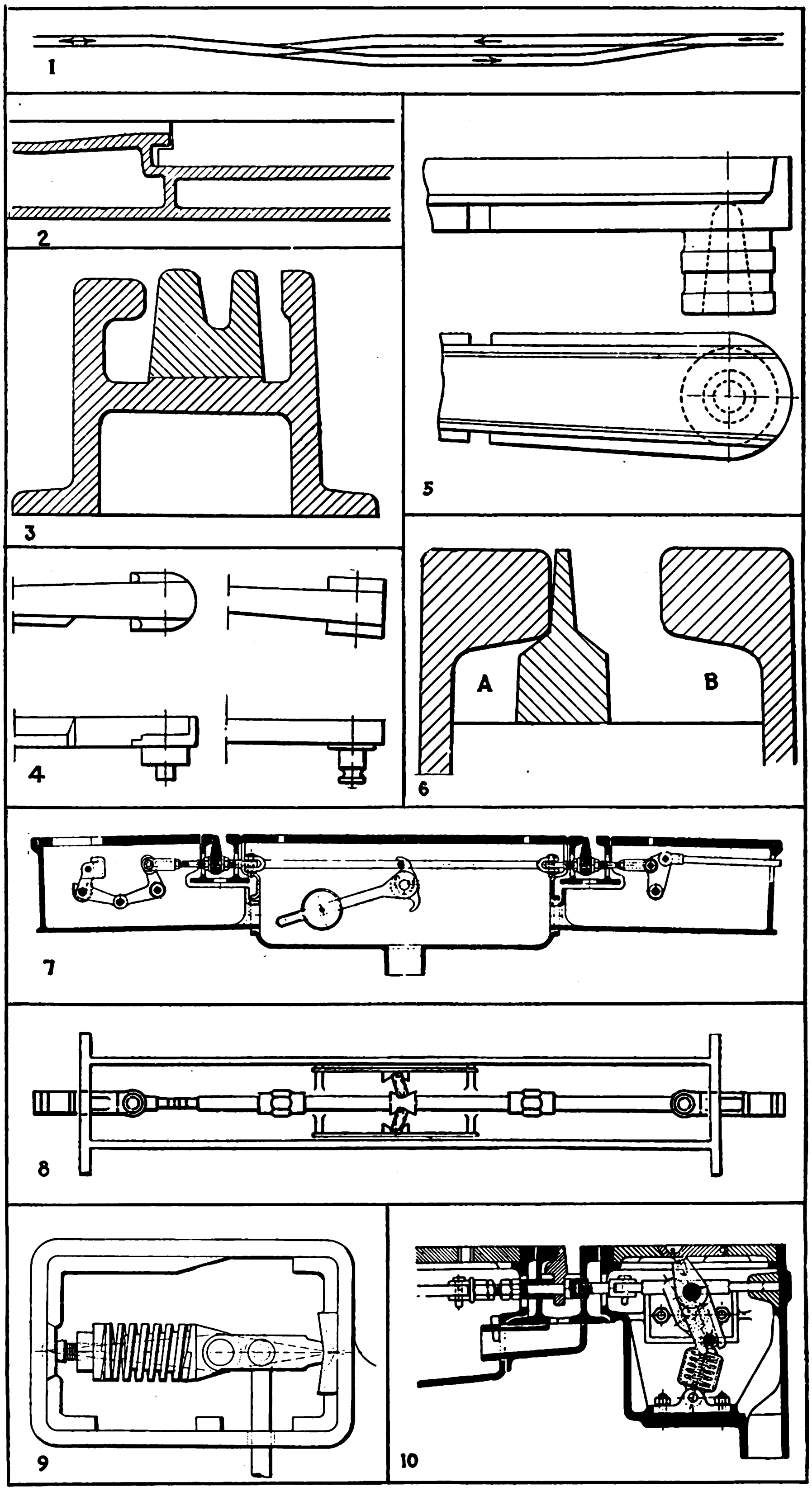
In general, the base of the tongue is broadened out to provide a greater wearing surface, but Geneva has found that with tongues having an enlarged base and recesses, as in Fig. 6, snow and ice are apt to become packed in the pockets marked A and B. In consequence, this company is abandoning this type of switch for one in which the tongue and tongue bed have straight sides. Most cities, however, declare that the switches can be kept clear of ice and snow by salt. The Lille Tramways reports that where a worn tongue is replaced by a new one, it is desirable to build up the switch bed, if worn, by welding, so that the new tongue will lie flat.

Switches are sometimes bolted and sometimes welded to the adjoining track, but the application of welding to join up manganese special work with running rail is still in the experimental stage. If bolted up, especially long angle plates should be used.

OPERATION OF SWITCHES

Switches can be operated mechanically or electrically. Mechanical methods of operation vary all the way from the movement of the tongue by a switch iron in the hands of the motorman or conductor to the operation of the switch by a switchman in the street or on the sidewalk. Hand operation by the motorman obviously is suitable only for lines of light traffic.

Positive action of the switch tongue, or of the switch tongues in double-pointed switches, is obtained in a



European Types of Track Switches for Use by Electric Railways in Paved Streets

Fig. 1—Through turnout not requiring tongue switches.

Fig. 2—Longitudinal section showing method of holding down point of switch tongue in Paris.

Fig. 3—Cross-section of switch bed and tongue, Buenos Aires.

Fig. 4—Two methods of mounting tongue heel on pivot, Geneva.

Fig. 5—Mounting of tongue heel on stud, Paris.

Fig. 6—Section of switch bed and tongue formerly used in Geneva but abandoned because snow became packed in the pockets A and B.

Fig. 7—Cross-section of track showing use of counterbalance in Marseilles for securing positive action for double-pointed switch.

Fig. 8—Method of securing positive action of switches, Paris.

Fig. 9—Method of securing positive action of switches, Buenos Aires.

Fig. 10—Method of securing positive action of switches, Geneva.

variety of ways, as by a counterbalance as in Marseilles (Fig. 7); with a spring lock, as in Paris (Fig. 8) and Buenos Aires (Fig. 9), and with a pivoted spring, as in Geneva (Fig. 10).

Electric Switches

There is a great variety of electric switches. They may be operated by (1) an overhead contactor, (2) insulated section of the trolley wire, or (3) insulated section of the track, over which the motorman passes with current on or current off, according to the position in which he wants the switch. One system only, the Henrard-Levêque, requires no attention from the motorman. In this there are two or more contact studs fixed on the side of the trolley pole below the harp, and these complete one of several circuits as the trolley pole passes through a trough cut into the overhead structure. These studs can be set on the poles of one set of cars so as always to throw the switch in one way, and on another group of cars to throw the switch in another way. While this system has the advantage that it is entirely automatic, the studs on the trolley pole have to be adjusted with pretty close exactness. Complications are produced also when cars for emergency have to be changed from one route to another, and the automatic features of the system tend to make the motorman feel that he has no responsibility when the car is passing over a switch.

The other types of electric switches differ in the form of contactor or method of switch operation, but all are under the control of the motorman. These switches can be arranged for (1) "power-on" operation, or that in which the motorman takes current only when he wishes to change the position of the switch, or (2) for "power on and off" operation, in which the motorman takes current or does not do so depending upon whether he wishes to go to the right or to the left. Both systems are used quite extensively, but the one first mentioned seems safer because when a motorman approaches a switch he must look to see what its position is, so does not get careless.

Motive power for these electric switches may be supplied by a solenoid or a motor. The former is cheaper in first cost and takes less space and is generally to be preferred. The action of a motor, however, is less abrupt, so switch maintenance may be lower with a motor.

The Influence of Transportation on the Growth of Cities*

The Author Suggests that Harmonious Development of Transit and Housing Calls for Public Ownership and Private Management of the Transport Facilities as Well as Possible Public Ownership of Suburban Areas Suitable for Wholesale Housing Plans

By G. Delavenne
President of Municipal Transport Commission and Reporter-General of the Budget, Department of the Seine

Some eager spirits have raised the question whether population follows or precedes transportation. The answer cannot be given out of hand. History shows that so far as old cities are concerned, they evolved without any thought being given to public transportation. It is only in recent times that this matter has been considered.

In the period just before the French Revolution, Quesnay denounced the tendency of the peasants to desert their farms for the city to batten on the extravagance of the court and nobility at Paris. The attraction of the city was greatly increased in the nineteenth century through the advent of the machine age with its corresponding change from the independent worker to the factory. This brought an ominous change in the method of city growth. Theretofore, the development had been toward the creation of numerous communities, each of which specialized in some particular industry so that the worker could stay within walking distance of his job. Transport was almost entirely a question of the carriage of food and other supplies to and from the geographical center and between the different sections.

The second step came with the introduction of regular public service routes. By 1854, ten concerns in Paris consolidated and in 1855 received the thirty-year franchise which marked the origin of the Compagnie Genérale des Omnibus. While this development marked a partial change from vertical to horizontal growth, it was noteworthy that the population density of the newly served sections tended more and more to approach that of the ancient center.

By 1873, the population had spread beyond the city walls and tramways had been built to connect communes north and south of Paris. Up to this time, also, speculation in land had been limited, so that the population tended to follow the routes of new transit facilities closely. All this occurred under animal traction with an average speed of only 6 to 7 m. (3.7 to 4.3 miles) per hour. With the arrival of mechanical traction giant steps were taken in 1890-1910 in the growth of the suburbs as compared with the inner city. Paris' suburban population grew from 693,000 in 1891 to 955,692 in 1901, to 1,039,345 in 1906, to 1,266,000 in 1911 and to 1,505,219 in 1921. Since 1861 Paris city has grown only 50 per cent, while the remainder of the department (of the Seine) has grown 200 per cent.

London shows much the same story. In 1861 the strictly metropolitan area had 2,803,000 inhabitants and the outer ring only 418,000. In 1881 the ratios were 4,000,000 to 1,400,000, the city showing 50 per cent increase, but the suburbs 240 per cent. Within the last thirty years the suburban population of Berlin has increased tenfold.

It is this tendency toward diffusion of the inhabitants through improved transport that has led some anticipators of urban possibilities to echo Vandervelde's prediction that: "The cities of the future will not be centers of habitation so much as agglomerations of public buildings and monuments, places for meeting and for work and rendezvous for business, pleasure and study."

While we have not yet reached this stage, we may hazard the statement that public utility transport has at least partially changed the city from a gathering of immobile inhabitants threatened with dead rot to a mobile community capable of spreading horizontally instead of vertically.

Transport as Related to Actual City Layout

It is only in recent years that municipal authorities have sought to direct the hitherto spontaneous growth of cities. Just now, in particular, the scarcity of houses and the presence of slums make more difficult the problem of spreading the population without violence to the natural tendencies of the inhabitants.

Here enters the fact that with every new Paris line there comes the same erection of six and seven-story tenements as in the center. This is so marked because of the increase in land values produced by the extensions that while the increase of all the suburban population of Paris was 200 per cent in the period 1861-1921, that of the sections directly served by the new transport facilities was 484 per cent. So this uncontrolled relationship between transit facilities and housing has led to the same congestion and high rents in the outer districts as was formerly unique to the center.

At the 1912 convention Herr Kuhles uttered a profound truth when he said that a route established through an unbuilt district without a complete understanding with the land owners along the line as to the construction of homes is a hindrance rather than a help to satisfactory urban development. Means must be taken to assure that the good from such a line will go to the public which pays the cost rather than to the speculator. Haphazard, speculative development which simply creates new congestion centers belies the true purpose of transport, viz., the diffusion of the population.

One way to secure the harmonious co-operative development of transport and housing facilities is suggested by the land-purchase policy (*Bodenpolitik*) of German municipalities. In this case. the same authorities who have control of transit have purchased large tracts which have not been thrown open to the public until the necessary transport and other public facilities have been prepared. The Department of the Seine is now trying town planning of this order at Courneuve and Sceaux. This kind of development not only assures a well-planned housing development but it permits the institution of a tax on surplus land values which helps to defray the cost of the lines.

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*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt Local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

That improvement in the speed of vehicles and, more lately, the greater leisure due to the eight-hour day increase the riding habit or mobility per inhabitant [aside from effect of increased area and population not mentioned by the author.—EDS.] is apparent from the following table:

INCREASE IN RIDES PER INHABITANT PER ANNUM, YEARS 1904 TO 1913

Department of the Seine (Greater Paris)	160 to 260
Düsseldorf	70 to 180
Berlin	230 to 325
Chicago	220 to 300
Average increase, approximately	33 per cent

It has been noted that the larger industrial groups have shown a tendency to move away from city centers for such reasons as excessive cost of land, sanitary regulations, need for better waterway and railway conveniences, etc. On the other hand, the movement of the offices, shops and amusements is inward. The conversion of residence into business sections has been especially noticeable in recent years. Despite legal efforts, such as the declaration of restricted districts, this movement is inevitable. Here, again, it is the function of transport to assure the freest possible circulation between the center and the suburban homes of the office and store workers.

PUBLIC OWNERSHIP AND PRIVATE MANAGEMENT A LA PARIS RECOMMENDED

Three ways are open to the functioning of city transportation enterprises, namely, unrestricted competition; local or general monopoly; public ownership with either public or private management.

In discussing the matter in 1912, Herr Kuhles said that the fault of private ownership was that there was expansion only where a profit was probable and with no regard to civic welfare, while the fault of public ownership was uneconomic overexpansion. Both points are founded on reason, but as this is not a perfect world we must choose the lesser of two evils. As a matter of fact, the financial and urban problems made more acute by the war have caused the large-scale development of metropolitan transportation to slip from private hands into those of the State.

This is what has happened in Paris. Four years ago, the Council-General of the Seine took over the existing surface transport systems preliminary to carrying out elaborate plans for their expansion. Then came the agreement whereby public ownership and private management, under lease, collaborate in financing the property while the company remains subordinate to the state in matters of routing, service, fares, standards of equipment and the like.

The question of rates of fare merits attention without regard to political considerations. No fare scheme can be called normal if the income from the property fails to meet both the costs of operation and all overhead expenses, including amortization. Fares higher than this are likely to be beyond the means of the average rider and therefore would automatically cut down the public's freedom of circulation and growth of the community. On the other hand, fares below cost would result in unjustifiable deficits except where part of the cost would come from the taxation of surplus value created by extensions. Despite the illusions of the public on the subject, only a trifling reduction in fare is possible through further reductions in general costs. An appreciable reduction is possible only by lowering the standard of service, as by longer headways and fewer seats per passenger. This would naturally tend to reduce travel in spite of the lower fares which are intended to increase it.

The "no fare at all" theory of the socialists is no less dangerous. The increase in land and building taxes which free-ride operation would necessitate might lead to prohibitive rentals that would offset the saving in fare.

After all, it should not be forgotten that because of advances in the art and in general efficiency, electric railway fares of self-sustaining undertakings today show far less increase than both the wholesale and retail indices of the cost of living.

Midwest Claim Agents Meet

Hold Active Convention at Des Moines—Many Papers Presented on Topics of Interest to the Claims Department

THERE were about thirty-five claim agents in attendance at the convention of the Midwest Claim Agents Association, held at Des Moines, July 18-19. The program, as printed in the issue of this paper for July 12, was carried out, except that E. A. Funke, claim agent, Lincoln Traction Company, Lincoln, Neb., was not able to be present, but his paper was read by Mr. Bennett of the Des Moines City Railway.

The two-day convention was opened with an address of welcome by Mayor Carl M. Garver of Des Moines, after which Trevor C. Nielson, claim agent East St. Louis & Suburban Railway gave the annual address of the president. Mr. Nielson referred to several causes, among them the automobile, for increased accidents, said that the claims men were finding greater help through conferences than formerly and urged all to work continuously, not spasmodically, for greater safety and fewer claims.

The "Rule of the Res Gestae" was the title of the paper delivered Friday morning by Hon. Herman M. Geuch, Judge of the Municipal Court, Des Moines. The speaker pointed out that in almost all American courts, declarations uttered by parties to a transaction which are the natural outgrowth of the transaction, spontaneously expressed and so nearly coincident in point of time that they may be taken as part of the transaction and explain it, are admissible as evidence. This is one of the exceptions to the hearsay evidence rule. In street railway accidents, these declarations, in so far as the railway company is concerned, are generally made by the motorman or conductor in charge of the car. The rules governing the admission of such evidence have been stated many times by the court. Thus, in the case of the Fort Wayne & Wabash Valley line, a declaration said to have been made by the superintendent that he should have known better than to have put a certain motorman in charge of a car, was not admitted as evidence when made long after the occurrence at a point 12 miles away from the place of the accident.

As a rule, only declarations made by persons competent to be witnesses are admissible, though they may be made by a bystander. A bystander's declaration is not admitted in some states, as for instance, Arkansas, Kentucky and Louisiana. Formerly it was held that the declaration must be contemporaneous with the transaction, but the decisions of modern times indicate that perfect coincidence of time is not required. Thus, in the case of the Spokane Railway, a statement made by the conductor of a derailed train two hours after its occurrence was admitted, and in another Washington case in which a boy was knocked unconscious by an accident, statements made when he recovered consciousness eight days later were admitted under the doctrine of *res gestae*. On the other hand, a statement made by a motorman that he was responsible for an accident in a Detroit case, after he had been threatened by a mob, was not admitted. The tendency of recent decisions is to relax the rule of admissibility rather than to restrict it.

That the claim agent, in order to be successful in his work, need the co-operation not only of the general public, but also of the railway employees, was brought out by T. G. Kelly, superintendent railway and claims, Fort Smith Light & Traction Company, Fort Smith, Ark. The best way to enlist this co-operation, according to Mr. Kelly, is through personal contact with the employees and the public. It is worth while to make a point to get acquainted with nearly all the employees. The railway should pay nominal damages if it believes it is liable regardless of whether the injured party would be able to prove damages in court.

Results obtained from a co-operative plan for the reduction of accident costs were told by C. B. Proctor, claim agent, Memphis Street Railway Company. The individual bonus caused a material increase in the number of unreported accidents because it failed to encourage the reporting of all minor happenings. Safety campaigns, dinners, meetings, prizes, etc., were tried but were not entirely satisfactory because the tendency was to reduce the number of reported accidents without materially reducing the accident costs. A co-operative bonus plan was therefore finally adopted whereby the men participate in the saving in accident costs made by the railway. As a result of this, the cost has been reduced from 5.59 per cent of gross earnings to 4.03 per cent of earnings.

That the modern claim agent is in reality a purchasing agent specializing in only one commodity—releases—was asserted in a paper by E. G. Funke, claim agent, Lincoln Traction Company, Lincoln, Neb. Various types of releases were analyzed by Mr. Funke, who described the essential points that should be embodied in order to stand legal attack.

The paper by F. W. Stockmar on "Outside Factors Affect Damage Claims" was printed in abstract in the issue of this paper for July 19.

One of the most spirited discussions of the convention was that which followed the paper by Mr. Robinson of Cincinnati. His urging of the practice of the Golden Rule and his theory that many claim departments are stirring up contestants by "soup to nuts" investigations brought nearly every man in the meeting into the discussion.

Another paper which proved most interesting in that it dealt entirely with the human element was that by Mr. Mahan on "Men." Emphasis was laid by Mr. Mahan upon the necessity of the claim department having an intimate touch with trainmen, and an assistance in their education on safety measures.

A feature of the meetings not on the regular program was a short impromptu talk on "Safety" by Mrs. C. B. Hardin, wife of the claim agent of the United Railways, St. Louis. Mrs. Hardin is a full-fledged member of the association and had a lively discussion with D. M. Finch of the Des Moines City Railway on the work of the safety councils in cities.

Each paper brought out a spirited discussion. The attendance was not so large as to require formality in procedure, and almost every claim agent present took part in the discussions. Almost no reader of a paper got through without submitting to a fire of questions.

D. M. Finch, claim agent of Des Moines City Railway, was host to the convention, and on Friday evening the claim agents were taken for an automobile ride around Des Moines ending at the Wakonda club, for dinner.

In the annual election of officers held Saturday morning the following were chosen: President, T. C. Neilson, East St. Louis; vice-presidents, S. G. Shaw, Denver, and D. M. Finch, Des Moines; secretary-treasurer, W. C. Adams, East St. Louis; committeeman at large, C. B. Hardin, United Railways, St. Louis. All of these choices were re-elections with the exception of the secretary-treasurer.

New England Club Holds Annual Outing

A ROUSING good time was had on July 24 at Norumbega Park, Mass., by the New England Street Railway Club, when 400 members and guests assembled for the annual outing of the organization. Harry H. Hanson of the Middlesex & Boston Street Railway was general chairman of the outing committee, and with his associates lived up to the program's promise that there should be "something doing" from 10 a.m. to 10 p.m.

The program included a wide range of outdoor sports for both men and women, and there was also many attractions for children. Families of club members were generously represented in the attendance, and the annual "costume baseball farce" between the street railway men and the supply men aroused great enthusiasm. The forenoon program featured sports for women, and after a box luncheon sports for the men and the ball game filled the time until about 4.30, when a series of water sports for men and women was run off. Following dinner came the award of prizes and the evening performance at the park theater. Provision for golf was made at the near-by Woodland Golf Club.

Central Accountants' Association Program

THE program of the Central Electric Railway Accountants' Association summer meeting, which will be held at Hotel Cleveland, Cleveland, Ohio, Aug. 15 and 16, 1924, has been announced, with the exception of the address of welcome. All meetings will be held on Eastern standard time.

The program follows:

Friday, Aug. 15, 9 A.M. to 12 Noon

Meeting of Executive Committee

Address of Welcome.

Paper, Light and Power Accounting, by H. M. West, chief clerk Benton Harbor-St. Joe Railway & Light Company.

Paper, Bus Operating Costs and Accounting, by F. A. Healy, auditor Indiana, Columbus & Eastern Traction Company.

Paper, Activities of the Public Relations Department, by A. E. Scott, director of public relations Interstate Public Service Company.

1:30 P.M.

Reports of Committees.

General Business.

Saturday, Aug. 16, 9 A.M. to 12 Noon

Standardization of Forms, joint paper by members of the Freight and Express Committee.

Question Box.

A general oral discussion will be held following all papers and committee reports.

American Association News

City and Interurban Operation

A JOINT meeting of the committees on city operation and interurban operation of the American Association was held at St. Louis, Mo., on July 25. Those present were:

City Operation—H. B. Flowers, chairman; R. F. Carbutt and R. W. Emerson, regional vice-chairmen; C. S. McCalla and E. J. McIlrath. *Interurban Operation*—Harry Reid, chairman; John S. Bleecker and G. W. Welsh, regional vice-chairmen; D. W. Snyder, Jr. and H. A. Mullet. *Both Committees*—E. F. Wickwire, manufacturer representative, and G. C. Hecker, secretary. *Guests*—J. A. Greig, W. H. Sawyer and Maj. R. J. Lockwood.

The meeting was held at the Missouri Athletic Club through the courtesy of W. H. Sawyer, who arranged for the meeting room and for the committee luncheon.

The secretary announced that reports had been received from six regional vice-chairmen. Messrs. Carbutt and Bleecker read their reports and the secretary read the others. There was considerable discussion of the several reports and it was especially noticeable that there was practically no duplication, each regional vice-chairman having summarized his observations from a different viewpoint.

Discussing methods of presenting the reports of the two committees, the suggestion was made that a joint report be made instead of two separate reports, the principal advantages being avoidance of duplication and conservation of time at the convention. It was decided that a joint report should be made. It was agreed that the report should consist of an introductory section; reports of regional vice-chairmen; conclusions and recommendations. The Handbook of Modern Practices should be included as an appendix.

The data gathered by the regional vice-chairman will be presented in the "Handbooks on City and Interurban Practices." It was decided to issue each handbook this year in stencilled form only, and the secretary was instructed to forward one to each member of the association.

An editing committee for the final report was appointed, consisting of R. F. Carbutt and C. W. Kellogg of the city committee; J. S. Bleecker and G. W. Welsh of the interurban committee and G. C. Hecker, J. A. Greig and Morris Buck.

Messrs. Reid and Flowers suggested that the two committees be combined next year as the "committee on electric railway operation." They also suggested that the chairman be a vice-president of the American Association. It was agreed that such recommendations should be embodied in the report this year.

It was decided to recommend the appointment of one Canadian regional vice-chairman and two Canadian members at large.

The secretary announced that exhibit space had been set aside for these committees at the coming convention. A discussion resulted in the decision to ask Secretary Welsh to eliminate the exhibit as a separate feature and to incorporate in the Association's exhibit any material which the committees might want displayed.

Foreign Operation Committee in London

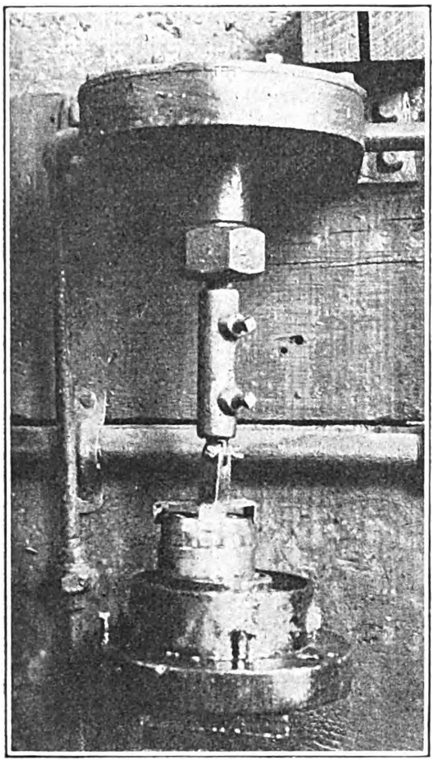
THE special committee on foreign operation of the American Association, consisting of Harley A. Johnson, James W. Welsh and Harry L. Brown, following its arrival in London on July 15, has devoted a considerable amount of time to a study of the London transportation situation.

Following two weeks spent on the London Underground system and the London County Council Tramways, the committee has arranged to visit important cities in the northern part of England and in Scotland. Following this trip, the committee plans to return to London Aug. 2.

Maintenance of Equipment

Air-Driven Valve Lapping Machine

LAPPING in motorman's air valves is usually a long tedious hand operation which makes this work comparatively expensive. In the shops of the Denver Tramway, an air-driven machine has been designed for doing this work, and is found to accomplish it successfully.



This Air-Operated Device Laps Motorman's Valves Automatically

The machine consists of a home-made air turbine, shown at the top in the accompanying illustration. A shut-off cock in the air line to the turbine acts as a throttle to regulate the speed so that the rate of rotation is approximately that which would be obtained were the lapping carried out by hand.

On the shelf below, the lower part of the valve is placed in position and the upper valve member set on top of it, just as if the lapping were to be done by hand. Grinding compound is applied in the customary manner.

On the stem of the machine is a small casting having fastened to it a sheet metal piece made up with four projections as shown in the illustration. This is set at a slight angle to the axis of the stem, so as to give it a slightly eccentric motion, when the stem is rotated by the turbine.

The prongs on the bottom of the driving fixture are not bent down exactly at right angles, but are twisted slightly from a straight line drawn through the center of the stem. These prongs are not fastened to the valve in any way, simply straddling it. As they rotate with an eccentric motion they rub against the sides of the upper portion of the valve and cause it to move about over the face of the lower member. The rate of rotation of the valve is less than half of that of the prongs, due to the slipping which takes place between them. The combination of this slipping with the eccentric motion of the prongs themselves results in the top valve member moving over the bottom surface in very much the same manner as would be done by hand. The continually changing direction of motion prevents the formation of grinding marks and gives a resulting surface equivalent to that with hand lapping.

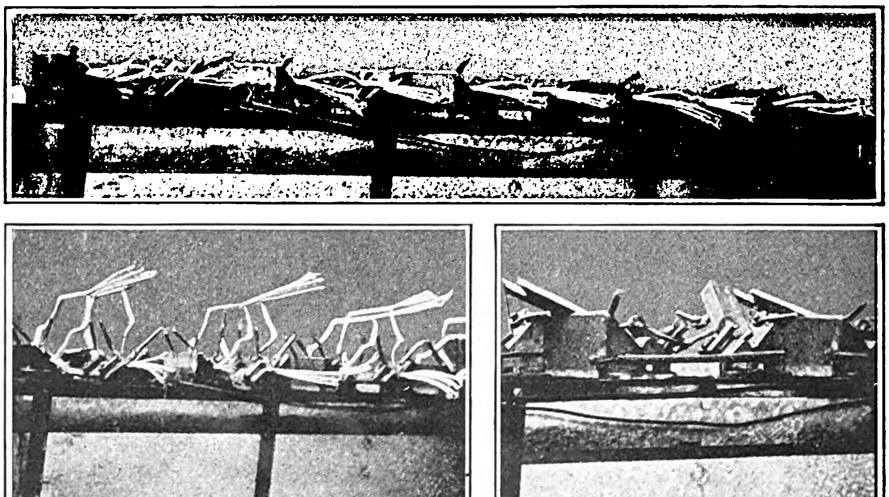
One of the men working on the air-brake repair bench takes care of placing valves in the machine from time to time, and while the valves are being lapped in he is engaged in other work at the bench.

Electrically Heated Coil Press

A NOVEL form of coil press is in use at the St. Catharines shop of the Niagara, St. Catharines & Toronto Railway. This form of coil press, which was developed by the railway under the supervision of W. E. Massie, mechanical superintendent, is electrically heated and water cooled. The main part of the press is a hollow casting which contains an electric heating element for 500-volt direct current. Provision is also made for circulating water, which is supplied from a jet under the casting in the water receptacle.

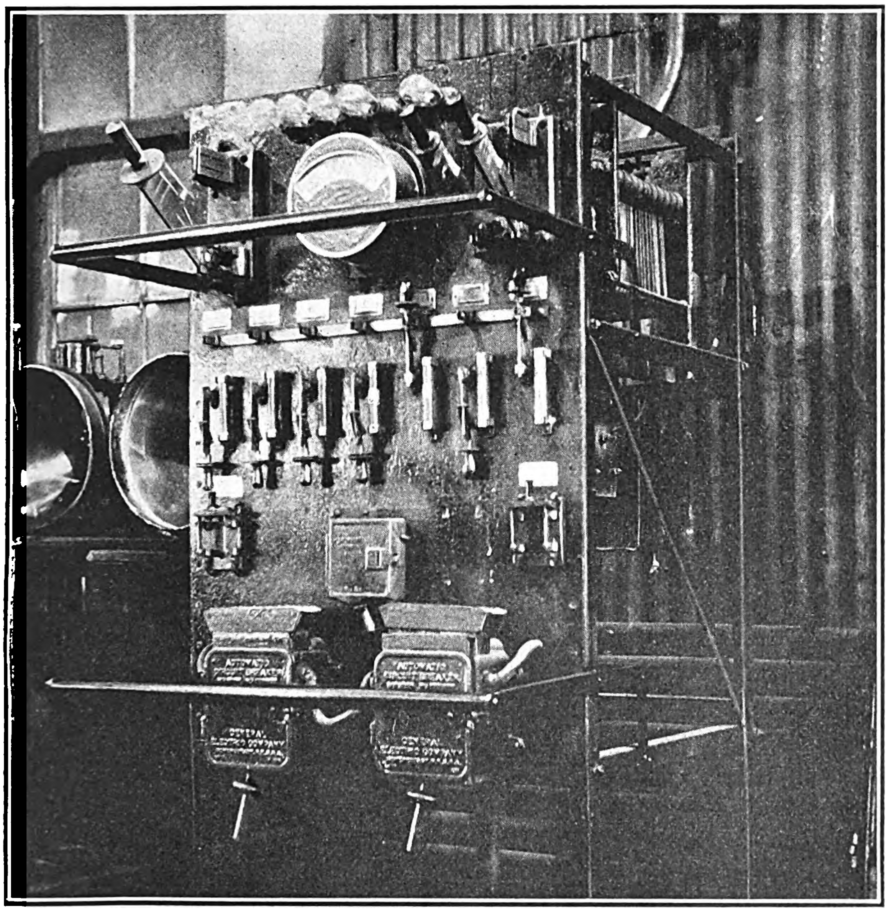
The press is designed so that it will take armature coils for all modern railway motors, including sizes from the GE 80 and Westinghouse 101-B up to the five-turn GE 240 coil. In practice, it takes about 20 minutes to heat the press and cool the coil. When the coil is removed all the wires are cemented together by the shellac between the layers.

A number of these presses have



This Coil Press Is Electrically Heated and Water Cooled

The empty press is shown at the lower right. In the view at the top coils are placed to obtain proper radius to fit the slots, and in the view at the lower left the coils are placed regardless of armature radius.



Automatic Circuit Breakers Are Tested by Shop Switch Panel at the Decatur Shops of the Illinois Traction System

been constructed by the railway, which has been using them with very satisfactory results. One of the illustrations shows the press empty. The levers for holding the coils in position and pressing them are shown. In the other illustrations are shown several coils in position in the presses.

Testing Circuit Breakers Under Load

At the Decatur shops of the Illinois Traction System every circuit breaker, whether new or rebuilt, is given a test before it is placed in service. The testing apparatus used consists of three heavy-duty quick-break switches, a standard circuit breaker and the circuit breaker under test all mounted on the face of a panel. On the back of the board are mounted sufficient standard motor resistor units to create the desired electrical load for testing. The main line switch, the circuit breakers and resistor units are connected in series on the 600-volt d.c. line with provision made in the wiring for imposing two different loads on the circuit breaker under test. These two conditions are taken care of by the two switches located in the upper right hand corner of the panel. An ammeter is also connected in series with the apparatus.

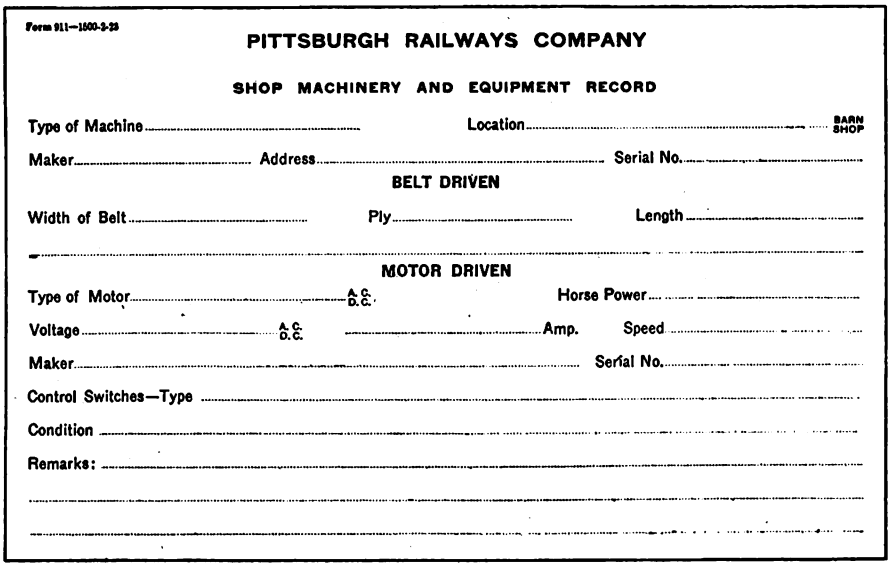
The circuit breaker under test is set to release at the proper current value. In turn the main line switch, the permanent circuit breaker and the control switch governing the amount of current are closed. If the circuit breaker does not release when the control switches are closed, the current reading shown on the ammeter is noted, the permanent circuit breaker is knocked out by hand and another adjustment made of the circuit breaker under test. The permanent circuit breaker placed in series for protection of the apparatus is set to release at an amperage of approximately 25 per cent above the normal rating.

As the railway has two types of circuit breakers, two control switches are installed to give the proper current for each type of breaker. When the heavy breakers are tested the permanent circuit breaker is set up so as to protect the line under these conditions. This apparatus was constructed by the electrical department of the shop and is mounted on the same panel as are the switches and fuses for the shop lighting circuit.

Keeping Records of Shop Equipment

Record cards are kept by the Pittsburgh Railways of all machinery and equipment located in the shops and car houses. This record is filed in the shop department office and is kept up by one of the engineers of that department. Cards such as shown in the accompanying illustration are used. They are of white cardboard, 8 in. x 5 in. Following an inventory a few years ago, the information obtained was placed on cards and since then these cards have been kept up to date by recording the changes in existing machines. A card is destroyed if the machine is scrapped and a new card is filled out when a piece of equipment is added.

If a shop machine is driven from


Form 911—1500-3-23

PITTSBURGH RAILWAYS COMPANY

SHOP MACHINERY AND EQUIPMENT RECORD

Type of Machine........................ Location........................ BARN SHOP

Maker........................ Address........................ Serial No........................

BELT DRIVEN

Width of Belt........................ Ply........................ Length........................

MOTOR DRIVEN

Type of Motor........................ A.C. D.C. Horse Power........................

Voltage........................ A.C. D.C. .... Amp. Speed........................

Maker........................ Serial No........................

Control Switches—Type........................

Condition........................

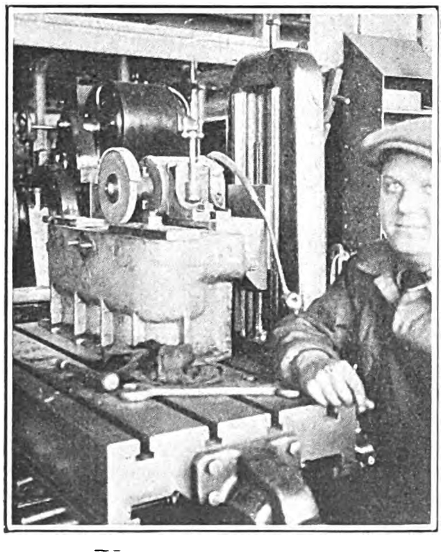
Remarks:........................

Card Used by the Pittsburgh Railways for Keeping Records of Shop Equipment the line shafting or countershafting the size and make of the belt to the machine is recorded. If, however, the machine has an individual electric motor, the space pertaining to the belt is disregarded and the data relative to the driving motor is recorded. This record system also applies to all equipment throughout the shop such as line shafting, welding outfits, power belts between line shafts, and power motors. Data are recorded on the face of the card and additional remarks are made on the back. With this method it has been found possible to purchase repair or replacement parts intelligently without the necessity of sending sample parts with the order.

Milling Machine Used as Surface Grinder

THE combination of a small portable grinder and a Lucas universal milling machine in the shop of the Department of Street Railways, city of Detroit, has been found very useful for a number of jobs which ordinarily would require a surface grinder.

One such job which is carried out efficiently on this machine, shown in an accompanying illustration, is the operation of finishing valve seats on the engines used for driving various automobile trucks on the railway property.



A Portable Grinder Is Used for Surface Grinding in a Lucas Milling Machine

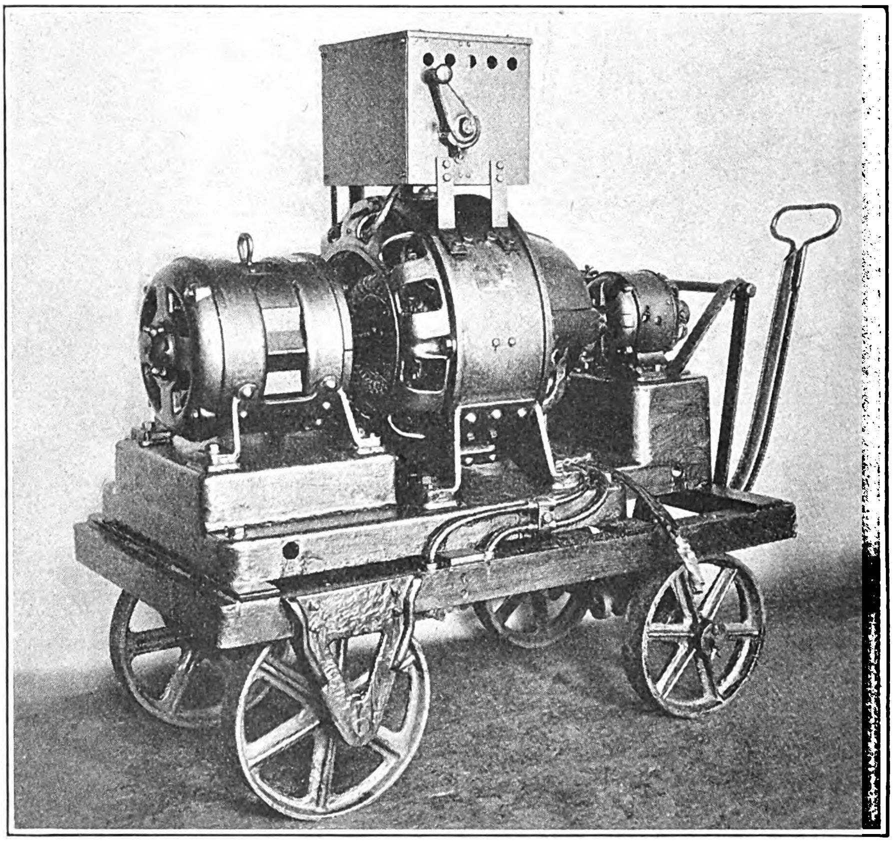
The worn valve seats are first welded and are then ground to a flush surface with the top face of the engine casting, so that after they have been re-seated the valves are again in first-class condition and ready for reinstallation.

New Equipment Available

Compact Arc-Welding Set

A COMPACT, entirely self-contained, single-operated 200-amp. arc-welding set has recently been designed by the Westinghouse Electric & Manufacturing Company. This is available in either the stationary or portable form. The generator will deliver 300 amp. on intermittent work, but any welding current from 60 to 300 amp. may be obtained by operating the rheostat handle located outside the control cabinet on top of the generator.

The generator is designed inherently to stabilize the arc, thereby overcoming instantaneously any resistance fluctuations in the arc circuit, while at the same time the necessity for relays, solenoid controlled resistors, etc., is eliminated. Because of the special design of the generator, the operator can readily strike and maintain the arc, obtaining the necessary penetration and fusion for good welding. Any of the commercial sizes of metallic electrodes, from 1/16 in. to 1/4 in. diameter, may be used.



Portable 200-Amp. Arc-Welding Apparatus

The generator and its driving motor are mounted on a common shaft to which the separate exciter is coupled by means of a special flexible coupling. Ball bearings are used throughout to eliminate the leakage of oil when operated on inclined positions.

The driving motor is of standard Westinghouse construction and may be either a d.c. type SK motor or an a.c. type CS squirrel-cage motor, depending upon the character of the supply service. Alternating-current driving motors may be used on 220- and 440-volt supply circuits simply by rearranging the lead connections.

Alternating-current motors are started by connecting them directly to the line through a safety switch. Direct-current motors are started by means of a type D starting rheostat. In both cases, all the operating mechanism except the handle is within the control cabinet, eliminating danger of contact with live parts. An ammeter and a voltmeter, if desired, are mounted on the cabinet.

The rugged construction of the unit makes it particularly adapted to railway shops and similar places where welding equipment receives rough usage. The truck is sturdy and is equipped with roller-bearing wheels so that it can easily be hauled by one man.

The News of the Industry

Buses for Oakland

Agreement Reached Under Which Key System Transit Will Start Fèeder Service on Short Lines

Definite progress toward the improvement of railway service in Oakland, Cal., was made on July 22 at a hearing before President Clyde L. Seavey of the Railroad Commission. That day the Key System Transit Company agreed to install three bus lines to connect with existing railway lines in East Oakland; one on Thirty-fifth Avenue, one on Seminary Avenue, and a line commencing at Ignacio and Trask. These bus routes are to be started as soon as a permit can be obtained from the city of Oakland.

It was agreed at the hearing that there should be a 6-cent fare on these bus routes, with transfer privileges to connect with street car lines. Representatives of the company, the city and the Railroad Commission agreed at the hearing that a further and complete investigation of the transportation system should be carried on under the supervision and guidance of the engineering department of the Railroad Commission.

The agreement is really the fruition of a traffic survey which has been in progress for the past four months by an expert for the city in conjunction with Richard A. Sachse, who has been acting for the Key System Transit Company.

W. R. Alberger, vice-president and general manager of the Key System Transit Company, stated that the buses have been ordered and the routes mapped and that it is now merely a question of official sanction.

Mr. Sachse declared that the three proposed lines will represent an investment of about $45,000; that the estimated total net revenue will approximate $37,000 yearly, and that the operating expenses will be in the neighborhood of $72,000, leaving a deficit of $35,000. He said:

> I believe that in spite of this loss to the company operation of the lines should be undertaken because this loss is not anticipated to exist always. In a few years the extensions should at least justify themselves to the point of carrying their own operating expenses.

C. O. G. Miller, president of the Key System Transit Company, made this statement:

> It will be noted by the official figures presented to the commission by our engineers that the proposed routes will be losing ventures for the company, but they will undoubtedly be valuable investments for the districts they serve. Transportation should be regarded as an investment for the community and as such is usually worth many times what it costs. But with the existing patronage these routes cannot pay any return to the company.

The three routes proposed are in the outskirts of East Oakland, a section that is experiencing rapid growth. The first route has a round trip mileage of 2.8 miles and a running time of seventeen minutes for round trips with a twenty-minute headway from 6 a.m. to 11 p.m. One bus will be required.

Route Number 2 has a 6.10 mileage with a fifteen-minute headway. Two coaches will be required on this schedule.

Route Number 3 has a 6.16 mileage and a fifteen-minute headway and will also require two coaches.

Transfers to regular lines will, of course, be given.

The five coaches for use on these lines, if the official approval is forthcoming, will be built in the Oakland shops of the Fageol Company. They will be of the same type as the famous city bus "Rosalie," which was run by Oakland in competition with the traction company at a loss during the two-man car war a few months ago.

The next step in the traffic survey will be consideration of Oakland cross-town lines. Engineers for the company and the city have had a conference on this matter and will probably make recommendations in the matter at the next hearing before State Railroad Commissioner Clyde Seavey. This has been set for the morning of Sept. 12 at Oakland.

The adjustment of the East Bay traffic problem is now well under way. Feeder bus lines have already been established in Alameda, and it is probable that the Oakland lines will be in operation by fall.

Employees' Contest in Salt Lake City

In the interest of improved service to the public, from whom it hopes to gain increased patronage, the Utah Light & Traction Company, Salt Lake City, Utah recently conducted a contest to be participated in by its employees. Fifty dollars in gold was offered in four prizes, $20, $15, $10 and $5 respectively for the best answer in 300 words to the question: "How can I secure twenty more fares a day for my company?"

Marked interest was displayed, many employees submitting answers to the question.

The answer which won first prize was submitted by Conductor Mark C. McDaniel. He said in substance:

> Show more courtesy; make riding a pleasure; do not leave end of line and time points ahead of scheduled time; show the people that we want their patronage, and that they cannot ride their automobiles to and from work as cheaply as they can ride the old reliable street cars. Handle your car with care. Watch every street you cross for prospective passengers and if you see anyone making an effort to catch your car, wait for him. Watch the fare box and transfers closely. Make friends, not charity riders. Take an interest in your work, or make room for someone else. Do not knock, but boost the company of which you are a part.

Safety Congress Meets

Legislation Adopted in Ohio Looking Toward Elimination of Highway and Grade Crossing Accidents

War against traffic accidents in Ohio was started in Columbus on July 23 when a permanent organization was perfected of the Ohio Committee for the Prevention of Grade Crossings and Other Highway Accidents. A. E. McKee, editorial writer for the Ohio *State Journal*, Columbus, was named chairman of the permanent committee and James B. Dugan, secretary of the Ohio Utilities Commission, was chosen secretary. Formation of the permanent organization was the outgrowth of a conference of representatives of railroads, electric railways, auto clubs and bus operators, called by Gov. A. V. Donahey, which met in the Senate chamber in the State House. Detailed arrangements for the Congress were left to a committee composed of Arthur V. Bland, director of public relations of the Indiana, Columbus & Eastern Traction Company, and other prominent men, including officials of the railroads and the organizations operating buses.

Provision was made for holding a similar conference annually and co-operation was promised by Governor Donahey in recommending to the next Legislature the findings of the conference. These included recommendations that auto drivers in Ohio be compelled to undergo tests as to their fitness to operate motor cars and that their licenses be subject to revocation for cause.

Other resolutions adopted by the conference included recommendations for elimination of grade crossings in an orderly and expeditious manner, avoidance of crossings wherever possible, co-operation of the state highway department and local political subdivisions in relocating highways that cross and recross railways with the view of eliminating all unnecessary crossings, enactment of laws authorizing the utilities commission, or other public authority, to require the removal of unnecessary obstructions to the view of the traveling public and to prevent the creation of new obstructions on property in the immediate vicinity of railroad crossings, enactment of "Stop, Look and Listen" legislation requiring drivers of all vehicles to come to a complete stop when approaching an unguarded grade crossing, use of colored lights, signals and signs recommended by the safety first committee of the American Railway Association, reporting of all motor vehicle accidents to proper authority for statistical and other purposes, a thorough system of education in schools in regard to accident prevention, and a development of public interest in every way possible in the elimination of grade crossing accidents.

It was resolved also that the committee confer with similar organizations in other states to promote the work and attempt to bring about a system of uniform laws, signs and warnings in the various states.

A committee composed of representative men in the railroad, railway and automobile fields was appointed to draft legislative proposals based on the resolutions adopted at the conference. Included on this committee was Fred Coen, general manager of the Lake Shore Electric Railway, Cleveland. The proposals will be submited to Governor Donahey.

Wage Hearings in Boston Scheduled

Public hearings will be held, probably in the State House at Boston, on Aug. 13, 14, 15, 25, 26, 27, 28 and 29 by the special board which has been selected to arbitrate the wages and working conditions on the Boston Elevated Railway system. Judge John D. McLaughlin of the Suffolk County Superior Court has been agreed upon as the chairman of the board. His associates will be James H. Vahey for the union and Charles W. Mulcahey for the company. Messrs. Vahey and Mulcahey will act both as counsel in the presentation of evidence and as arbitrators in voting upon the final award, and Judge McLaughlin will be the neutral member of the board, his to be the deciding vote. The men ask an increase in pay from the present maximum of 70 cents to a maximum of 95 cents an hour. The company has made a counter proposition that the men accept a reduction of 5 cents an hour from the present maximum.

Thirty-six Hurt in Long Island Accident

One person was killed and thirty-six others were injured during the evening rush hour on July 30, when three cars of a Long Island Railroad train left the rails. The accident is attributed to hasty opening of a switch in the Sunnyside Yards at Woodside. One of the cars that left the rails was hurled against an electric locomotive standing on an adjoining track. It was in the impact of these vehicles that so many persons were hurt. A statement made by the Long Island Railroad explaining the cause of the accident is as follows:

> At 5:31 o'clock, Long Island Train 466, while passing a Pennsylvania Railroad electric engine at Tower H, in the Sunnyside Yards, Long Island City, had the hand switch thrown on car No. 7, which was third from the rear. As a result, a car of the electric train grazed the electric engine, causing the car to be thrown on its side. Cars No. 7 and No. 8 of the passenger train were derailed by the force of the collision with the overturning engine.
>
> The electric engine had stopped at a clearance point on a westbound track. At the time of the collision James J. Moore, a helper on the electric engine, had descended to the ground and was standing near a hand switch at the clearance point when the ten-car passenger train approached. Moore is reported to have turned the switch before the ten-car train had passed entirely over the frogs, causing cars 7 and 8 to collide with the electric engine.

Director to Have Control of Cincinnati Properties

Tentative clauses by which the Cincinnati Street Railway, Cincinnati, Ohio, places virtually complete control over the maintenance and operation of the system in the hands of the Director of Street Railroads has been agreed upon by representatives of the Cincinnati Street Railway, Cincinnati Traction Company and city officials, who are drafting a new traction franchise. While agreeing to these clauses, the traction representatives obtained protection for their interests in two reservations mutually agreed upon. They are that no order of the Director of Street Railroads shall be of such character as to raise the cost of operation so high that a return of 6 per cent cannot be made upon the property and that no orders be issued that would keep the company operating the system from maintaining its property and plant in a proper manner.

The object of both sides is so to draw up the ordinance that the responsibility would rest with the Director of Street Railroads. For that reason, authority over all changes in schedules, stops, routes, tracks or equipment will be vested in the director in the tentative draft of the franchise. These steps mark the first radical departure in the proposed provisions of the new ordinance from that of the present franchise, in which the powers of the Director of Street Railroads is limited.

Another development was the agreement providing for the eventual use of motor buses, trackless trolley cars or other modes of transportation by the street railway company. It was agreed that the franchise should run for twenty-five years. Provision for other modes of transportation by the operating company was made because it was believed that in the future the city probably would require rapid extension of the electric lines, which thus would be provided for. It was decided that in the event of disagreement arbitration would be resorted to and that such tribunal would consist of three members, one to be named by the city, one by the railway and one by the Board of Sinking Fund Trustees.

Philadelphia to File Formal Protest Against Increased Fare

Since the filing of the 8-cent fare tariff with the Public Service Commission, the Philadelphia Rapid Transit Company, Philadelphia, Pa., has become the target of much complaint and criticism, including a formal protest by the city of Philadelphia against the proposed advance in rates. Reference to the company's statements and the letter sent to Mayor Kendrick by Thomas E. Mitten calling attention to the expected loss in income in 1924 was made in the ELECTRIC RAILWAY JOURNAL, July 26, 1924. In its new tariff seeking to establish an 8-cent fare, with two tickets for 15 cents, the company announced its plan for improving service and for a system of 5-cent fare zones to be put into effect on its suburban lines.

Mayor Kendrick, on July 24, requested that City Solicitor Gaffney co-operate with the Department of City Transit in preparing and filing a formal protest against the fare increase. In this communication he said that although the people appreciate the efficient management now operating the Philadelphia Rapid Transit Company lines and are willing to pay proper compensation for the service rendered, they are at the same time unwilling to accept added burdens in the form of increased carfares without being satisfied that such increases were absolutely necessary in order to maintain good service.

W. D. B. Ainey, chairman of the Public Service Commission, said that a public hearing in regard to the matter would be held on Sept. 2.

New Bus Service for Hartford

A new bus line is to be established at Hartford, Conn., by the Connecticut Company. It will start at Pearl Street and operate along Allyn Street, Asylum Street and Woodland Street. Transfers will be valid from trolleys or inbound or outbound buses of the company, if used at Asylum and Trumbull Streets and Pearl and Trumbull Streets.

Bus Company for Brooklyn Chartered

The Brooklyn Bus Corporation has been formed to own and operate buses for the Brooklyn-Manhattan Transit Corporation. The certificate of incorporation was filed with the Secretary of State on July 24 and the County Clerk of Kings County on July 25. The officers of the new company are W. S. Menden, president; Travis H. Whitney, vice-president, and F. C. Marston, secretary and treasurer. The incorporators of the new company and its directors for the first year are Gerhard M. Dahl, W. S. Menden and Travis H. Whitney. It is understood that the active direction of the bus company will be under Travis H. Whitney, vice-president. As stated in the certificate of incorporation, the purpose of the new company is:

> To purchase, lease or otherwise acquire automobiles, taxicabs, or other motor vehicles of every character and to operate and conduct a general livery, taxicab, sightseeing and motor vehicle service for the carriage and transportation of persons and property for hire, but not for the purpose of establishing, maintaining and operating any stage or omnibus route or routes.

This is in line with the statement made in the ELECTRIC RAILWAY JOURNAL for July 26 that the buses will not be operated on definite routes, unless the public authorities deem it wise to sanction the operation of bus lines, and that pending such authorization the buses will be used for livery service.

The first of the buses was expected to arrive by Aug. 1. The company already has a number of applications for use of buses by special parties going to the various beaches. Several civic organizations have also suggested various routes which in their opinion should be operated as bus lines. This is taken as an indication that the readiness of the B.-M.T. to render bus service, if public authorities approve, has been well received by the public.

Chicago Surface Lines Franchise Does Not Permit Buses

Operation of buses as feeders to the street car lines in Chicago is not permitted under the terms of the existing franchise, according to the city law department.

Assistant Corporation Counsel Doty recently stated that the present franchises do not permit such auxiliary operation, and that an amendment to the franchise of the Chicago Surface Lines would be necessary before such operation could be undertaken.

Due to the rapid expansion of the territory included within the corporate limits of the city, demands for extensions of various car lines are made continually. Under the terms of the original franchises the companies were required to build a certain number of miles of new extensions each year. This requirement became one of the elements in the controversy over changes in the rate of fare during Mayor Thompson's administration, and the subject has not yet been entirely settled. If the opinion of Mr. Doty is correct, the Surface Lines will be unable to utilize buses for service in outlying sections of the city without special action by the City Council.

Buses Running in Oskaloosa

Bus service is being given a trial in Oskaloosa, Iowa, by the Oskaloosa Traction & Light Company over the routes of trolley lines which have been operated at a loss.

Special permission was granted the traction company by the City Council to operate the buses over a ninety-day period to test the desirability of motor transportation in certain parts of the city.

Two White cars with Champion de luxe coach bodies, identical with the buses operated by the Illinois Power & Light Company, have been put into service. The coaches are running over the route covered by the east end car besides serving the west end with new service over a loop that extends to the entrance of the southern Iowa fair grounds.

Manager J. H. Porter of the traction company is authority for the statement that no attempt will be made to replace the entire trolley service with buses, but only those electric lines that have not been paying. The resolution of the City Council authorizing bus operation was referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 7, 1924.

Popularity of Interurbans in Ohio Growing

It cost almost $3,000,000 more to operate the interurban electric railways in Ohio in 1923 than it did the previous year, according to annual reports of the companies just compiled by the State Public Utilities Commission.

At the same time taxes of the interurbans were increased, and it is revealed that only fourteen of the sixty-three companies declared dividends.

The total operating expenses of the interurban lines last year were $25,971,219, an increase of $2,820,248. Taxes amounted to $2,719,585, an increase of $220,288. As these charges were mounting, revenues increased $1,315,863, to a total of $31,363,857.

More people are riding the interurbans, however, the reports show. A total of 234,047,833 passengers were carried, an increase of 18,550,247. There was an increase, too, in the amount of freight business.

Mileage operated by the Ohio interurbans was 2,729, an increase of a little over 7 miles over the year before.

The total investment of the companies was $212,634,738.

While expenses increased, the combined reports show that the interurbans are gradually being placed upon a sounder basis and that their popularity is growing, both as to passengers and as carriers of freight.

Railway's Answer Filed in Labor Suit

An answer to the suit brought recently by the street car men's union at Cleveland, Ohio, in an attempt to force a wage increase and bring about continued recognition of the union has been filed by the Cleveland Railway in Common Pleas Court there. The company admits having signed the agreement with the men in 1906, but charges that the contract is now null and void because it provides that no person shall work for the railway as a motorman or conductor for more than sixty days unless he makes application for membership in Division 268; that it is void because of the provision that the railway shall discharge any motorman or conductor, no matter how careful or competent he may be, unless he continues his membership in Division 268; that it is void because of the attempt of Division 268 to delegate the duty resting on the defendant to discipline its men to an "irresponsible and unauthorized" board of arbitration.

The answer further says that the 1906 agreement is now unenforceable because it is "indefinite, uncertain and without any limitations as to its extent or duration, and is in effect only an agreement to make a further agreement"; that it is void because it does not obligate or require any member of Division 268 to remain in the employ of the railway for any period whatever.

The answer sets forth that Charles Higley, one of the arbitrators who handled the case during the recent threatened strike, had withdrawn from the arbitration and would have nothing more to do with it and that Mr. Higley's withdrawal was in itself a revocation of the submission of the entire question.

It is further charged that James W. Holcomb, another member of the arbitration board, was "prejudiced and biased."

The answer further says that the "alleged agreement" provides that either party will, at the request of the other, meet and consider changes in the "pretended agreement" and that the railway notified the union of such a desire, set a date for the meeting and the union men refused to meet the railway officials. It is charged that this was a further violation of the agreement.

Bus Deal in St. Louis Off

John A. Ritchie, president of the Omnibus Company of America, holding corporation for the St. Louis bus lines, says the deal for the sale of the local bus lines to the Newman committee, seeking to reorganize the United Railways, is off. The deal is said to have fallen through because holders of the St. Louis Transit Company bonds declined to submit to an assessment to raise the $2,400,000 asked for the bus lines. Mr. Ritchie has informed E. R. Kinsey, president of the St. Louis Board of Public Service, that the bus lines will remain under the present ownership, and he gave assurances that any new bus lines opened up in St. Louis would be permanent.

The Board of Public Service of St. Louis on July 15 postponed until July 28 final action on the application of the Peoples Motorbus Company for permits to open six new lines. Postponement was decided on when R. J. Lockwood, assistant general manager of the United Railways, informed the board that Col. Albert T. Perkins, general manager, is taking his first vacation in five years and would not return to St. Louis for ten days, and desired to be heard on the matter before final action was taken on the bus permits. It has been estimated by United Railways officials that the four bus lines now in operation take an average of $2,000 daily from the street cars.

Prior to the decision of the board for delay, Clinton H. Fisk, director of streets and sewers, announced that he would recommend the issuance of the six permits sought, increasing the bus route mileage about 45 miles. He stated that he had reached an agreement with President Meade for provisions in the new permits guaranteeing permanency of the lines.

Frank Carter, acting as counsel for the bus company, informed the board that the delay in granting the permits had held up the company's plans for constructing a $200,000 garage and purchasing additional buses. At present the company is operating eighty-five buses, including three single-deckers. This number would be increased to 200 soon after the new permits are granted, the board was informed.

Col. Albert T. Perkins, general manager for Receiver Rolla Wells of the United Railways, is opposed to the opening of bus lines that are not supplemental to the existing railway lines. He said the board should not permit duplication of transportation facilities. Mr. Perkins attended the meeting on July 11, but left prior to the discussion of the bus permits. He has stated that the United Railways has not changed its attitude toward the buses.

$2,000,000 Bus Project in Prospect

The Twin City Rapid Transit Company, Minneapolis, Minn., it is reported, plans to invest $2,000,000 in a comprehensive bus project to serve its suburban communities. The original expenditure calls for a sum of $500,000 for the purchase and operation of fifty buses.

Aroostook Valley Railroad Seeks to Build Extension

Permission to build a 27-mile extension has been asked of the Public Utilities Commission of Maine by the Aroostook Valley Railroad, Presque Isle, Me. The proposed line would go from New Sweden to St. Agatha. A careful survey has been made of the ground and engineers estimate that the cost of construction would be about $26,000 per mile. The steepest grade to be encountered would be 2 per cent, and in only two places would bridges be necessary. The estimated total cost of construction is approximately $700,000, and an additional $100,000 would be spent for equipment.

If the extension is permitted it will open up a large tract of valuable timber and potato country in Aroostook County. The greater portion of the new road, as laid out, will pass through timberland except the northern end near St. Agatha. In this section the land is mostly cleared but is not intensively cultivated. Testimony was given at the hearing regarding the present difficulty of lumber and logging operations. Much of the lumber cut in this territory has to be rafted down the lake, and when the logs are sent down the boom has to be broken at the small rivers which connect the lakes. Potato growers also testified that the building of this extension would greatly increase their business. It is said that where the haulage is more than 5 miles the crops cannot be profitable, and with the new road the haul from St. Agatha and nearby villages will be shortened to about 3 miles. The present haul is between 9 and 17 miles.

The Bangor & Aroostook Railroad protested against the granting of the application, on the ground that it would parallel its steam railroad lines between New Sweden and Stockholm. This company claims that the present facilities are sufficient to take care of all of the business. Final decision has not yet been made by the commission.

Subway Plan for St. Louis Outlined

Plans for a subway system costing upwards of $50,000,000 forming a net work of underground tracks in the loop district down-town and an extended elevated system connecting remote parts of St. Louis were discussed before members of the transportation committee of the Board of Aldermen by C. E. Smith, consulting engineer for the city, at a meeting of the committee on June 26.

The committee was appointed by President Neun of the Board of Aldermen to study the city's transportation problems and endeavor to solve them. The members during the next few months will visit other cities, principally New York, Boston, Chicago and Cincinnati, to investigate transportation methods.

Mr. Smith outlined a plan for a subway from Eighteenth Street to the river and between Washington Avenue and Market Street with an elevated system west of Eighteenth, and northward from Washington Avenue and south from Market Street. He estimated the cost of subway work at $5,000,000 a mile and the elevated at $1,000,000 a mile.

He expressed the belief that the most equitable way of paying for the improvement would be to assess one-third against patrons in increased fares, one-third against the owners of adjacent property and one-third to the city.

He pointed out that 300,000,000 passengers yearly are handled by the transportation system in St. Louis and that a 1-cent increase in fare would pay 6 per cent interest on $50,000,000, the estimated cost of the subways and elevated lines.

Wants Jitney Ordinances Suspended in Northampton

The Massachusetts Public Utilities Department has been petitioned by the Northampton Street Railway to suspend the jitney ordinances in the city of Northampton. Under these ordinances jitneys may run on any of the streets in the city. The railway maintains that they should not be permitted to operate in streets through which the tracks of the company extend.

The official attitude of the city, as expressed by the city solicitor, is that the ordinances should not be changed, that practically every main artery of travel through the city is occupied by the railway and the jitneys would be crowded out if the company's appeal were granted.

It is argued by the jitney interests that the state authorities should not interfere with the rules of the city authorities unless it is proved that their regulations are a public injury; that the jitneys purpose to do a through business between Springfield and Greenfield and ought to be permitted to get their share of the Northampton business.

Ten Cents in White Plains, N. Y.

The Public Service Commission granted an order July 25 authorizing Leveritt S. Miller, as receiver for the Westchester Street Railway, to increase the fare to 10 cents in two zones on the Mamaroneck Avenue line in the city of White Plains, N. Y. On June 25 the commission approved a fare of 10 cents on the Tarrytown, Silver Lake Park and Scarsdale lines, but decision on the Mamaroneck Avenue line was deferred pending consideration of legal questions as to the effect of franchises granted to the applicant's predecessors by the town of Harrison and the village of Mamaroneck. The increased fare is effective to Dec. 1, 1924.

The order of the commission provides that the receiver shall issue transfers without additional charge to passengers boarding cars in Zone No. 1, which shall be good on any line operated by the receiver.

The commission held that the franchises granted by the town of Harrison and village of Mamaroneck do not control the rights of the company with the consent of the city of White Plains to charge such fare as may be proper upon the Mamaroneck Avenue line within the city, nor do they restrain the commission from allowing the increase asked.

Toledo Property Barred from Ousting Interurban

The Detroit, Monroe & Toledo Short Line Railway was granted a temporary restraining order in Common Pleas Court at Toledo, on July 25, barring the Community Traction Company, Toledo, Ohio, from ousting the interurban from the city tracks, as had been threatened. For several months there has been a dispute over the city track rentals. The interurban has withheld payments for tracks and power since March 1. The amount now accumulated in rentals past due is about $24,000, it was brought out at the hearing. Several other lines have followed a similar plan of combating the rates. Rate now charged is 36 cents for heavy cars and 27 cents for lighter cars.

When the first contract was made with the interurban companies it provided for annual opening of the rate matter and named a plan for the selection of a board of arbitration in case of disagreement. This board would consist of three members—one to be appointed by the interurbans, one by the traction company and a third by the Court of Appeals.

The Milner ordinance provides for setting rates for interurbans and names an arbitration plan which includes a representative of the city, of the company and a third to be selected by the federal court. It specifies that the interurban railroads may have representatives present at this type of arbitration. Hearing will be held by the Common Pleas Court in September to determine which form of arbitration governs the case. The court has also been asked to name a fair rate.

The Maumee Valley Line has kept clear of arbitration by maintaining the validity of an old contract through non-acceptance of the Milner ordinance. It pays on a passenger basis for use of tracks and claims that the lease which it holds is a perpetual one.

New Road Proposed for Kentucky Coal Fields

A new power development is in sight at Owensboro, Ky., in connection with the incorporation of the Owensboro, Rockport & Chicago Railroad if the Interstate Commerce Commission approves the plan to build a bridge across the Ohio River, at Owensboro, and 84 miles of electric railway to Elnora, Ind. The company plans to build a line that will connect at Elnora, Ind., with the Chicago, Milwaukee & St. Paul Railroad, and at Owensboro with the Illinois Central Railroad, Louisville, Henderson & St. Louis Railroad, and Louisville & Nashville Railroad, giving a new Ohio River crossing, and a fresh connection to the Western Kentucky coal fields. Officials of the road are E. T. Franks, president; D. C. Stimson, vice-president, and E. W. Smith, secretary. Lawson Reno, head of the Central Trust Company, largest bank in Owensboro; R. W. Owen, Gleeson Murphy, E. T. Franks and D. C. Stimson are directors. The City Commissioners of Owensboro have already granted right-of-way through the city, and it is reported that options have been secured on right-of-way through the county.

Wants Bus Operation Curtailed in Toledo

With the fare stabilizing fund exhausted the Community Traction Company, Toledo, Ohio, is to be financed through the period of deficits by Henry L. Doherty & Company. This is the plan recently laid before Mayor Brough and the City Council. No dividends will be paid by the Community Traction Company, on its preferred stock, of which $1,000,000 is held by the Doherty interests. Some of this stock was sold to citizens of Toledo and on this checks will be forwarded by the Doherty company at regular dividend periods, but the stockholders will be asked to assign their dividends to the Doherty company.

Mr. Doherty also told President B. C. Adams that the extraordinary maintenance charge of $15,000 should be continued despite the bad business period. He agreed to furnish that amount to rehabilitate the property. Economy plans are now before the Council.

The Doherty company proposal was made in a letter in which Mr. Doherty asked that bus competition be curtailed. The buses are understood to be cutting into the receipts of the railway to the extent of $100,000 a year.

Franchise in Illinois Will Be Resubmitted

It is expected that the proposed twenty-year franchise for the railway lines of the Illinois Power Company, Springfield, Ill., defeated at the election on April 8, will be resubmitted to the voters at a special election. In a letter to General Manager Mackie of the company, S. A. Bullard, Mayor, states that the majority of the Council favor submitting the franchise with some modifications in order that the city may not be interrupted in its street improvements and may have the necessary co-operation of the company.

The most important change contemplated in the franchise ordinance is the removal of the clause giving the company the right to operate buses. The Mayor said that the bus question did not come within the jurisdiction of the city; that permission must come from the State Commerce Commission. Some of the provisions of the original franchise weere referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 22.

Another Maine Decision Protects Existing Utility

The Public Utilities Commission of Maine recently dismissed the application of the Checker Cab Company to run buses between Portland and Old Orchard, Me. The commission states that the public in this vicinity is being adequately cared for at reasonable rates.

The Cumberland County Power & Light Company operates a line from Portland to Old Orchard. The commission in its decision states that the manager of that company testified that the Old Orchard line was not remunerative and that the directors of the road would gladly discontinue service if allowed to do so. He further asserted that much of the traffic to Old Orchard at times other than the active summer resort season was from school children. The commission said that their plight had to be considered in the event of the discontinuance of the Old Orchard branch.

The finding stated that the situation presented a question similar to that considered at length in the commission's decision of last August when it rejected the petition of the Portland Taxicab Company and others to run buses between Portland and Old Orchard.

The commission also stated that its function was not merely supervisory and regulatory as the petitioner had contended. Further, the commission ruled that the spirit of the Maine laws protected an existing utility from an invasion of its field without the consent of the commission and that in its opinion the policy of the state was to build up a structure of transportation which might be co-ordinated with the existing system.

A somewhat similar decision with respect to traffic to Old Orchard, rendered about a year ago, attracted wide attention because of the views expressed by the commission at that time.

West Chester Property Seeks Eight-Cent Fare

In a four-page letter which was distributed on July 28 to the passengers of the Philadelphia & West Chester Traction Company, Philadelphia, Pa., A. Merritt Taylor, president, presented figures to show that increases in the cost of materials, labor and wages, together with the addition of new facilities and the decrease in passenger traffic for the first five months of this year, as compared with the first five months of 1923, make necessary an advance to an 8-cent cash fare. He filed notice with Public Service Commission stating that the decrease in earnings was due largely to the privately owned automobiles.

The new rates proposed were authorized at a meeting of the board of directors on June 25. The basis is an 8-cent cash fare per zone, with tickets in strips of four for 30 cents and six for 45 cents. These rates, according to Mr. Taylor, will compare with rates that were established long ago by other companies, most of them in 1920.

In his letter Mr. Taylor states that the operating expenses for the first five months of 1924 increased $33,893, or at the rate of $6,779 a month. Further, comparison of fares collected and car-miles operated during the first six months of 1924 with the first six months of 1923 shows that the number of fares collected during this six-month period increased only 2.89 per cent and that car-miles operated increased 7.15 per cent during May and June compared with similar months of last year. He said that in order to borrow large sums of money needed for recent capital expenditures the company had to pay more than 6 per cent per annum, whereas under pre-war conditions the company sold its 4 per cent general mortgage bonds at 90 per cent of par, which subjected the company to a charge of only about 4½ per cent for new money required.

Parking Ordinance in Los Angeles Being Drafted

The City Council of Los Angeles, Cal., recently approved the ordinance covering the recommendations of the special parking survey committee. The work of drafting the ordinance for enforcement has already been started. Besides prohibiting parking between 7 a.m. and 6.15 p.m. on eleven downtown streets, the ordinance also prohibits the parking of all sightseeing and sales promotion cars in congested districts between 7 a.m. and 6.15 p.m., and will reduce all parking periods from the present 45-minute limit to 30 minutes for private vehicles and increase the limit from 15 to 29 minutes for commercial vehicles.

Although there were many protests against the new restrictions, proponents of the report declared it was the best move possible to meet the emergency situation of the congested traffic. The majority of the protests were on the ground that certain streets were designated for no parking instead of having a blanket no-parking rule for the entire downtown district. It was explained that certain streets were put under the no-parking ban in order that no one place of business in the downtown district would be more than a block away from where an automobile might be parked.

The parking survey committee was created by the Council last year and submitted its report early in the current year. The recommendations of the members were referred to in the ELECTRIC RAILWAY JOURNAL of May 10, 1924.

Wisconsin Institute May Publish New Journal

The *Journal of Land and Public Utility Economics* is in prospect for publication in February, May, August and November, by the Institute for Research in Land Economics and Public Utilities. The new publication will be edited by Richard T. Ely, director of that institute and professor of economics in the University of Wisconsin. In a statement as to the purpose of the *Journal*, Professor Ely says that it will be devoted to economic aspects of the utilization of the land and the regulation and administration of public utilities. In addition to leading articles there will be sections in each issue which will chronicle the comment upon the latest and most important legislation and court decisions relating to land and public utility economics; summaries of the results of research and experiment, and a review and criticism of current literature in the field.

Professor Ely says that if the response to the announcement is sufficiently encouraging, the A. W. Shaw Company will publish the *Journal*, and has agreed to pay to the Institute the net profits in each year, these profits to be applied by the trustees of the Institute to the support of further research in the field of land and public utility economics. The yearly subscription rate will be $5. Correspondence should be directed to the A. W. Shaw Company, Cass, Huron and Erie Streets, Chicago.

News Notes

Uniform Rates in Connecticut.—The Connecticut Company, New Haven, Conn., has announced that on and after Aug. 2 the fare rate will be three tickets for 25 cents on every line operated by the company in Connecticut. The old rate was three tickets for 25 cents on all lines except those in the Bridgeport district, where the fares were two tickets for 15 cents. The Public Utilities Commission has authorized the change.

Rerouting in Effect.—The Arkansas Central Power Company, Little Rock, Ark., put into service July 15 the new curves recently installed on Capitol Avenue and Main Street for the rerouting of cars recommended by Ross W. Harris, traffic expert, recently employed by the city of Little Rock.

Bus Permit Denied.—The Council of Hornell, N. Y., recently rejected the plea of C. G. Abernathy, who sought a permit to operate buses from Hornell through North Hornell to Arkport. His principal object was to provide bus service for North Hornell, where the Hornell Traction Company recently discontinued its lines.

New Parking Laws Passed.—The Council of Rochester, N. Y., has passed a new traffic code, including drastic limitations of parking in the downtown districts, provision for arterial highways and addition of many one-way streets. With the opening of Aldridge Concourse, the new street over the interurban and rapid transit subway on Aug. 1, relief from Main Street traffic congestion is expected.

Wants to Substitute Bus Service.—The Pacific Electric Railway, Los Angeles, Cal., has asked the Railroad Commission for permission to abandon service and to remove its tracks on four avenues and five streets in the city of Redlands. The reason for this abandonment is that the city proposes extensive improvements on those streets and the company is unable to stand the expense of its share of the work. It is proposed to substitute bus service for the discontinued railway service.

Railways Spurn Steam Line.—The Michigan Public Utilities Commission has advised the Interstate Commerce Commission that the electric railway properties have shown no desire to acquire the Kalamazoo, Lake Shore & Chicago Railway, Kalamazoo, Mich., a steam property, which will be abandoned following an order of the Interstate Commerce Commission. The line extends from Kalamazoo to Lawton, Mich., a distance of approximately 16 miles. The State Utilities Commission thought that electric railway managements might be interested in securing this line in order to tie it in with other electric railway transportation in the State.

Compromise Extends Fare Zones.—Extensions of fare zones on the Hartford Avenue, Manton Avenue and Plainfield Street lines of the United Electric Railways, Providence, R. I., will become effective at once as a result of a compromise reached between the city and the traction company at a hearing before the Public Utilities Commission on July 21 on protests against recent fare increases and zone changes. The announcement was made by City Solicitor Elmer S. Chaces, who appeared on behalf of the city, the company having waived the thirty-day clause relating to new tariff schedules. As a result of several recommendations for improvement in service the hearing was adjourned to Aug. 5 to permit the officials of the company to make answer. Lengthening of zones, reduction of second zone fares and the issuing of commutation tickets were some of the items brought out at the hearing.

Honor Fare System Pronounced Success.—Clinton D. Smith, general manager of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, New Brighton, Pa., has firm faith in the honor fare system which went into effect about two months ago. The result has been that the patrons of these two lines are considered 99½ per cent honest. The system means that the patron boarding the car tells the motorman his destination and drops into the fare box 5 cents for each zone through which he passes. If a transfer is necessary this is given to the passenger. Before the institution of the honor system identification slips were issued to passengers.

Readjustment Application Dismissed.—The application of the Key System Transit Company, Oakland, Cal., for readjustment of passenger fares between points in Alameda County and Contra Costa County has been dismissed by the commission.

Uniforms Reduced in Price.—The Los Angeles Railway, Los Angeles, Cal., announces that it will be able to reduce the price of uniforms from $28 to $27. The price of the ventilated caps will also be reduced from $2 to $1.85. This reduction is the result of careful buying and the signing of a new contract with the men. Uniforms on hand were purchased by the company under the old contract, but will be sold to trainmen at the new price of $27.

Funeral Pyre of Railway Equipment.—Several trailers and one old car of the Brunswick & Interurban Railway, Brunswick, Ga., were burned recently as a first move in the junking of the property. The road has been on the verge of suspension for many months. At a recent election residents of the city voted against taking over the line.

Buses to Cease Operating.—Buses operated in connection with the Greenfield & Turners Falls Street Railway, Greenfield, Mass., were set to be discontinued on Aug. 1, when the line passes from the Connecticut Valley Street Railway to the Greenfield & Montague Transportation Area, trustees of the new municipal control have announced. At the same time the service will be put on a half-hour instead of an hourly basis. For some time the buses, operated over a shorter route, have alternated with the trolley cars.

Fare Evidence Concluded.—Evidence was closed on July 23 in the application of the Poughkeepsie & Wappingers Falls Railway to the Public Service Commission for permission to increase fares in its operating zones to 10 cents. The company submitted certain information as to additions and retirements of property requested at the last hearing by the counsel for the commission and the city of Poughkeepsie, and cross-examination on these exhibits was completed. At the adjourned hearing in the afternoon accountants and engineers of the commission testified as to examinations of the books and properties of the company.

Use of One-Man Cars Being Extended.—Under new plans formulated by the Rochester lines of the New York State Railways, one-man cars will be used more extensively on "owl" runs and on Sundays on lines where traffic is lightest. These are phases of a general plan, fostered by James F. Hamilton, president of the company, and Charles R. Barnes, city commissioner of railways, for effecting economy in operating costs on trolley lines where travel is light to provide additional funds for the maximum of service on heavy travel lines. Two lines now are operating one-man cars exclusively, and this service may be extended to other lines for all day travel.

Files New Rate in Springfield.—The Springfield Street Railway has filed with the Massachusetts State Public Utilities Commission a petition for an increase of the cash fare from 7 cents to 10 cents, with three tickets for 25 cents and school pupils' tickets at 5 cents. Nine zones are provided for in the Springfield division, five in the Westfield division and seventeen in the Palmer, Monson, Ware, Three Rivers and Bondsville divisions. Special coupon tickets good between points in different zones, especially for the accommodation of industrial workers, are provided in certain cases at a rate of eight for $1, and in other instances twelve for $1. Subject to certain exceptions, cash fares and tickets entitle passengers to transfers.

Railway Opposes Bus Application.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., opposes the application of Wilbur F. Menke to operate sightseeing buses because it is about to establish lines of buses on a route that would parallel that outlined by the applicant. Mr. Menke desires to run buses from the Arcade Cafe, at Broad and Juniper Streets, to Fairmount Park and thence to Evergreen Farms, at the upper end of Roosevelt Boulevard, operating on a schedule at a fare of $1 for the round trip. He would not take any passengers en route.

Stop Signals Proposed.—Believing that stop signals on the rear of electric cars would avert many accidents, directors of the Cincinnati, Ohio, Automobile Club have suggested to the city solicitor that a provision be inserted in the new traction ordinance requiring the Cincinnati Traction Company to install such signals. According to the club officials, many letters have been received from their members advocating the use of stop signals as a means of preventing collisions between street cars and automobiles. In their letter to the city solicitor they point out that an ordinance as they propose is in effect now in Cleveland and Detroit and that stop signals also are carried by some street cars in Dayton, Ohio.

Financial and Corporate

Security Holders Approve

Plans for the Reorganization of the New York Railways Accepted by Bondholders

Announcement was made on July 28 that a plan and agreement dated July 18 had been adopted by the committee representing New York Railways first real estate and refunding bonds. At the same time, John Candler Cobb, chairman of the protective committee for the New York Railways 5 per cent adjustment bonds, issued a statement in which the opinion was expressed that the new plan appeared to be "unnecessarily complicated," but urging all security holders to accept the plan "and let the company get down to business."

The plan has been authorized by the Transit Commission and has been approved by Judge Julius M. Mayer of the Federal Court. Dissension among certain bondholders had threatened to prevent the carrying out of the plan, which, however, has been approved and adopted by the protective committees representing the following securities: New York Railways thirty-year first real estate and refunding mortgage 4 per cent gold bonds, New York Railways adjustment mortgage thirty-year 5 per cent income bonds, Lexington Avenue & Pavonia Ferry first mortgage 5 per cent gold bonds and Lexington Avenue Railroad stock.

The committee which announced its adoption of the plan is composed of Harry Bronner, Haley Fiske, Caspar W. Morris, Harold Palagano, Charles A. Peabody, Harold Standley and Willis D. Wood.

The statement by Mr. Cobb, chairman of the protective committee for the 5 per cent adjustment bonds of the New York Railways, says in part:

> The New York Railways plan of reorganization seems to me in certain respects rather unnecessarily complicated and the reason for some of the minor details is not clear, but I fully appreciate the difficult and complicated situation the reorganization committee has had to deal with.
>
> Very curiously the fact that there are no outstanding receivers' certificates, but, on the contrary, a large amount of cash and property not needed for the reorganized company, seems to have increased the difficulties of reorganization instead of simplifying them.
>
> Another difficulty which must have hampered the committee is the very drastic, and I believe entirely unwarranted, cut in total capitalization. This cut bears especially heavily on our 5 per cent adjustment mortgage bonds, as we stand the bulk of it. This situation is, however, considerably ameliorated by the fact that, although the new securities to be received by the adjustment bonds show a very drastic cut in principal, the provision for income gives us 70 per cent of what we were entitled to under our old bonds and our prospect of getting it is increased by a material reduction in charges ahead of us.
>
> The fact that the reorganization is effected without any assessment or charge to the many thousands of holders of securities is important, as such assessments are a serious problem to many who have not the facilities to take care of themselves and usually bear with especial severity on the small holder.
>
> When the reorganization is completed and the financial readjustments made the company should, on the basis of present conditions, be able to earn, with active and progressive management, all charges ahead of the preferred stock, including the income bond interest.
>
> On the whole it is of such vital importance to us all to get the company out of the hands of receivers and lawyers and on a sound and independent operating basis that it is clearly for the interest of all the security holders to promptly and unitedly accept the plan and let the new company get down to business.

Northwestern Ohio Property Passes to Doherty

The property of the Northwestern Ohio Railway & Power Company has come under control of the Henry L. Doherty & Company interests through a recent purchase from the General Gas & Electric Corporation headed by W. S. Barstow. Along with railway, which sells power to a dozen small municipalities, was included the property of the Sandusky Gas & Electric Company, which will be transferred to the Ohio Public Service Company.

As in the case of several similar acquisitions lately made by the Doherty interests, the power properties will probably be separated from the traction lines and operated independently.

The property of the Northwestern Ohio Railway & Power Company was carried at $2,641,348, according to the latest balance sheet available. The company operates 52 miles of track between Toledo and Marblehead and has 22 miles of high tension lines tied in with the Toledo Edison lines for supply from the Acme station at Toledo.

There is a first mortgage bond issue of $1,293,000 due July 1, 1932, preferred stock amounting to $500,000, and common stock of a par value of $800,000, all owned by the former holding company.

Short Long Island Lines Unprofitable

Among the properties operated by the Long Island Railroad there are included four short electric railway lines operated to the shore from the main line of the railroad. These properties are the Ocean Electric Railway, Far Rockaway, 15 miles; Northport Traction Company, 2.69 miles; Nassau County Railway, 1.55 miles; Glen Cove Railway, 3.25 miles. All the roads except the Ocean Electric Railway were operated at a deficit in 1923. The earnings of the companies are contained in the accompanying statement.

$359,026 Deficit by Interborough for Year

There was a deficit of $359,026 upon the Interborough Rapid Transit Company system in New York for the fiscal year ended June 30, 1924, and a deficit of $412,621 for the month of June, 1924. The corresponding statement last month showed a balance of net income of $53,595 for the eleven months ended May 31, 1924, and a balance of $42 for the month of May, 1924.

The company explains that the deficit for June and the deficit for the fiscal year were caused principally by the deduction from June revenues of $310,000 for income tax from Jan. 1, 1924, to June 30, 1924, imposed by the new income tax law of May, 1924, and by the deduction of $233,877 as a reserve to cover contingent liability since July 1, 1922, to stockholders of the Manhattan Railway, who have not yet formally assented to the readjustment plan.

There have been decisions both ways on the question of this liability and the cases are on appeal, but, pending final adjudication, the board of directors decided unanimously, in view of the adverse decisions, to create such a reserve. It will amount to about $5,500 monthly hereafter. There was also deducted from June, 1924, revenues the balance of 15 cents a share, amounting to $90,000, which had not been accrued on account of Manhattan rental for the year ended June 30, 1923. This balance was subsequently found to be due and was paid on July 1, 1924. These reserves were not accrued monthly because it was believed until recently that the liability involved was too remote to require such a course. It became necessary therefore to make the readjustment when decided upon at the close of the fiscal year by the method which has been described.

Sale Terms Being Negotiated at Milwaukee

The principal provisions of the proposed contract between the city of Milwaukee and the Milwaukee Electric Railway & Light Company, aimed to provide eventual municipal ownership, have been summarized as follows:

> Contract to go into effect Jan. 1, 1925, after having been approved by the people at the November election and by the Wisconsin Railroad Commission.
>
> Contract to run in successive periods of ten years with an option by the city to purchase by giving six months written notice.
>
> Fare to remain the same—7 cents cash or freight tickets for 50 cents—until "stabilizing reserve" fund shall be effected.
>
> Company for first year given a return of 7.7 per cent on its investment, excess to go to the city.
>
> City to pile up an interest in the company through the so-called "city equity account," built up by loans to the company; through excess earnings which accrue to the city and through taking "municipal

INCOME STATEMENTS OF ELECTRIC RAILWAYS OWNED OR CONTROLLED BY THE LONG ISLAND RAILROAD

	Operating Revenues	Operating Expenses, Including Taxes		Operating Income	Other Income		Gross Income	Deductions from Gross Income		Net Income
Ocean Electric Railway	$335,803	$215,167		$120,635	$2,592		$123,228	$74,443		$48,785
Northport Traction Company	14,842	15,681	Def.	838	212	Def.	626	586	Def.	1,212
Nassau County Railway	19,676	23,567	Def.	3,890	212	Def.	3,678	38	Def.	3,716
Glen Cove Railroad	31,136	36,764	Def.	5,628	212	Def.	5,415	146	Def.	5,561

> mortgage bonds" on the company property.
>
> City to have control over service and over extensions of service during the period of the contract, with certain restrictions.
>
> Option to purchase to include the company's heating, lighting and railway property in the entire metropolitan district, including Milwaukee, Cudahy, North Milwaukee, South Milwaukee, Wauwatosa, West Allis and villages of Shorewood, West Milwaukee and Whitefish Bay and intervening territory.
>
> City utility commissioner provided for, whose salary is paid by the company.

The important matter of the valuation has also been touched upon recently in the comment in the daily papers. The figure most frequently mentioned in this connection places the amount at $50,000,000.

Fred S. Hunt, chairman of the street railway acquisition committee, made a statement in which he said:

> The presumption is that the proposed contract has not as yet been submitted to the company's highest officials, some of whom are away on vacation. We have agreed on many of the points involved in the contract but there are still a few which remain to be cleared up.

It is expected that the proposed contract will be submitted to the voters at the fall election if an agreement is reached. The contract would first have to go to the Common Council.

Buses Must Be Substituted.—Permission has been granted by the Railroad Commission to the Pacific Electric Railway to discontinue railway service on East Washington Street from Lake Avenue, Pasadena, to the end of the line at Tierra Alta in the County of Los Angeles, on condition that motor bus service be installed.

Stretch of Line Discontinued.—The Hartford & Springfield Street Railway Warehouse Point, Conn., planned to discontinue service to Somers, Conn., on July 27, and to fix the terminus of the Somers and Enfield division at McCormick's corner in Somersville. This will be the first section of track to be discontinued on the East Side system of the Hartford & Springfield. The stretch to be discontinued, from McCormick's Corners to Somers Center, is 2.3 miles.

Net Earnings Show Falling Off.—In June the net earnings of the Eastern Massachusetts Street Railway, Boston, Mass., were $32,593 compared with $59,021 during the corresponding month last year. The total revenue and income for the month was $767,575, and the expenses and taxes $618,227. The fixed charges were $112,054, slightly less than during June, 1923.

Loss for Six-Month Period. — The Massachusetts Northeastern Street Railway, Haverhill, Mass., reports to the Department of Public Utilities for the six months ended June 30 a net loss of $17,834, compared with a net loss of $29,153 during the corresponding period a year ago. The number of revenue passengers dwindled from 5,544,454 in the first six months in 1923 to 4,349,543 during the first six months of the present year.

Gross Revenue and Net Income Fall Off.—For the six-month period ended June, 1924, the gross revenues of the Twin City Rapid Transit Company and subsidiaries, Minneapolis, Minn., were $6,635,455, against $7,045,975 for the six-month period of 1923. Operating expenses showed a decrease of only 2.4 per cent and the net income fell off from $929,075 for the first six-month period in 1923 to $604,189 for the period from January to June, 1924.

Fewer Passengers Carried.—For the six-month period ended June 30, 1924, the net income of the Capital Traction Company, Washington, D. C., amounted to $466,200, compared with $583,446 for the corresponding period a year ago. The decrease in earnings is attributed to the decline in the number of revenue passengers carried. In the first six months of this year the company carried 33,366,020 revenue passengers, while in the similar period last year the number was 35,815,501.

Park Offered for Sale.—Pine Rock Park, purchased by the Connecticut Railway & Lighting Company, New Haven, Conn., to be developed into an amusement park, has been offered for sale. The land, which is a natural beauty spot consisting of about 150 acres, is situated on the company's line which runs from Bridgeport, Conn., to Derby. The Connecticut Railway & Lighting Company is operated under lease by the Connecticut Company.

Wants Properties Turned Over.—The Los Angeles Railway Corporation, City Railway Company of Los Angeles, and the Los Angeles Railway have filed a joint application with the Railroad Commission for authority for the two former corporations to turn over to the Los Angeles Railway all lines and properties now held separately by the three corporations. The Los Angeles Railway also asks authority to issue its bonds in the aggregate amount of $30,939,000 and for authority to issue such amount of its common capital stock as the commission considers fair and reasonable, and to exchange the same with the stockholders of Los Angeles Railway Corporation and City Railway of Los Angeles for their holdings of stock in those corporations.

$20,000,000 Public Service Issue Offered.—A $20,000,000 issue of 6 per cent bonds for the Public Service Corporation of New Jersey is offered by Drexel & Company, Philadelphia, and Bonbright & Co., Inc., New York. These are secured gold bonds, 6 per cent, series, due 1944, and are priced at 96. They will be a direct obligation of the Public Service Corporation of New Jersey and will be secured by 4,283,334 shares of the common stock of the newly consolidated Public Service Electric & Gas Company, which is a subsidiary of the corporation. Additional bonds in other series under the indenture may be issued to an amount not exceeding $10,700,000 against the pledge of the remaining 2,141,666 shares of common stock of the company, also held by the parent corporation, and also to an amount not exceeding 50 per cent of the cash that may be realized by the Public Service Electric & Gas Company from additional common stock hereafter issued and pledged. These bonds will be followed by $21,508,600 of 8 per cent cumulative preferred stock, $9,967,900 of 7 per cent cumulative preferred stock and 699,185 shares of common stock, representing at present market quotations an equity in excess of $70,000,000.

Line Brings $36,950. — Operations were suspended by the Caldwell Traction Company, Caldwell, Idaho, on June 10. Recently bondholders of the company bid the property in at a sheriff's sale at a total figure of $36,950. The line is 11 miles long. Of the amount bid $1,950 was in cash and $35,000 in bonds. The sale was made on order of the District Court after a judgment of $143,000 had been obtained against the railroad property, which was pledged as security for a bond issue of $100,000. C. D. Purkhiser, former manager of the company, remains in charge temporarily, representing the new owners.

Plan of Adjustment Declared Operative.—A letter has been sent to holders of the Michigan Railroad first mortgage five-year gold bonds, Series A, 6 per cent, due May 1, 1924, by the president, B. C. Cobb, notifying them that a plan of adjustment of the maturing bonded indebtedness has been declared operative by the directors with respect to the bonds deposited. More than 76 per cent in principal amount of the bonds have been deposited. Holders who have not deposited their bonds had until Aug. 1 to do so. The president states the company will make application at once to the Michigan Public Utilities Commission for the necessary approval of the plan and of the issuance of the securities provided under its terms. The National City Bank, New York, is the depository.

Court Proceedings on Valuation Dropped.—Under stipulations filed by counsel for both the United Railways and the city of St. Louis, Mo., court proceedings have been dropped which were pending in Jefferson City and St. Louis for review of the order of the Missouri Public Service Commission fixing the valuation of the street railways at $51,761,384. The dropping of the court proceedings resisting the valuation is expected to assist the work of the reorganization committee of the United Railways. After the commission fixed the valuation the city filed a petition for a writ of review with the Cole County Circuit Court contending the amount was too high. Attorneys for the company then brought similar action in the Circuit Court at St. Louis claiming the valuation as allowed was too low.

Seek Tax Reduction.—Petitions are being circulated in Phoenix, Ariz., asking the State Tax Commission to reduce the valuation of the Phoenix Railway for state and county tax purposes to a figure not to exceed the cash offer of $165,000 made by the city of Phoenix. The revenue in 1923 was $158,938 and in 1924 it is estimated at approximately $145,000. The loss of revenue is attributed to automobile competition.

Two New Directors Chosen.—At the recent annual meeting of the Terre Haute Traction & Light Company, Terre Haute, Ind., two new directors were chosen. They are Wilson Naylor Cox and G. O. Nicolai. Mr. Nicolai succeeded E. M. Walker as general manager of the company when Mr. Walker resigned to go to Schenectady.

Legal Notes

FEDERAL COURT—*Value of Right to Operate Cars.*

The right to operate the only street car system in a city of 250,000 people and to be exempt from taxation for doing so *held* reasonably worth $5,000 a month, in view of an agreement of the parties fixing the value at that amount. [City and County of Denver vs. Stenger, 295 Federal Rep., 809.]

MASSACHUSETTS—*Injury to Driver of Wagon, Striking a Street Railway Pole Maintained Under License, Held Not Actionable.*

Where a street railway erected and maintained a pole in the highway under a license lawfully granted, it is not liable for injuries received by the driver of a wagon who ran into it, even if without such license a pole would be a nuisance. [Curran vs. Boston Elevated Railway, 143 Northeast Rep., 821.]

MASSACHUSETTS — *Contributory Negligence Not Excused Because Person Was Put in Position of Certain Peril.*

A person negligently crossed in front of one car, expecting to take a car in the other direction, but the second car reduced its speed unexpectedly and he was unable to get out of the way of the first car. The court held that it was no answer to a charge of contributory negligence that the intending passenger was unexpectedly put in a position of greater peril than that in which he expected to be placed. [Fitzpatrick vs. Boston Elevated Ry., 144 Northeast Rep., 75.]

MASSACHUSETTS — *Investigator Held Without Authority to Make Settlement for Passenger's Injuries.*

An investigator and adjuster for a claim department was alleged to have lead a claimant to believe that the railway company would settle with her for a larger amount than the company was willing to pay. No evidence was presented in court to show that this claim investigator had any authority to settle claims against the company so the court did not pursue the matter further, declaring the company was not responsible for any such offer. It added that any one dealing with an agent is bound to ascertain the nature and extent of his authority. [Ferrin vs. Boston Elevated Railway, 143 Northeast Rep., 823.]

NEW JERSEY—*Action on Detached Coupon Within Six-Year Limitation.*

An interest coupon, detached from a corporate mortgage bond and providing that a company will pay to the bearer a named sum on a certain date, is a simple contract obligation to pay, and to it the statutory limitation of six years applies. [Dickerson vs. Wilkes Barre & Hazelton Railroad, 124 Atlantic Rep., 512.]

NEW YORK — *Extent of Lessee's Liability for Expense of Eliminating Grade Crossing Determined.*

The International Railway leased a certain section of the tracks of the Erie Railroad, under an agreement which provided, among other things, a certain division of the expenses incurred when overhead crossings were substituted for highway crossings on grade upon the leased section. A change from a grade crossing to an overhead crossing was ordered at Main Street where the tracks of the International Railways left the leased line and turned at right angles to run on the street. The plaintiff claimed that the defendant was liable to share in the cost of constructing this overhead crossing to the extent of paying for all of the work on the leased section and one-half of all other expenditures except the expense of carrying the track on the structure over the street. The defendant denied it had any obligation other than the small item of grading the leased section to bring its track into Main Street. The court held that the International Railway would not gain any benefit from the overhead crossing other than that which was gained by other users of Main Street and that it was not liable to share in the total expense of the work, though it did require it to pay a small additional sum for a cement walk and driveway in connection with the grade crossing which it used in common with the Erie Railroad. (204 New York Sup., Erie Railroad vs. International Railway, 771.)

OHIO—*Employment Begins When Employee Enters Employer's Conveyance to Go to Work.*

Where an employer contracts to carry an employee to and from his work, the employment begins when the employee enters the conveyance to go to the place of work. Hence, an employee of a street railway who was injured at the car stop where he left the street car to go to the carhouse is injured in the course of his employment and his case comes under the workmen's compensation act. [De Camp vs. Youngstown Municipal Railway, 144 Northeast Rep., 128.]

PENNSYLVANIA—*Agreement as to Paving and Repair of Paving Must Be Carried Out, Though Cost Involved Is Greater Than Anticipated.*

The Borough of Swarthmore granted a franchise to a street railway company now represented by the Philadelphia Rapid Transit Company under certain conditions, one of which was that the street occupied should be "telforded or macadamized to a depth of 12 in." from curb to curb and at all times kept in good order. Nether Providence township also granted a franchise to a predecessor of the same railway company, permitting occupation of a certain road on condition that it should be kept "in good order, repair and travelable condition." In the Swarthmore case the company got a ruling from the Public Service Commission that it need maintain only that portion of the highway occupied by its rails and ties, but this was reversed by the court. The company then claimed that as the kind of pavement specified, while satisfactory for the kind of traffic used when the agreement was made, was recognized as entirely unsatisfactory for modern conditions, and as it had not ever agreed to lay a more expensive pavement, it could not be forced to do so. The court held, however, that the existence of a franchise requires compliance with all of its terms, though the carrying out of the contract may eventually result in a serious financial loss to the grantee of the right. While the condition existing at the time that a contract was made must be considered, a specific agreement to do a certain thing must be carried out. It could not be required to install a more expensive pavement than telford or macadam but it could be required to keep that pavement in good condition and the fact that it wore out rapidly was no excuse to prevent performance. In the Nether Providence case, the situation was somewhat different, because the type of paving was not specified. Here the court said that where the duty of the grantee is limited to keeping paving in repair, it must keep that paving in a reasonably passable condition, and changes in the kind of traffic using the road do not excuse the company from carrying out the obligations specified. [Borough of Swarthmore vs. Philadelphia Rapid Transit Co. and Nether Providence Township vs. Philadelphia Rapid Transit Co., 124 Atlantic Rep., 343, 345.]

TEXAS—*Risk of Substation Attendants. Life Insurance Held by Deceased Immaterial in Assessing Damages.*

A substation attendant, while sweeping behind a passageway, was killed by a high tension wire carried close to the point he was required to sweep. The court held that while an employee assumes the ordinary risks incident to his employment, he does not assume risks resulting from the negligence of his employers, even though they are known to him. The criterion was whether an ordinarily prudent man, in the opinion of the jury, would have undertaken to sweep the station at that point. The fact that the employee carried government life insurance should not be considered as a reason for reducing the damages. [El Paso Electric Railway vs. Buttrey, 260 Southwest Rep., 897.]

WEST VIRGINIA—*Injury From Overhang of Car.*

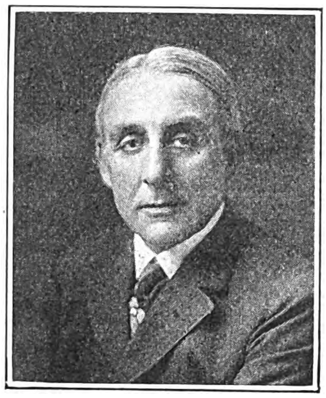
A street railway company operating cars over the streets of a city is required to sound a gong or otherwise give notice to persons traveling thereon at street crossings; it is also the duty of persons at such places of danger to use their own senses, and if a motorman in rounding a curve has kept a proper lookout and has safely passed one using the street at such point he may assume that such traveler will keep out of the way of the overhang of the car in rounding the curve, and he is not bound to stop the car or give further warning of the danger. [French vs. Princeton Power Co., 122 Southeast Rep., 171]

Personal Items

M. J. Insull Heads Middle West Company

Well-Known Operator Succeeds His Brother, Who Becomes Chairman of the Board

Martin J. Insull has been elected president of the Middle West Utilities Company, Chicago, in recognition of his invaluable work as vice-president of the company since its inception in 1912 and of the ability displayed by him in the management of that vast and constantly growing institution. Several months ago changes were made in the company's by-laws creating the position of chairman of the board. Samuel Insull has been elected to that office and will continue to take an active part in the company's management.



M. J. Insull

The great development of the company's business has necessitated an increase in its executive staff. To meet this situation, four additional vice-presidents have been elected, all of whom have been associated with the company in important capacities for a number of years. These new officers are: E. V. Graham, who will be in charge of the sale of securities; W. C. Sharp, who will be in charge of operations; George W. Hamilton, who will be concerned with the hydraulic and electrical engineering end of the company's business, and A. J. Authenreith, who will have the artificial ice engineering under his control. John F. Gilchrist, who has been a vice-president of the company, will continue in that capacity. Samuel Insull, Jr., recently was elected a director of that company.

As stated previously Martin J. Insull has been vice-president, as well as a director and a member of the executive committee of the company, since its organization in 1912. He is also an executive and director of several other important utility companies under the management of Samuel Insull and associates. He is a public utility administrator with both business and engineering training. After he came from England, Mr. Insull was first employed in the Edison works at Schenectady. He was graduated from Cornell University in mechanical engineering in 1893 and was engaged in various electrical engineering, manufacturing and merchandising pursuits in Chicago, New York and Pittsfield, Mass., until 1906, when he took charge of a group of public utility properties in and near New Albany, in southern Indiana, controlled by Samuel Insull, his brother. These southern Indiana properties became part of the Middle West Utilities Company.

In the period since his association with the company the gross revenues of its operating subsidiaries have increased from $3,660,676 in 1912 to $36,185,181 in 1923. The subsidiaries serve directly or indirectly more than 1,000 cities and towns, and while their principal business is the generation and sale of electricity, they do a very large gas, transportation, water and ice business. The company was one of the first to promote customer ownership and its subsidiaries have more than 60,000 stockholders.

Martin J. Insull has received numerous honors from the electric light and power industry since his association with it. In 1920 and 1921 he served as president of the National Electric Light Association and in 1922 and 1923 was chairman of the public policy committee of that association.

P. P. Crafts, purchasing agent for the Eastern Massachusetts Street Railway, Boston, Mass., for the past four years has resigned his position due to ill health. He has been succeeded by T. H. McGarry, formerly assistant purchasing agent.

E. A. Robert has resigned as president of the Montreal Tramways & Power Company, Montreal, Que. It is said that the new United Securities, Ltd., now has full control of the company and its subsidiaries. The new interests have elected Julian C. Smith president, to succeed Mr. Robert.

Ernest H. Shoemaker has succeeded Miss Florence Snyder as auditor of the Marion & Bluffton Traction Company, Bluffton, Ind. Miss Snyder was appointed to the position of auditor in April, 1923.

Obituary

Michael G. Karline of the New York State Railways, Rochester, N. Y., died at his home in that city on July 23 at the age of seventy-six years. He went to Rochester in 1889 after thirteen years of service with the railways in Buffalo, and in November, 1890, when railway service was started in Rochester, he was the first conductor on the new trolleys.

A. L. Kempster

A. L. Kempster, vice-president and general manager of the New Orleans Public Service, Inc., and an officer of that company and its predecessor, the New Orleans Railway & Light Company, since April, 1920, died in that city on July 28. Mr. Kempster had been sick for nearly two years. Not so long ago it was believed that the turning point had been reached in his illness, but subsequently he suffered a relapse from which he rallied only momentarily.

By virtue of his appointment to the New Orleans company in 1920 Mr. Kempster became the operating head of one of the most important public utilities of the South. The company operates 218 miles of track and at the time of his appointment the property was in the hands of J. D. O'Keefe, receiver, for whom Mr. Kempster, who had previously been in Seattle, directed the system.

After leaving Seattle Mr. Kempster engaged in the conduct of investigations into public utilities for Stone & Webster. The survey of the lines of the Brooklyn Rapid Transit Company and the New York Railways was made largely under his direction. For several months he assisted Frederick P. Royce, then general manager for the receiver of the Brooklyn Rapid Transit Company, and assisted in the appraisal of the Manhattan surface lines.

A. L. Kempster

Mr. Kempster was born in Canfield, Ill., in 1872. Entering the employ of the Seattle Consolidated Railway as a clerk at the age of nineteen, he was subsequently made bookkeeper and auditor. When the Seattle Consolidated Railway was reorganized as the Seattle Traction Company, he became secretary and auditor, continuing in these capacities until the merger of the city's utilities under the name of the Seattle Electric Company. After the merger he was made trainmaster of the system.

In 1902 he was advanced to the position of superintendent of transportation, retaining this title for eight years. He was then appointed superintendent of the railway department. Still later he was again promoted, becoming general manager of the Seattle properties. He served in this capacity until early in 1919, when the system was taken over by the city.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

New Equipment Is in Greater Demand

Inquiries Received by Manufacturers Indicate Much Deferred Maintenance Has Been Caught Up

War-time conditions forced upon the electric railways a program that required them to carry out only such work regarded as absolutely essential. Expansion was of course out of the question. So maintenance began to be deferred. It piled up over the period of years. Starting in 1919, however, the companies began to try to catch up with work deferred. This they appear now largely to have accomplished. In fact, a change is being noted by the manufacturers in the nature of the inquiries received by them.

Thus the demand for new parts, rather than for replacements, has lately come to be an important factor in reorders. In fact, one of the largest electrical manufacturing companies reports a tendency of sales to decrease except for larger units and equipment intended to be used in heavy electric traction work. Moreover, the nature of the buying of the railways has recently undergone a change. This has been due partly to the use of the automobile for various purposes connected with railway operation. Thus a manufacturer of tanks for lubricants says he is doing the largest business of his career and one with the electric railways that is somewhat surprising. Again, a large maker of lubricants reports big sales among the electric railways and unusual requests for the delivery of gasoline in bulk.

However, not all the deferred maintenance has been caught up. Far from it. As the JOURNAL'S survey of the work for the year indicated, there is still much to be done, but the fact remains that a tendency is showing itself which indicates more real new work in the future with fewer complete replacements.

ACTIVITY IN HEAVY TRACTION

As indicated before, the manufacturers look ahead hopefully to the signs of increasing activity with respect to heavy electrification work. These are interpreted to mean increasingly large expenditures for equipment all along the line, with most beneficial orders for all kinds of accessories. It would be superfluous to review here the projects along this line that are now under way, but it might be well to state that, perhaps, the latest of these projects to be mentioned is a proposal to electrify the Danbury & Bethel branch of the New Haven Railroad, a work that will involve the application of electricity to a line more than 20 miles long.

$1,750,000 to Be Spent in El Paso

El Paso Electric Railway, El Paso, Tex., is planning an expenditure of $1,750,000 in improvements and betterments to the system. Part of the money may not be spent until next year, but at least the bulk of it will be expended during the present year. The biggest item is $1,030,000 for a new 15,000-kw. turbo-generator, new wells and additions to the plan on South Santa Fé Street. Approximately $27,800 will be needed for track extensions and improvements. About $8,300 is being spent on shops and on the carmen's clubhouse. The purchase of new cars is included in the list of improvements.

General Electric Six Months' Orders Show Decrease

Orders received by the General Electric Company, Schenectady, N. Y., for the six months ended June 30 total $144,707,887. This is a decrease of 12 per cent compared with the corresponding period in 1923, when orders totaled $164,263,755. Orders for April, May and June, 1924, totaled $71,219,984, a decrease of 15 per cent compared with the corresponding three months of 1923.

New Norfolk & Western Locomotives Delivered

The first of the new class L.C.-2 locomotives for the Norfolk & Western Railroad were delivered by the builders a short time ago. These locomotives were built jointly by the American Locomotive Company and the Westinghouse Electric & Manufacturing Company. The new design was described at length in the ELECTRIC RAILWAY JOURNAL for Dec. 30, 1922, page 1012. One of the differences between this design and that of the L.C.-1 class is that the phase converter on the older units are of the induction type, while on the new locomotives the converters are of the synchronous type.

Twenty Miles of Extension in Chicago

The Chicago Surface Lines, Chicago, Ill., has commenced work on its extensions, which will cost $1,000,000, in accordance with the terms of an order recently prepared by the Illinois Commerce Commission. The commission's order is in answer to a petition filed several weeks ago by Corporation Counsel Francis X. Busch and subsequent negotiations on the part of the company with the city officials at which plans for certain extensions were agreed upon.

The money to pay for the extensions is to be taken from the special equipment fund, from which $1,500,000 is also shortly to be taken to pay for the 100 new cars to be constructed for the Surface Lines. Under the order of the commission, the Surface Lines will construct approximately 20 miles of track this year.

ELECTRIC RAILWAY MATERIAL PRICES—JULY 29, 1924

Metals—New York

Copper, electrolytic, cents per lb.	13.125
Lead, cents per lb.	7.55
Nickel, cents per lb.	27.00
Zinc, cents per lb.	6.375
Tin, Straits, cents per lb.	49.25
Aluminum, 98 to 99 per cent, cents per lb.	26.75
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b vessel, Hampton Roads	$4.325
Somerset mine run, Boston	2.025
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	1.70
Central, Ill., screenings, Chicago	1.625
Kansas screenings, Kansas City	2.00

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.525
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	3.75
Steel bars, cents per lb.	2.15
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	2.85
Sheet iron (28 gage), cents per lb.	3.40
Sheet iron, galvanized (28 gage), cents per lb.	4.50
Galvanized barbed wire, cents per lb.	3.55
Galvanized wire, ordinary, cents per lb.	2.60

Waste—New York

Waste, wool, cents per lb.	15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$1.03
White lead (100 lb. keg), cents per lb.	11.625
Turpentine (bbl. lots), per gal.	$0.84
Car window glass (single strength), first three brackets, A quality, discount*	84.0%
Car window glass (single strength), first three brackets, B quality, discount*	86.0%
Car window glass (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.25
Rubber-covered wire, No. 14, per 1,000 ft.	$6.15
Weatherproof wire base, cents per lb.	17.50

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.48
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	53–54
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.50
Light copper, cents per lb.	8.75
Heavy brass, cents per lb.	6.00
Zinc, old scrap, cents per lb.	4.00
Light brass, cents per lb.	5.25
Lead, cents per lb. (heavy)	6.25
Steel car axles, Chicago, net ton	$17.25
Cast iron car wheels, Chicago, gross ton	16.75
Rails (short), Chicago, gross ton	17.25
Rails (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	8.75

Rolling Stock

Menominee & Mariette Light & Traction Company, Menominee, Mich., has placed an order for six new cars. The detailed specifications follow:

Date order was placed	July 7, 1924
Date of delivery	October, 1924
Builder of car body	St. Louis Car Company
Type of car	One-man safety
Seating capacity	32
Length over all	28 ft. ½ in.
Width over all	8 ft. 1¼ in.
Body	Steel
Interior trim	Birch
Headlining	¼-in. Agasote
Roof	Arch
Air brakes	Westinghouse
Axles	A.S.T.M. spec. carbon steel
Bumpers	5-in., 6½-lb. channels
Car signal system	Consolidated
Control	Westinghouse 6 MMK 63 BR
Curtain fixtures,	Curtain Supply Company, No. 90
Curtain material	Pantasote
Destination signs,	Hunter, on ends and sides
Door operating mechanism	Westinghouse
Fare boxes	Cleveland
Fenders	Type "A" Consolidated
Gears and pinions	Nuttall
Hand brakes	Drop handle
Heater equipment,	12 Consolidated, No. 1522, T truss plank, and 2 vestibule heaters
Headlights	Golden Glow S.M.-95
Journal bearings	3¾ x 6 in.
Lightning arresters	Westinghouse M-P
Motors	Two Westinghouse 508-A
Finish	Patton pyroxylin lacquer enamel
Sanders	St. Louis
Sash fixtures	O. M. Edwards 13-M-D-1
Seats	St. Louis, reversible
Seating material	Rattan, spring cushions
Slack adjuster	Westinghouse
Step treads	3-in. safety
Trolley catchers	Keystone
Trolley base	Westinghouse, No. 13 U.S.
Trucks	St. Louis
Ventilators	8 Peerless, St. Louis
Wheels	Steel, 26-in. diam., 2½-in. tread

Detroit United Railway, Detroit, Mich., has put in service on its Flint division two parlor cars built in its own shops. The specifications follow:

Date of delivery	May 15, 1924
Builder of car body	Detroit United Railway
Type of car	Parlor
Seating capacity	30
Total weight	85,700 lb.
Bolster centers, length	34 ft. 3 in.
Length over all	58 ft. 3½ in.
Truck wheelbase	7 ft.
Width over all	8 ft. 7¼ in.
Height, rail to trolley base	12 ft. 11 in.
Body	Semi-steel
Interior trim	Mahogany
Headlining	Steel
Roof	Arch
Air brakes	Westinghouse AMM
Axles	6-in.
Bumpers	Hedley
Car signal system	Detroit United Railway
Car trimmings	Dayton
Center and side bearings	Standard
Control	General Electric, Type M
Couplers	M.C.B. radial
Curtain fixtures	Curtain Supply Co.
Curtain material	Silk pantasote
Door operating mechanism	Hand
Headlights	Luminous
Motors	Westinghouse No. 303
Sash fixtures	O. M. Edwards
Step treads	Kass
Trolley retrievers	Knutson
Collectors,	Savage combination shoe and wheel
Trucks	C.-80 P Standard
Ventilators	Detroit United Railway
Wheels	Rolled steel, 36-in.

The Trenton & Mercer County Traction Corporation, Trenton, N. J., will place an order for twenty new double-truck cars, after the Board of Public Utility Commissioners approves of the order and the city of Trenton decides on the color scheme of the cars. Ten of the cars will be for city service and ten for the suburban division. Each will have a seating capacity of 48 and will be arranged for one and two-man operation. Each will contain four-motor equipments.

Key System Transit Company, Oakland, Cal., has ordered five buses from the Fageol Company for use on three routes which it is to establish in the city of Oakland.

Canadian National Railways plans to install storage battery car service between Kitchener and Elmira, Ont. W. D. Euler, member of Parliament for North Waterloo, states that negotiations with the Canadian National Railways have proved fruitful, and the purchasing department of the railway has been instructed to advertise for tenders for the new car.

York Railways, York, Pa., is purchasing three double-truck interurban cars, weighing 32,000 lb. and seating fifty-two. The company is also buying two double-truck cars, weighing 28,000 lb. and seating forty-four.

Grand Rapids Railway, Grand Rapids, Mich., is receiving bids on the one-man, two-man type of car, thirty of which will be purchased to replace rolling stock lost in the recent fire.

Track and Line

Valley Railways, Lemoyne, Pa., will share in the cost of building a new state highway through Lemoyne and New Cumberland. It will lay 8 ft. of oil-bound macadam and will raise its tracks to a new grade level.

Calumet & South Chicago Railway, Chicago, Ill., has been authorized by the Illinois Commerce Commission to extend its line on Torrence Avenue from 112th to 124th Streets. The extension work is scheduled for completion within sixty days. This extension has been urged by the South Chicago Chamber of Commerce since the completion of the first unit of the new Ford plant in the Calumet district.

Houston Electric Company, Houston, Tex., will spend $200,000 on improvements which include repairing, paving, repaving and construction of sidings.

Power Houses, Shops and Buildings

York Utilities Company, Sanford Me., is expending approximately $100,000 this year in building new terminals at Sanford and in completing a loop of track through Sanford and Springvale. The new terminal facilities include a freight yard, an express office, a carhouse and a repair shop.

Boston Elevated Railway, Boston, Mass., by authority of the Massachusetts Department of Public Utilities, will be permitted to use for garage and other building purposes land which it owns at Forest Hills which under the recent zoning legislation could not be used for such purposes. The premises for which the company seeks exemption from the zoning act were all owned and in use for railway purposes prior to the enactment of the new law. The department approved the company's petition on July 24.

Trade Notes

Morse Engineering Company, St. Louis, Mo., has just been appointed exclusive territorial selling agent for the Ramsey Chain Company, with general offices and works at Albany, N. Y. The Ramsey chain is a silent transmission chain of novel construction.

Conveyors Corporation of America, Chicago, Ill., has appointed the Thermal Efficiency Company, Scarritt Building, Kansas City, Mo., as district representative, handling the sale of American steam jet ash conveyors, American cast iron storage tanks, American air-tight doors and other conveyor specialities in western Missouri and Kansas.

Page & Hill Company, Minneapolis, Minn., has recently purchased the Metropolitan Cedar Company at Spokane, Wash. The Page & Hill Western offices, formerly located at Newport, Wash., are now in the Peyton Building at Spokane, Wash. J. E. Seaman, long connected with the pole industry in the production of Western red cedar poles, has joined the Page & Hill organization as manager of Western operations. His headquarters will be in Spokane.

New Advertising Literature

Thompson Electric Company, Cleveland, Ohio, has issued Catalog B-22, describing the method of reflector cleaning by the Thompson safety lowering switch or disconnecting hanger.

National Carbon Company, Inc., New York, N. Y., has issued its new carbon brush catalog, which is in loose-leaf sheet form, to allow for changing of pages and the insertion of additional ones. The technical side of brush operation is emphasized in this pamphlet to a greater extent than ever before. In addition there are illustrations of types of brushes with descriptions of brushes and explanation on how to order brushes.

Square D Company, Detroit, Mich., has issued a new folder showing the complete system of fused bottom meter service switch installations manufactured by the company. This pocket-size folder contains complete illustrations, descriptions and specifications for small and large residence work, apartment jobs, power work and current transformer installations and is intended as a convenient guide to dealers or contractors in either ordering or installing.

Ohmer Fare Register Company, Dayton, Ohio, has issued a ten-page pamphlet called "The Ohmer Way." In this booklet a few of the more popular types of Ohmer fare registers are illustrated.

M. A. Hoffi Company, Indianapolis, Ind., has just issued a new booklet, describing in detail National Furnace arches. The booklet points out the lower maintenance costs, outstanding advantages, ease of installing and replacements, as well as other exclusive features of the National arches.

New York, August 9, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

Henry W. Blake and **Harry L. Brown**, *Editors*

Volume 64
Number 6

The Electric Railways Are Not Going Out of Business

NOTWITHSTANDING the mass of evidence that has been accumulated and published during the present year, there still are a few persons who continue to assert that the electric railways as an industry are moribund and soon will be extinct. All that is necessary to refute such a claim is found in the articles that have been published in this paper in recent months, and a number of excellent articles in the public press.

Broadly speaking, the industry is now in the best condition it has been in for the past ten years. This is not an overnight development, but has been a gradual improvement from the early post-war days when prosperity was abroad everywhere in this country except for the electric railways. Since the dark days of 1919 there has been more and more a realization that the electric railway is one of the basic industries, and that much of our modern city life is dependent on it. Far from becoming obsolete, its patrons are increasing steadily. The year 1923 was the banner one in the history of the electric railways, both for gross revenue and for passengers carried. And this is so even though passengers carried on buses increased at an enormous rate. The per cent of increase of passengers carried on buses looks enormous merely because there has been little to begin with. The same condition held with the electric railways in the early days.

The difficulties experienced by electric railways in the past few years have been of two kinds—low revenue and high costs. That the revenue has been insufficient has not been because it has shrunk. On the contrary, it has shown a continual growth. The difficulty has been that the revenue has been fixed, not by the cost of doing business, but by provisions written in generation-old franchises that were made when the operating ratio was low, even with a 5-cent fare. Look ahead as they might, the managements could not see far enough to visualize costs at two to three times as high as they were then. Most of them felt that they had driven very shrewd bargains.

But there must be an end somewhere. Costs have today stopped advancing and have reached almost an absolute level. This was foreseen in an article published in the Annual Statistical Number of this paper for Jan. 5, 1924, page 18. Between December, 1923, and July, 1924, there has been a drop of 3 per cent in the index of wholesale prices and of 1.4 per cent in construction costs, while electric railway material costs have remained stationary. Electric railway wages have gone up 1.4 per cent, and street car fares have advanced 1.3 per cent. The fluctuations in intermediate months all lie between these limits, indicating a very stable condition. Even though the fares have not risen proportionately with costs, improved management, with the introduction of economies and more intensive cultivation of the riding habit, have made it possible for the progressive companies to make showings of net income that compare very favorably with pre-war statements.

The demand for electric railway securities continues unabated. As was pointed out in an article in this paper for July 26, new issues totaling nearly $50,000,000 were issued on terms favorable to the railways during the first six months of the year. Here is concrete evidence that the industry is viewed with favor by investors.

As evidence of how favorably the industry is looked on today, many newspapers are spreading the information that the industry is once more on its feet. One of the best examples of this is the series of articles by Paul Willard Garrett published in the New York *Evening Post* recently. This writer, who is well known in financial circles, concludes that "it is safe to say that the industry is working into a stronger position and that traction securities, properly chosen, occupy a better market position than they have for some time. The future in many cases is positively bright. In weathering the storms of recent years, the industry has learned better how to avoid trouble. Not only that, the business has been put upon a sound basis, a thing which brightens the outlook for traction securities."

Where the Bus Fits Into the Picture

IN THIS discussion of the future of the tractions, no mention has been made of the place the bus will take. This has been stated in these pages many times. Today the truth of the statement in an editorial published on Jan. 5 is more apparent than ever before, that the leading men of the electric railway industry and the principal bus manufacturers will dominate the bus situation in its major operations and that the electric railways are to be the great market for buses. Out of some 75,000 sq.ft. of exhibit space already applied for at the October convention of the American Electric Railway Association requests for 30 per cent of the space are from bus manufacturers.

With this great field before them the bus men need have no fear that they will not have the opportunity to develop business. While it is conceded that the bus cannot be compared with the street car for the great bulk of the transportation requirements, it is likewise true that with the high costs of electric railway construction there are many localities where street car service has not been given, though the residents are demanding transportation. Usually these are localities where the traffic is not dense enough to support rail lines. In the aggregate this amounts to a very material extension to the existing service. Chief among these areas requiring service are suburban districts. While the street car can be operated at less cost if the traffic is sufficiently dense, nevertheless no service or an indifferent service is being given in many areas that should have transportation of the high grade that can be furnished only by the recognized agency—the street railway. The bus is a means of furnishing this service so that the railway will be able to meet the just demands of the public without having to make the tremendous investment that would be necessary to extend its lines at present prices.

This is just one of the uses of the new vehicle. De luxe service, sightseeing routes, boulevard and park lines—all these are fields where the railway may well use its new ally. In interurban territory, too, there is a similar field where special service of this sort may be given. In fact, a number of progressive railways already are providing it.

The possibilities are large and the way has but recently been opened. With co-operation between bus manufacturers and co-ordination of the two services by the railways, there is without doubt a bright future for the new vehicle. And in the readjustment the public cannot help but be the gainer.

The Real Measure of Transportation Service

FREQUENT and regular service—every electric railway man knows how desirable that is. In the morning when the superintendent of transportation sees on his desk a record showing correct and even headways on his various lines the preceding day, he feels gratified. But it is often worth while to look below the surface of records to see whether or not they really mean good transportation service provided for the public.

It may be taken for granted that headway checks made on the streets by inspectors are accurate. To make them so is a mere matter of discipline in the organization. But service means more than having a good headway on paper. It means providing transportation at the places where it is wanted and at the times when it is wanted.

An example that can be cited to show the danger of placing too much emphasis on a paper headway is the case of a heavy suburban line where the inspector was accustomed in the afternoon rush hour to turn back inbound cars at the outskirts of the city. By so doing he avoided having a serious gap in the outbound headway at his particular checking point, but, because the traffic on this line originates almost entirely in the center of the city, his plan resulted in taking away cars from the very point on the line where they were most needed.

Another example is the practice of short routing cars unexpectedly and compelling through passengers to change. On a short headway this procedure may take longer and cause a bigger gap than the one it was intended to correct. There can be no fixed rule in these matters that will tell the supervisory force when it is worth while to juggle the headway and when it is better to leave it alone. But if it is always borne in mind that the facilities provided on the street are the real measure of transportation service, inspectors are unlikely to make serious mistakes.

It Can Pay the Public to Be Patient

WHEN the Bay State Street Railway was reorganized as the Eastern Massachusetts Street Railway and placed under the management of state trustees in September, 1919, the latter announced that the property would be divided into areas that would have to be either self-sustaining or quit if the deficits were not made up, at least in part, from local taxation. Most of the districts saw the justice of the plan and went along with the trustees.

One recalcitrant was Gloucester. After attaining a loss of $74,000, the trustees shut down the service on June 20, 1920. A number of private, unregulated jitneys followed. In December, 1920, the citizens of Gloucester voted 4,492 to 1,101 in favor of bus operation rather than pay a 10-cent trolley fare and make up $20,000 of the deficit. As jitney operation proved unreliable, a regulatory ordinance was passed on Feb. 6, 1921. The Gloucester Auto Bus Company had been organized in December, 1920, but it was not until May 1, 1921, that this company secured a general monopoly of bus transportation in Gloucester and environs. In 1922 its city franchise was renewed for three years.

It is well to ask the question, "What did the public gain, if anything, in the switch from trolley to motor bus over the same routes?" Since the 10-cent fare was such a bone of contention, one would expect that the bus fares would be lower. Such is not the case. The minimum adult fare is 10 cents cash or 12 rides for $1 net. On the other hand, the trustees have made such a good job in reorganization of the railway elsewhere that they are selling reduced-rate tickets giving from 13 to 20 rides for $1 in the different districts.

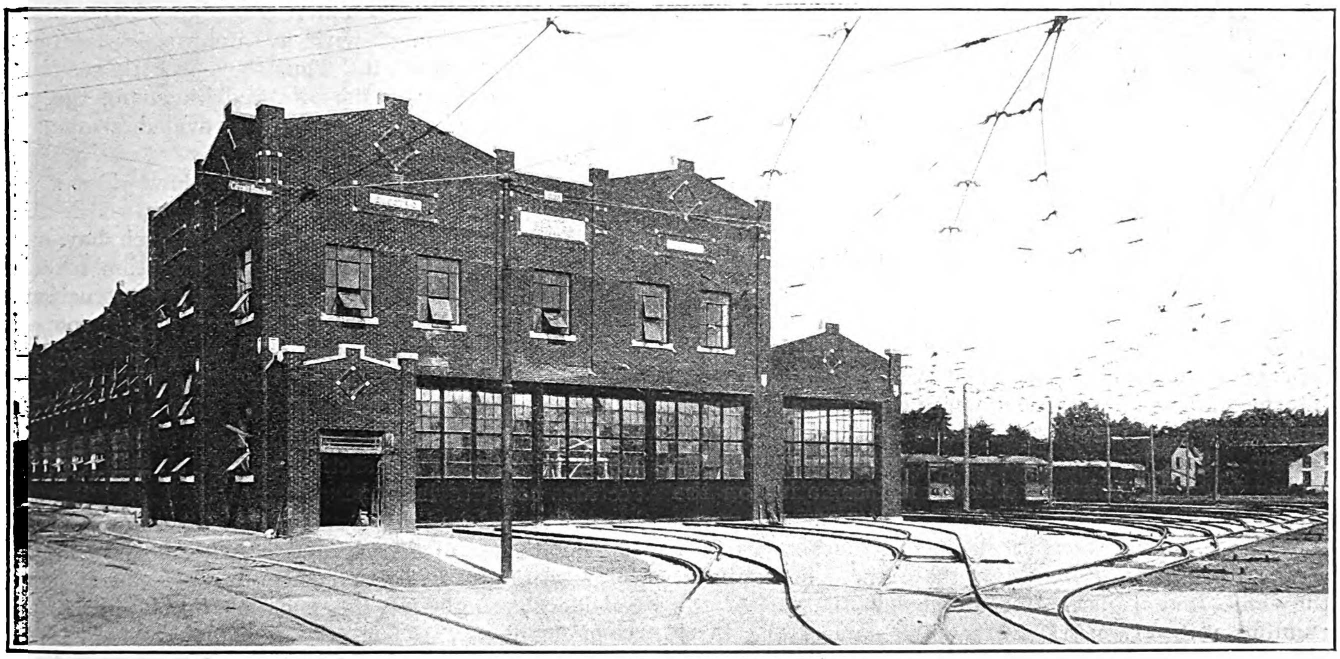
No data are available as to whether the bus company is making money on its operations in the Gloucester city zone, but it has recently declared that it lost $4,850 or 6.3 cents a mile on a 20-cent route between Gloucester and Magnolia. Evidently the public is not feeling more kindly toward the bus company than Gloucesterites felt toward the railway, for the attorney for the bus company is quoted as saying: "It is amusing when people say we have a monopoly, when in reality we have something in which we are losing money." How familiar this sounds! Strange that the public should feel this way after five successive bus operators from 1910 onward had been unable to make ends meet. The Magnolia run is to a summer community, one that the railway never even tried to serve because of the sparse population, yet the public has been unwilling to support bus operation thereto at any fare, whether 50 cents or 20 cents.

As to the financial benefits to the city of Gloucester, it may be noted that when the railway was operated the city secured substantial taxes including a charge for paving. What does the city get from the bus company? All of $10 a year per bus licensed and $1 a year per driver!

Bearing in mind what the trustees of the Eastern Massachusetts Street Railway have done elsewhere in lowering fares, improving service, restoring track first abandoned and operating buses to supplement instead of supplant existing transit investment, it is fair to assume that if the public of Gloucester and vicinity had shown the confidence and patience that other districts manifested toward the public management the fares would be less and tax revenue greater than it is.

Fort Wayne Builds Modern Carhouse

New Structure of the Indiana Service Corporation Cost $125,000 and Provides Convenient Inspection Facilities and Wash Room—Second Floor Is Used for Offices and Recreation Rooms for Employees—The Final Development of the Property Will Include Repair Shops at a Total Cost of Half a Million Dollars



Modern Inspection Shop and Wash Room of the Indiana Service Corporation, Built of Red Brick with White Limestone Trimmings

A WELL-LIGHTED and well-equipped car inspection shop has recently been completed by the Indiana Service Corporation, Fort Wayne, Ind. This building is the first of several which will be located adjacent to the power house on the Spy-Run property of that company. Buildings already on the property include the power house, maintenance-of-way shops, paint shop and the recently completed carhouse. In addition to the buildings, extensive trackage has been constructed for a storage yard. Further improvements will include a repair shop and such small buildings as are necessary for the most efficient operation of the interurban and city lines.

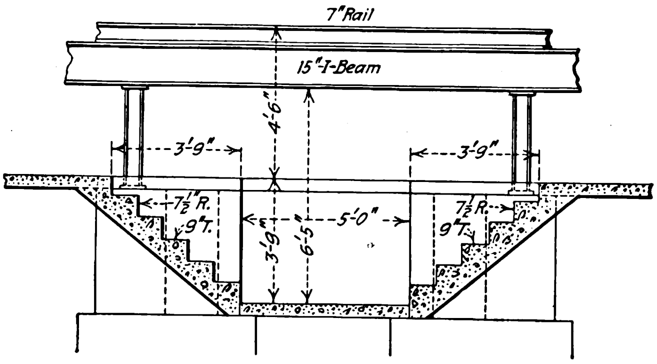
The car inspection shop occupies the main floor of a two-story building 252 ft. x 52 ft., the second floor of which is to be used for offices and recreational purposes. Adjacent to the north side of the main building, with a wall common to both, is a one-story wash house of the same length as the other but only 23 ft. wide. The construction of this one-story building is such that a second story may be added if requirements necessitate. The interiors of the buildings present a pleasing, well-lighted appearance, the side walls and posts being painted a dark green up to a height of 6 ft., above which the walls and ceiling are white.

The main floor of the two-story building has three tracks, which extend the entire length. Each track has an inspection pit extending from within 15 ft. of one end of the building to within 15 ft. of the other. The floor on each side of the three tracks in the inspection shop is 12 in. below the top of the rail. Ramps have been provided connecting with the normal floor level. The ceiling is 16 ft. 6 in. above the floor and is supported in the inspection shop by means of two rows of columns.

The construction of the building is fireproof throughout and all steel work, with the exception of the second floor supporting columns, is incased in concrete. Side walls are of red brick on the outside with building brick inside. The pilasters of the two outside walls and the dividing wall between the inspection shop and wash room are spaced 22 ft. 10 in. apart and have a supporting steel column as an integral part of their construction. The second floor is carried on these steel columns and upon two rows of "H" beams spaced 22 ft. 10 in. centers down the aisles between the tracks in the inspection shop. The span of 23 ft. in the wash room does not require any intermediate supporting columns. In the inspection shop the columns are 8-in. x 6-ft. 5-in., 23.5-lb. "H" section steel members and extend through the main floor to the sub-floor, 3 ft. 7 in. below. Here the columns have been set on individual foundations. The dividing wall between the two rooms is of the same construction as the outside walls and has a passageway 6 ft. wide x 8 ft. high at each end of the wall, closed by means of a steel sliding door.

HANDY ARRANGEMENT OF PITS

One of the interesting features of the design is the construction of the main floor in the inspection shop. The pit construction is open. The main floor is reinforced concrete, 7 in. thick, laid upon steel framework. The floor of the pit, which is also concrete, is continuous from the outside wall to the dividing wall with the


7"Rail
15"I-Beam
3'-9"
3'-9"
4'-6"
7½"R.
9"T.
5'-0"
3'-9"
6'-5"
7½"R.
9"T.

Cross Section of a Transverse Pit

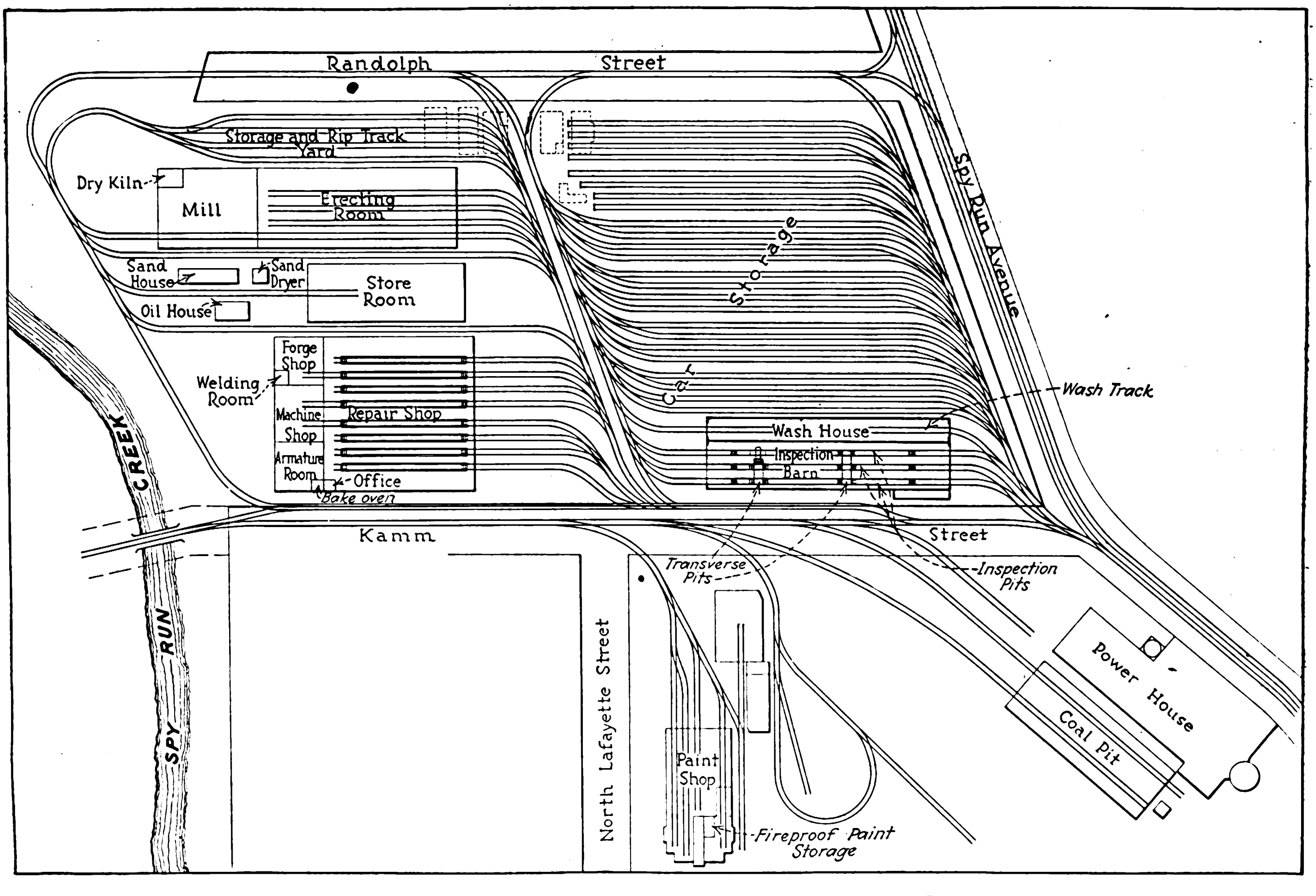
wash room. The reinforcement of the main floor is 6-in., 12½-lb. I-beams spaced 3 ft. 10 in. centers. These members are fastened to the 15-in., 46-lb. I-beam rail supports so that the lower edges of the two are flush. The 15-in. I-beams are the longitudinal members of the floor structure and form the sides of the pit opening. They are supported every 11 ft. 5 in. by a 6-in., 20-lb. "H"-section column. The latter are set on individual concrete foundations similar to those which support the intermediate second floor supporting columns. The pit running rails are mounted on the top flange of the 15-in. I-beam. This type of floor construction is sufficiently strong to accommodate the heaviest locomotive on the system.

With this design of main floor construction, the floor of the pit is 3 ft. 7 in. below the main floor, while at the same time it is 4 ft. 7 in. below the top of the running rail. Two transverse pits connect the three longitudinal pits. One of the transverse pits has been located at the center of the building and the other near one end of the longitudinal pits. These pits have a floor level 3 ft. 9 in. below the floor of the longitudinal pit, thus providing a convenient passageway from one working pit to another. Concrete steps connect the main floor level with the longitudinal pits at the ends of the latter. Steps have been provided also between the longitudinal pits and the transverse pits, which are at the lower level.

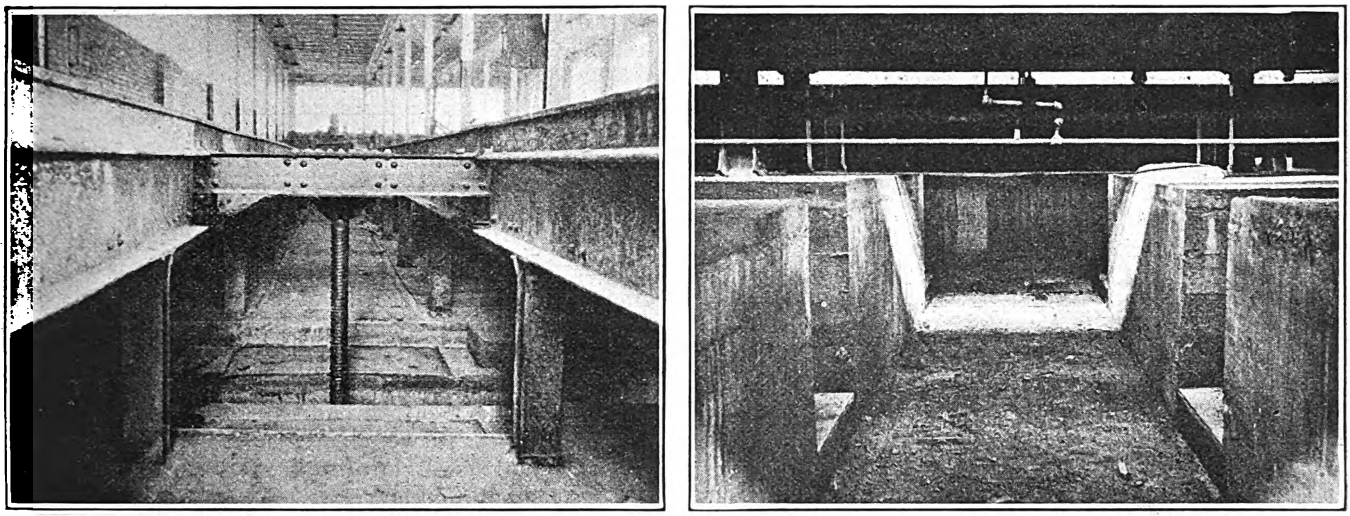
Each pit is provided with two drainage troughs, one on each side, directly under the edge of the I-beam. These drains connect with a catch basin located in the lower level cross pit. Thus there is little possibility of water collecting in the pits and hindering the work of the men. Drains have been provided also on the main floor level.

The outside walls of the building have 40 per cent window space. The panes are clear glass set in "Fenestra" standard side wall steel sash. Each bay has a 16-ft. 1½-in. wide x 10-ft. 3½-in. high section made up of 14-in. x 20-in. panes. This same construction is used on the north wall of the one story wash room. At both ends of the two rooms are swinging steel doors, manufactured by the Detroit Steel Products Company, with the upper two-thirds of the door area equipped with small panes of clear glass. These doors are 15 ft. 16 in. high and each section is 3 ft. 6 in. wide, four sections constituting a single track opening. They are hand-operated and move very freely on a hanger at the top. This type of door has added materially to the convenience of the inspection shop inasmuch as it admits considerable light at the ends of the building, even when closed.

At night illumination of the inspection shop and wash


Randolph Street
Storage and Rip Track Yard
Dry Kiln
Mill
Erecting Room
Sand House
Sand Dryer
Store Room
Oil House
Forge Shop
Welding Room
Machine Shop
Repair Shop
Armature Room
Office
Bake oven
Spy Run Avenue
Storage
Car
Wash Track
Wash House
Inspection Barn
Kamm Street
Transverse Pits
Inspection Pits
Power House
Coal Pit
SPY RUN CREEK
North Lafayette Street
Paint Shop
Fireproof Paint Storage

General Layout of the Spy-Run Shops and Storage Yard



Transverse Pits Connect the Longitudinal Pits. At the Left a Columbia Wheel Drop Is Shown at the End of One of These Transverse Pits

room is accomplished by the use of 200-watt lamps set in dome reflectors mounted approximately 13 ft. above the floor level. In the inspection shop there are four rows of 11 lights each, one row being over each aisle adjacent to the tracks. In the wash room there are two rows of 11 lights each. This system of lighting produces an illumination of approximately 6 foot-candles on the floor level. In addition to the ceiling lighting the pits are illuminated by means of lamps, one in each bay, mounted on the underside of the I-beam rail support on one side of the pit. These lamps are of 23-watt capacity and are protected by means of wire cages. Adjacent to every third lamp is a receptacle for receiving a trouble lamp plug. These receptacles are of special design, having a spring cover.

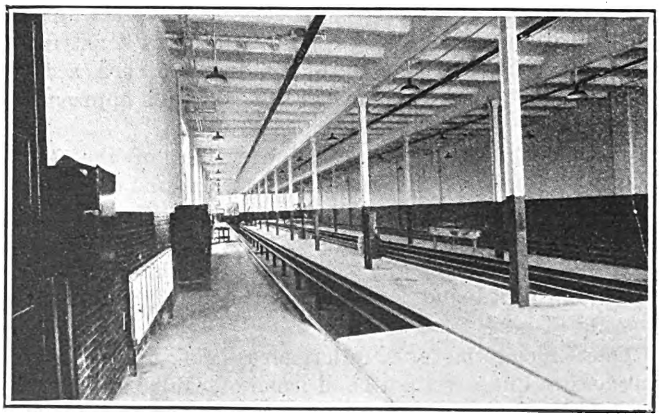
To expedite the work of changing wheels a Columbia wheel drop has been installed in one of the inspection pits at an end of one of the transverse pits. This hoist moves a 3-ft. section of track to a lower level where storage space for two pairs of wheels has been provided. No crane or hoists have been provided inasmuch as it is to be used only for inspection purposes.

Washing facilities for rapidly and efficiently cleaning cars are provided in the wash room by numerous water outlets and adequate drains. Water conditions are such in Fort Wayne that it was necessary to provide duplicate sets of piping in order to furnish both city water and river water. The city water is drawn from rock wells and is very hard. The close proximity of the river to the power house and carhouse made it exceptionally easy to provide soft river water for washing purposes. It is planned to use the river water for the initial washing and the city water for rinsing purposes. Outlets for the hard city water and the soft river water are placed every 25 ft. on each of the wash rooms. Faucets have been provided with threads in order that a coupling may be made with hose or special washing devices. An auxiliary water supply has also been provided which furnishes hot and cold specially treated water in quantities sufficient for special washing purposes, requiring small quantities of water. This water is available at one end of the shop only. It was originally brought into the building for use in the shower baths and wash basins on the second floor but it was thought advisable to make the same type of water available in the wash room.

In the design of the building careful consideration was given to the heating facilities in order to provide a place to work which would be comfortable at all times of the year. Close proximity to the power house permits the use of live steam through a reducing valve. The usual type of wall-supported radiators are located under the windows both in the main inspection shop and in the wash room. The radiators in the inspection shop have a heating surface of 1,800 sq.ft., while those installed in the wash house have a heating surface of 1,170 sq.ft.

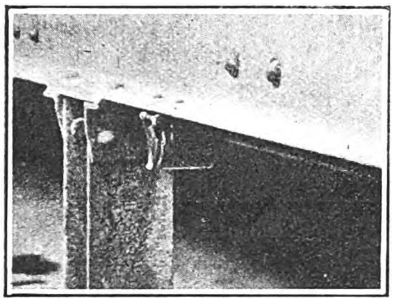
An unusual feature of the heating arrangements is the additional heating area provided by radiators located under the floor in the inspection shop. These are ceiling type radiators, placed on each side of each inspection pit. This auxiliary system has a total of 1,080 sq.ft. for radiation and may be turned on in sections for each track whenever occasion demands. This permits warm air to circulate directly from the pit against the under rigging and floor of the car. With this heating system in operation, it is hoped that the men will be able to work on the brakes and motors of the cars in the winter time, almost immediately after the car is placed in the shop. Warm air being drawn up and around the car will help to melt off the ice and snow accumulated on the car during the winter months. The entire heating system is operated at a pressure of approximately 2 lb. per square inch and maintains a temperature within the building of 70 deg. F. when the outside temperature is zero.

On the second floor of the building are to be found the offices of the transportation department and recreational rooms for the use of the company's employees. The stairway opens into a lobby on the second floor, from which open offices, shower rooms, locker rooms and



The Interior of the Inspection Shop Is Well Lighted, 40 per Cent of the Wall Area Being of Clear Glass toilet rooms. A hallway connects this lobby with recreational rooms located at the center and at the far end of the floor. Directly at the end of the hall is a room with space for three billiard tables and four bowling alleys. Beyond this is located an auditorium with a stage and dressing room at the far end. The doors and interior trim of the second floor are of steel, furnished by the Variety Manufacturing Company.

The appointments of the shower, locker and toilet rooms are the best. The floor in the shower and toilet rooms is raised 6 in. and is covered with white tile. The floor construction is of 6-in. sheared I-beam, reinforced concrete, covered with a Terrazzo surface. However, in the auditorium a hard maple flooring has been laid. The roof is supported on truss spans, 52 ft. long, with a sheared I-beam reinforced concrete roof, upon which is placed 5-ply felt, pitch and gravel.


Trouble Cord Receptacles of this Type Are Located 45 Ft. Apart Along the Pits

The building is of simple design, with nothing fancy about either the exterior or interior. The details of the building were laid out by the engineering department of the Indiana Service Corporation. All of the construction work was done by the company with the exception of the heating and plumbing systems, for which contracts were let to outsiders. The total cost of the building is $125,000, while the entire Spy-Run plan will ultimately involve an expenditure of $500,000 when completed.

Underground Garage One Way Out

AN UNDERGROUND garage in Grant Park, on Chicago's downtown lake front, housing 3,000 automobiles, is the latest plan of various clubs and business organizations to help in relieving the city's traffic congestion.

It is particularly designed to further the projected plan of the Mayor's safety commission, whereby all parking on downtown and car-line streets is to be abolished. The garage is to be the answer to the question: If we can't park our cars on the street, where can we put them?

The garage is to be sunk below the surface of the earth a distance of about 6 ft. It is to be constructed in units, each unit capable of holding 306 cars, according to a plan that already has the tentative approval of a committee.

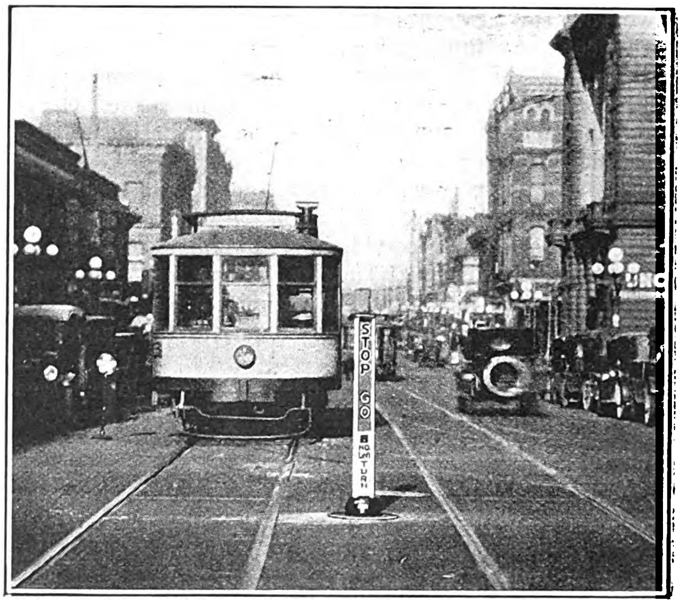
Permission of the board of directors of the South Park commission to erect the garage must first be obtained, but in preliminary conferences, the directors have signified their willingness to permit the construction of such a garage as will meet with the approval of their engineers and which can be constructed without the aid of park funds.

One Chicago motor club has already signified its willingness to underwrite a bond issue of $1,000,000 for the first unit of the garage. In accordance with this plan, after the garage has paid for itself out of the fees collected each day from the motorists who park their cars it will be turned over to the park authorities.

Traffic Signal Designed to Stand Between Tracks

AN AUTOMATICALLY operated traffic control signal, so designed that it can be placed between the tracks of the street railway without interference to the passage of cars, was recently installed in Minneapolis. It consists of a slender square post mounted on a cast-steel ball. The post bears the customary words "go" and "stop" cut through the metal of the sides. The openings are covered by glass so that the flashing on and off of the lights inside of the post illuminates the words in different colors.

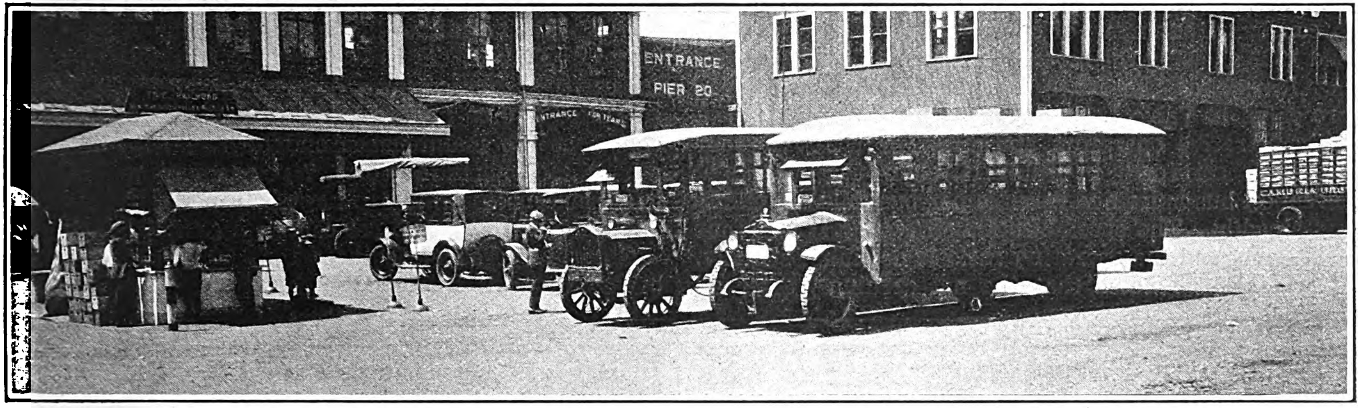
The steel ball at the bottom of the post fits into a steel plate flush with the pavement. Underneath this plate there is an arrangement of springs to hold the post in a vertical position. These springs are flexible enough, however, so that the post yields if struck by a passing vehicle. Mechanism controlling the signal is housed in a steel cabinet at the curb, and the working parts are unaffected when the post is struck.



The Dimensions of This Traffic Signal Permit Placing It Between the Tracks at Street Intersections

Two advantages are claimed for this signal. In the first place it is superior to a signal located at the curb or one suspended overhead from span wires, because it is more likely to be seen by drivers of vehicles. In the second place if a vehicle accidentally runs into it no serious damage is done either to the vehicle or to the signal, whereas collisions with steel or concrete posts are likely to be disastrous.

The Twin City Rapid Transit Company considers that this traffic signal is superior from a street railway standpoint to any of the others that have been placed at various points throughout the city of Minneapolis. Although the clearance between cars is approximately 10 in., no difficulty is experienced in operating where these signals have been installed. The signal is manufactured by the Griswold Safety Signal Company, Minneapolis, Minn.


ENTRANCE
PIER 20

Municipal Buses Waiting for Passengers at Chambers Street Ferry, Lower New York

Coach and Bus Operation in New York

The Fifth Avenue Coach Company and the Municipal Buses Give Quite Different Kinds of Service—Statistics of Each Are Compared with Those of Surface Lines in New York

By *John A. Beeler*
Director the Beeler Organization, Public Utility Consultants, New York

MOST readers of this paper are acquainted with the transportation service supplied in New York by the Fifth Avenue Coach Company, but as large a number may not be familiar with the routes and service of the municipal buses in New York City. Nevertheless the number of passengers carried by the latter annually approximates if it does not exceed in number those carried by the Fifth Avenue Coach Company. A review of the bus situation in Manhattan and Bronx boroughs follows:

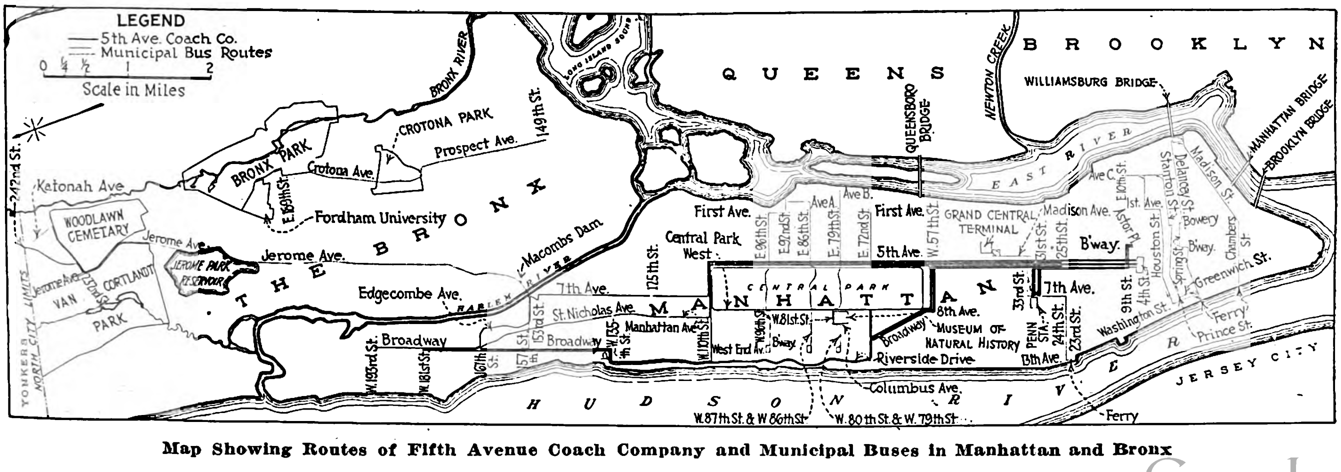
FIFTH AVENUE COACH COMPANY

The Fifth Avenue Coach Company is a privately owned concern controlled by the New York Transportation Company, which, until recently, was a subsidiary of the Interborough Rapid Transit Company. In common with all privately owned public utilities, it renders periodical statements to the Transit Commission so that reliable information regarding its operations is available.

The company operates 10 routes in Manhattan and the Bronx, as shown in the accompanying map. The streets used, like Fifth Avenue and Riverside Drive, are generally wide and well paved. A 10-cent fare is charged, with free transfers good at designated locations, such as short line points and points of divergence.

Most of the coaches are of the double-deck type with the upper deck open and are operated with two men on a coach. A few of the coaches have the upper deck inclosed. The double-deck coaches seat about 48 passengers. The company also operates a few inclosed, single-deck, one-man coaches. A total of 293 coaches are scheduled for daily service, about 60 per cent of them being scheduled in the base service. The base headway on most of the lines is 10 minutes. This results in about a 30-second headway on lower Fifth Avenue in the normal hours. In the rush hours the combined headway in this section is less than 20 seconds.

The company's 1923 balance sheet shows that at that time it had an investment in operating equipment, including real estate, of $3,611,621 and total assets of $6,875,941. Included in its outside investments are $2,568,168 in United States government securities. As the capital stock of the Fifth Avenue Coach Company is the nominal amount of $50,000, the company's sur-


LEGEND
5th Ave. Coach Co.
Municipal Bus Routes
0 ¼ ½ 1 2
Scale in Miles
QUEENS
BROOKLYN
BRONX RIVER
CROTONA PARK
Prospect Ave.
149th St.
BRONX PARK
Crotona Ave.
E. 189th St.
Fordham University
THE BRONX
242nd St.
Katonah Ave
WOODLAWN CEMETARY
Jerome Ave.
Jerome Ave.
Jerome Ave.
JEROME PARK RESERVOIR
VAN CORTLANDT PARK
233rd St.
YONKERS NORTH CITY LIMITS
Macombs Dam
HARLEM RIVER
Edgecombe Ave.
7th Ave.
St. Nicholas Ave.
Broadway
Broadway
Manhattan Ave.
W. 193rd St.
W. 181st St.
161th St.
157th St.
153rd St.
W. 135th St.
125th St.
W. 110th St.
West End Av.
W. 96th St.
W. 81st St.
B'way.
Central Park West
CENTRAL PARK
MANHATTAN
First Ave.
E. 96th St.
E. 92nd St.
E. 86th St.
Ave A.
E. 79th St.
E. 72nd St.
Ave B.
First Ave.
W. 57th St.
5th Ave.
QUEENSBORO BRIDGE
NEWTON CREEK
EAST RIVER
GRAND CENTRAL TERMINAL
Madison Ave.
Ave C.
31st St.
25th St.
B'way.
E. 10th St.
Astor Pl.
1st. Ave.
Stanton St.
Delancey St.
Madison St.
Bowery
B'way.
Houston St.
Spring St.
Chambers St.
Greenwich St.
WILLIAMSBURG BRIDGE
MANHATTAN BRIDGE
BROOKLYN BRIDGE
8th Ave.
MUSEUM OF NATURAL HISTORY
Broadway
Riverside Drive
Columbus Ave.
33rd St.
7th Ave.
PENN STA.
24th St.
23rd St.
8th Ave.
9th St.
4th St.
Washington St.
Ferry
Prince St.
Ferry
HUDSON RIVER
JERSEY CITY
W. 87th St. & W. 86th St.
W. 80th St. & W. 79th St.

Map Showing Routes of Fifth Avenue Coach Company and Municipal Buses in Manhattan and Bronx plus account in the 1923 balance sheet was $5,816,780. A condensed summary of operations for the years 1922 and 1923 showing the revenue, operating deductions and net income of the Fifth Avenue Coach Company is presented in Table I.

Comparative operating statistics for the past four years, as set forth in Table II, show that the total revenues, bus-miles and revenue per bus-mile are climbing steadily. The speed also is better than it was four years ago, and the operating ratio is declining steadily. It will also be noted that the net earnings, after all charges available for interest, have increased from 9.3 cents to 12.69 cents, or 36 per cent in four years. The company charges off 10.40 cents per bus-mile to cover the cost of maintenance and depreciation of equipment. In round figures during 1923, 18 per cent of the revenue went to maintenance and depreciation, 43.5 per cent to transportation costs, 7 per cent to general and miscellaneous including damages, 10 per cent to taxes, and the remaining 21.5 per cent to net income.

General operating features for 1922 and 1923 have been grouped in Table III. The company carried dur-

TABLE I—FIFTH AVENUE COACH COMPANY—SYNOPSIS FROM ANNUAL REPORTS

	1923	1922	Cents per Bus-Mile 1923	Cents per Bus-Mile 1922
Revenue:				
Passenger	$5,597,411	$5,284,013	55.86	54.57
Chartered car	12,326	11,451	.12	.12
Advertising	100,820	94,851	1.01	.98
Miscellaneous	....	98	.....	.....
Total	$5,710,557	$5,390,414	56.99	55.67
Non-operating (net)	126,639	98,696	1.26	1.02
Total revenue	$5,837,196	$5,489,110	58.25	56.69
Deductions:				
Operating expenses:				
Maintenance (a)	$1,045,937	$888,874	10.44	9.18
Transportation	2,529,292	2,406,959	25.24	24.86
Injuries and damages (b)	199,701	206,523	1.99	2.13
Miscellaneous	203,891	208,395	2.04	2.15
Total operating	$3,978,821	$3,710,751	39.71	38.32
Taxes	586,223	610,358	5.85	6.31
Total deductions	$4,565,044	$4,321,109	45.56	44.63
Net income	$1,272,152	$1,168,001	12.69	12.06
Dividends	320,000	....	3.19	....
Surplus	$952,152	$1,168,001	9.50	12.06

(a) The company charges off 10.40 cents per bus-mile for maintenance, including depreciation. Depreciation of tires is based on 'bus-tire mileage" at the guaranteed cost per mile.

(b) Reserve fund for payment of injuries and damages accrued at rate of 1¼ cents per bus-mile.

TABLE II—FIFTH AVENUE COACH COMPANY OPERATING AND FINANCIAL STATISTICS

	1920	1921	1922	1923
Total revenue	$4,353,920	$5,198,936	$5,489,111	$5,837,196
Rate of fare in cents	10	10	10	10
Bus-miles	8,796,195	9,683,500	9,683,500	10,019,805
Speed in miles per hour	7.95	8.15	8.21	8.17
Total revenue per bus-mile, in cents	49.50	56.56	56.69	58.25
Total operating deductions per bus-mile, in cents	40.20	44.68	44.63	45.56
Net earnings per bus-mile, in cents	9.30	11.88	12.06	12.69
Ratio, operating deductions to total revenue, per cent	81.2	79.0	78.8	78.3
Available for interest from each dollar of revenue, in cents	18.8	21.0	21.2	21.7

TABLE III—FIFTH AVENUE COACH COMPANY, MISCELLANEOUS STATISTICS

	1923	1922
Buses:		
Revenue	293	296
Non-revenue	68	74
Total	361	370
Revenue Bus-Hours:		
Active and idle	1,221,567	1,177,463
Private hire	2,926	2,633
Total	1,224,493	1,180,096
Revenue Bus-Miles:		
Active	9,840,557	9,472,327
Idle	166,745	199,735
Private hire	12,503	11,438
Total	10,019,805	9,683,500
Bus-miles per bus-hour	8.17	8.21
Passengers carried	55,974,110	52,840,135
Transfers collected	3,450,608	2,732,608
Employees:		
Drivers	451	434
Conductors	444	453
Others	611	520
Total	1,506	1,407
Total wages and salaries	$2,787,952	$2,616,894
Accidents:		
Persons killed	6	3
Serious injuries	15	19
Minor injuries	955	762

TABLE IV—MUNICIPAL BUS LINES—NEW YORK CITY DATA FROM DEPARTMENT OF PLANT AND STRUCTURES

(Number of passengers carried is based on estimates)

Route	Miles	Buses	Daily Passengers
Delancey and Spring Street	2.09	40	40,000
Avenue C—Desbrosses Street Ferry	2.41	12	15,000
Madison and Chambers Streets	2.17	38	50,000
86th Street	2.26	26	25,000
96th Street	1.97	20	18,000
79th Street	2.32	20	20,000
Pennsylvania and Grand Central Stations	2.36	*5	5,000
Jerome Avenue	7.42	15	15,000
Prospect Avenue	3.41	22	18,000
Fort Schuyler	4.07	8	6,000
	30.48	206	212,000

* Estimated.

TABLE V—NEW YORK CITY (MANHATTAN AND BRONX) STREET RAILWAY OPERATION

	New York Railways	New York & Harlem Railroad	Eighth Avenue Railroad	Ninth Avenue Railroad	Total or Average
Revenue passengers	175,577,130	29,859,051	23,540,476	9,991,964	238,968,621
Transfer passengers	3,669,408	2,107,008	0	20,767	5,797,183
Passenger revenue	$8,424,518	$1,492,953	$1,177,009	$498,177	$11,592,657
Rate of fare, cents	5.00	5.00	5.00	5.00	5.00
Receipts per revenue passenger, cents	4.80	5.00	5.00	4.99	4.85
Receipts per passenger, cents	4.70	4.68	5.00	4.97	4.73
Car-miles operated	11,990,169	2,763,141	2,879,558	1,474,080	19,106,948
Car-hours operated	1,799,478	383,787	382,896	212,145	2,778,306
Average car-miles per hour (a)	6.67	7.21	7.52	6.95	6.90
Receipts per car-mile, cents	77.5	53.9	40.9	33.8	60.6
Receipts per car-hour	$5.17	$3.89	$3.07	$2.34	$4.18
Operating ratio in per cent	88.3	85.5	102.0	102.0	96.8
Expenses per car-mile, cents	68.3	46.1	41.7	34.5	58.8
Expenses per car-hour	$4.56	$3.33	$3.13	$2.39	$4.05
Revenue passengers per car-mile	14.67	10.80	8.17	6.78	12.50
Active cars in daily service	492	80	62	31	665
Miles per car per annum (b)	24,350	37,300	46,400	47,600	28,800
Miles per car per day (b)	66.8	104	127	130	79
Average seats per car	43.5	40.8	32.0	36.0	40.6
Seat-miles per annum	521,491,731	111,181,756	92,145,856	53,066,880	777,886,223
Man-hours per 1,000 seat-miles	6.79	5.87	7.48	4.00	6.60
Investment (c):					
Total	$35,100,000	$3,695,499	$3,910,766	$2,373,571	$45,079,836
Per dollar of revenue	$4.16	$7.47	$3.32	$4.76	$3.89
Per 1,000 seat-miles	$67.40	$33.20	$42.50	$44.60	$58.00
Per 1,000 revenue passengers	$200.00	$127.00	$166.00	$237.00	$188.50
Taxes, per cent of passenger revenue	10.25	6.80	8.04	11.20	9.30

(a) Obtained by dividing the total car-miles by the total car-hours. (b) Obtained by dividing the total car-miles by the number of active cars in daily service. (c) Value determined by the New York Transit Commission as of June 30, 1921.

CITY OF NEW YORK
DEPT OF PLANT & STRUCTURES
179
EMERGENCY BUS SYSTEM

A Typical Municipal Bus in New York

ing 1923 about 60,000,000 passengers, more than 94 per cent of whom were revenue passengers. The average speed for the year 1923 was 8.17 m.p.h., which is about the same as for the two years preceding.

MUNICIPAL BUS ROUTES

The municipal bus routes are lines operated under the direction of the Department of Plant and Structures, City of New York. But little operating and practically no financial data relative to the operation of these buses are available. The routes of the buses are shown on the map, and a statement of the routes operated, together with their length, the number of buses operated, and an estimate of the number of passengers carried daily is given in Table IV. This information is based on data obtained from the Department of Plant and Structures, where the statement was made that if a bus did not return $40 per day it was withdrawn from service.

All of these municipal buses operate on a 5-cent fare. The present routing eliminates the transfer question. The buses are of the single-deck inclosed type. They have longitudinal seats accommodating about 20 passengers. Standing is permitted, while on the Fifth Avenue buses passengers are accepted only when seats are available.

The owners of the buses operated over the municipal routes are individuals who as a rule are also the operators of these buses for at least a part of the day. These operators are not obliged to file reports with any municipal or other board of the number of passengers carried by them or of their expenses, and there is consequently no public accounting for fares. Based on the meager information available and on observation, a liberal estimate of the business done by these municipal buses would be that they are carrying about 70,000,000 passengers annually. On this basis the annual gross receipts would be $3,500,000. Observations made indicate that the buses are making about 7.5 m.p.h. With the gross receipts assumed, this would make their receipts 38.8 cents per bus-mile. A fair estimate of their expenses would be 33.4 cents. This would give them an operating ratio of 86.1 per cent.

804
4 5' AVE.-110' ST. RIVERSIDE DRIVE
PENN. STATION

A Fifth Avenue Bus on Riverside Drive

TABLE VI—COMPARISON OF FIFTH AVENUE COACH AND MUNICIPAL BUS OPERATION, MANHATTAN AND BRONX

	Fifth Avenue Coach Company (a)	Municipal Buses (b)
Revenue passengers	55,974,110	70,000,000
Transfer passengers	3,669,408	0
Passenger revenue	$5,597,411	$3,500,000
Rate of fare, cents	10.00	5.00
Receipts per revenue passenger, cents	10.00	5.00
Receipts per passenger, cents	9.43	5.00
Miles operated	9,840,557	9,022,500
Hours operated	1,221,567	1,203,000
Average miles per hour	8.05	7.50
Receipts per bus-mile, cents	55.86	38.80
Receipts per bus-hour	$4.58	$2.91
Operating ratio in per cent	71.0	86.1
Expense per bus-mile, cents	39.71	33.40
Expense per bus-hour	$3.19	$2.50
Revenue passengers per bus-mile	5.69	7.76
Active buses in daily service	293	206
Miles per bus per annum	33,600	43,800
Miles per bus per day	66.8	120
Average seats per bus	48.5	24
Seat-miles per annum	477,000,000	218,000,000
Man-hours per 1,000 seat-miles	4.83	5.52
Investment:		
Total	$3,612,000	$2,500,000
Per 1,000 seat-miles	$7.60	$11.48
Per 1,000 revenue passengers carried	$64.80	$35.80
Per dollar of revenue	.65	.72
Taxes, per cent of passenger revenue	10.5	....

(a) Based on annual reports.
(b) All operating data are estimated.

COMPARATIVE STATISTICS

A summary of the operating and financial information for the municipal buses and Fifth Avenue Coach System is presented in Table VI. It shows that all the buses in Manhattan and the Bronx are carrying 125,000,000 revenue passengers annually and have receipts of $9,000,000. The passengers carried represent about 8 per cent of the total passengers carried in New York City.

Similar statistics for the street car companies operating in Manhattan and the Bronx, exclusive of the Third Avenue System and the Second Avenue Railroad are presented in Table V. These companies are omitted from this table for the reason that those shown serve more nearly the same territory as the buses. The salient operating and financial figures of the three are presented in comparative form in Table VII.

TABLE VII—SUMMARIZED COMPARISON OF DATA, NEW YORK SURFACE TRANSPORTATION SYSTEMS

	Fifth Avenue Coach Company	Municipal Buses	Surface Street Railways
Rate of fare, cents	10	5	5
Average miles per hour	8.05	7.50	6.90
Receipts per mile, cents	55.86	38.80	60.60
Operating expenses per car-mile, cents	39.71	33.40	58.80
Operating ratio	71.0	86.1	96.8
Taxes, per cent of revenue	10.5	....	9.3
Revenue passengers per mile	5.69	7.76	12.50
Seat-miles per revenue passenger	8.54	3.12	3.26
Investment per dollar of revenue	$0.65	$0.72	$3.89
Investment per 1,000 seat-miles	$7.60	$11.40	$58.00
Investment per 1,000 revenue passengers	$64.80	$35.80	$188.50

The cost of operations for the surface street railways is considerably higher than normal on account of depreciation charges, largely brought about through deferred maintenance. The municipal buses apparently have no overhead charges, are virtually tax free, and operate only where each bus is assured of at least $40 per day. The railways do not have these advantages.

In Manhattan the railways are required to use the underground conduit type of electric railway construction, which is by far the most expensive type of street railway construction. The unit investment of the railways is from three to six times that of the bus or coach. The railway is required to construct its own substantial roadway of steel and concrete, and to improve it with city paving. In the case of the bus and coach the roadbed and paving are furnished by the city at public expense. With the cost of this included under each of the other headings, the difference in investment will be not nearly as great.

Bonus System Reduces Accidents

Nashville Railway & Light Company Has 25 per Cent Fewer Accidents Since Adoption of Plan Whereby Trainmen Profit by Accident Reduction

A BONUS system for trainmen, inaugurated by the Nashville Railway & Light Company on Jan. 1, 1923, in connection with the safety work of the company, has resulted in a gratifying reduction in the number of accidents. The report for the first six months of 1924 shows a decrease in the number of accidents due to negligence on the part of the railway, from 319 to 245, approximately 25 per cent.

For the purposes of this work the company has divided the calendar year into three contest periods. The first and second of these are of four months each, but the last is a three-month period, ending Nov. 30, so that the bonus can be distributed to employees before Christmas. A fund of $1,500 is set up by the company as a base amount at the beginning of each contest. For every accident less than the number occurring during the same period the previous year $20 is added to this fund. If there are more accidents than during the corresponding period of the previous year, $20 is deducted from the fund for each such accident.

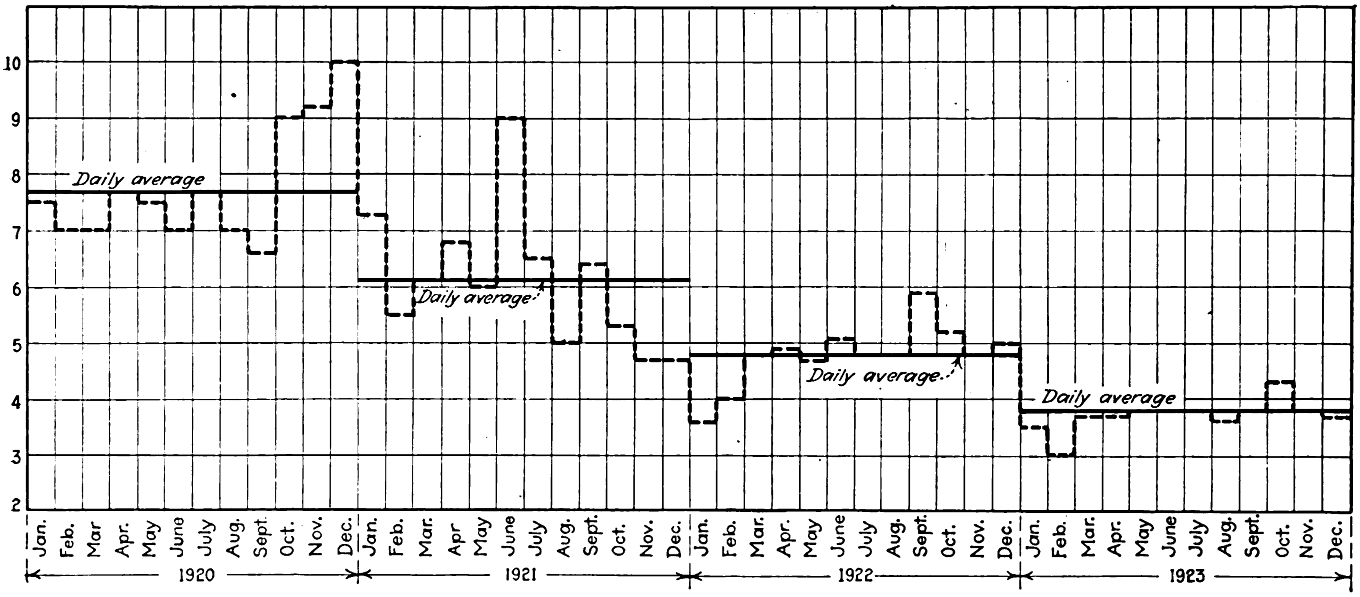
Trainmen participating in the contest are divided into two classes; first, motormen, operators and conductors who act as motormen most of the time; second, men who work only as conductors. Three-quarters of the bonus goes to trainmen in the first class, and one-quarter to those in the second class. No trainman is included in either class, however, unless he has worked as many as 750 hours during the four-month period. Conductors who have had one accident and motormen who have had three or more accidents do not participate in the bonus. Distribution is made in the proportion of 10:5:3 to those who have had none, one or two accidents during the four months.

Under the conditions of the contest certain classes of accidents must be reported but do not count against trainmen. These are collisions between automobiles or other vehicles near a street car, which are reported merely as a matter of protection to the company. Similar reports are made when the rear end of a car on straight track is run into by any vehicle, when passengers are sick on the cars, or when clothing is damaged by some defect. Any claim which may be filed and for which no report has been made by the crew is considered a blind claim, and counts double against the trainmen failing to make such a report. A double deduction is made in such a case from the bonus fund.

As a result of the inauguration of this system the average daily number of accidents was reduced from 4.8, in 1922, to 3.8 for 1923. This reduction has been made in spite of a constantly increasing number of automobiles registered in the county. Gratifying results continue to be obtained. The record for the month of June, 1924, and for the first six months of the year are shown in the following table:

	June, 1924	Year to Date
Total accidents	94	632
Car-miles operated	441,949	2,668,761
Car-miles per total accident	4,702	4,223
Chargeable accidents	39	216
Car-miles per chargeable accident	11,332	12,355

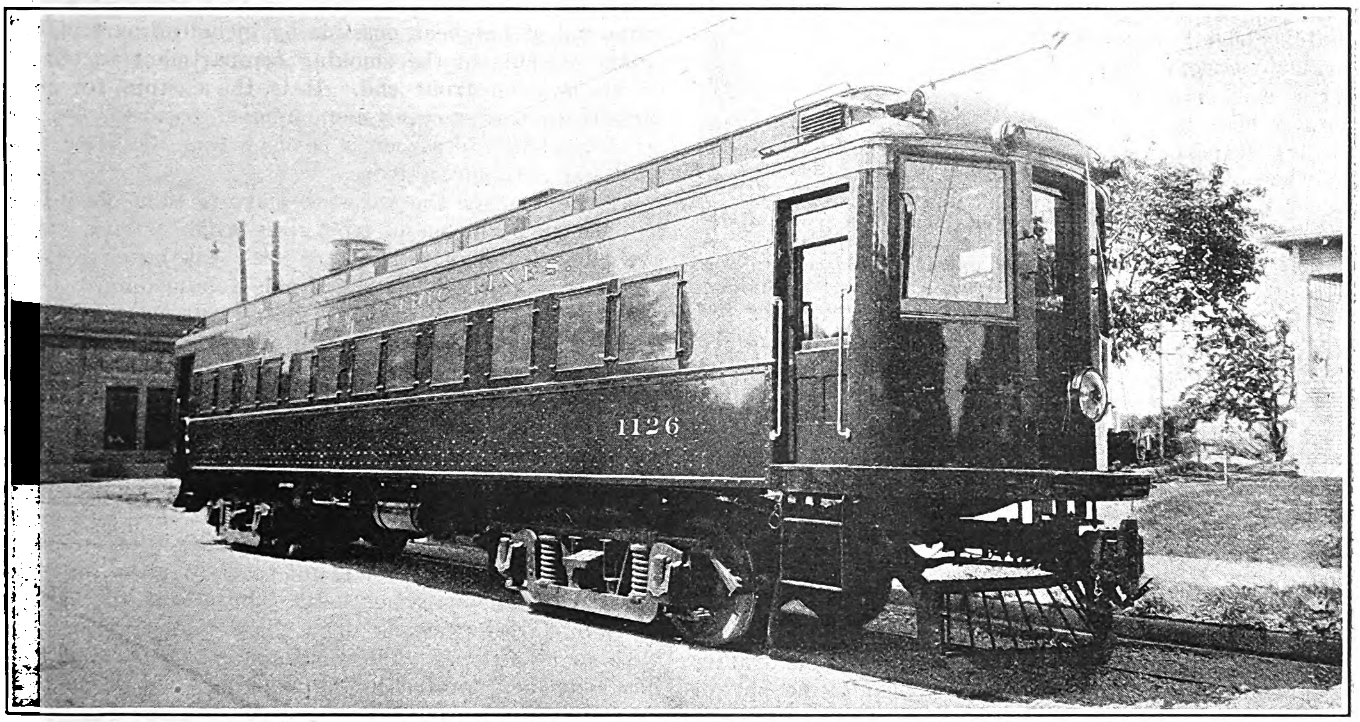
For the first six months of 1923 there were 683 accidents as against 632 this year. Of these only 245 were chargeable this year as compared with 319 last year.



Four-Year Accident Record of Nashville Railway & Light Company

Luxurious Cars for Interurban Service

Parlor Car and Coach Built by the Milwaukee Electric Railway & Light Company Have Many Features Typical of Steam Railroad Practice — Semi-Observation Front and Inclosed Observation Platform at the Rear Are Provided—Leather-Upholstered Deep-Cushioned Seats Are Used in the Coach



Attractive New Interurban Car of the Milwaukee Electric Railway & Light Company, Painted Pullman Green Below the Letterboard and Chrome Yellow Above

TWO cars recently completed at the Cold Spring shops of the Milwaukee Electric Railway & Light Company are the first of several of a new type of luxurious equipment which will be placed in service on the interurban lines of this company. Both cars are examples of modern car building, containing features which have not been incorporated heretofore in electric railway rolling stock. One is a parlor car having observation facilities at both ends. The other is a coach, with an interior finish as fine as that of the parlor car, and having deep-cushioned, non-reversible cross-seats with leather, upholstered backs, cushions and open-frame arms.

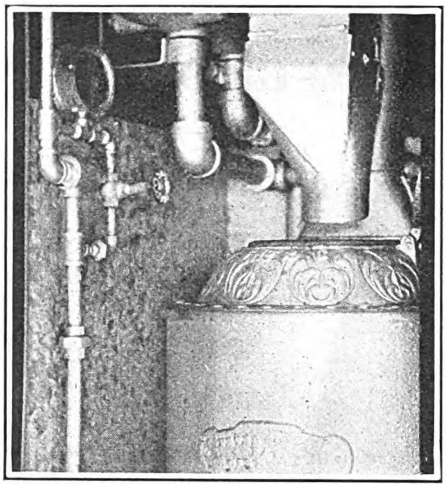
The parlor car has the same type of sub-frame as the standard interurban cars of this company. Baldwin electric motor passenger car trucks of 7-ft. wheelbase having triple elliptic springs, Westinghouse type 548-C-7 field control motors, and new Westinghouse schedule A.M.M. combined automatic and straight air-brake equipment are provided.

In this car a smoking compartment is separated from the main portion of the car by a small section which contains the toilet and a hot water heater. The arrangement of this apparatus and the utilization of every inch of available space for accessories are noteworthy. At one end of this dividing section is a partition extending almost across the car. At the other end a partition with a swinging door at the center separates it from the smoking compartment. These two partitions are approximately 5 ft. apart. A lavatory occupies the space adjacent to the main compartment partition, and a Peter Smith heater takes up the remaining space on the same side. The heater is inclosed by double doors with shutter strips. In the corner directly opposite the heater is a luggage rack.

By this method the smoking compartment is effectively separated from the rest of the car. The finish and appointments resemble those found in Pullman cars. Turned posts are used at the end of the dividing partition and at the corner of the luggage rack. The door to the lavatory has been placed at an angle, while the paneling adjacent to the door has been so placed as to create an effect similar to that of curved steel paneling in Pullman cars.

Appointments in the lavatory are of the latest design. The toilet is of the wet hopper type and a wash basin in the corner is of nickeled steel. Water for the toilet and wash bowl is stored in a tank which occupies space under the roof above the dividing section. The tank, which carries water sufficient for a day, is filled from the outside. The swinging door leading into the smoking compartment has a window of leaded glass worked into an artistic design. The luggage carrier consists of three shelves spaced with ample room for 12 suitcases of the ordinary size. Nickel-plated strips have been placed on the wall panels adjacent to the luggage rack in order to protect the finish.

With the Peter Smith heater located at the center of the car, it was necessary to devise some means of getting coal into the heater and removing the ashes, without tracking up the car. To accomplish this, the space immediately above the heater compartment was made into a coal bin with a trapdoor in the roof by which to fill the bin. A chute which may be swung back out of the way connects this bin with the opening in the top of the stove. By means of a grate type damper, it is possible to shake out as much coal as is desired. The device was worked out in the shops and is made up of sheet iron of sufficient thickness to withstand the impact of pouring the coal.


Coal for the Peter Smith Hot Water Heater Is Stored in a Bin Above the Heater. A Damper and Chute Provide a Means of Refueling the Stove. Ashes Are Dropped Through a Hole in the Floor of the Car Into a Pan Suspended Below

Ashes are removed by opening a slide in the floor of the car directly below the grate of the heater. This opening in the floor is above a receptacle hung from the framework of the car, which contains a flat ashpan. With this arrangement, it is possible for the conductor to fire the heater and remove the ashes without soiling his hands or causing coal or ash dust to be spread throughout the car. The stove and all of its fittings in the heater compartment are painted with aluminum paint.

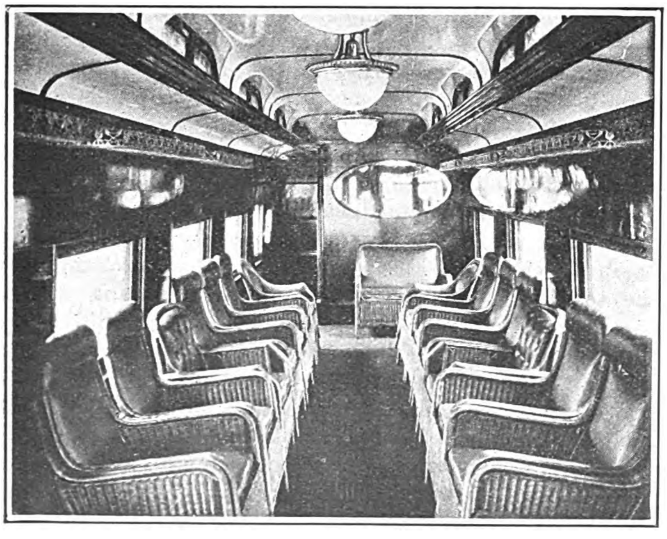
The roof is of the monitor deck type with an empire ceiling. Red mahogany finish and the white enameled ceiling with red mahogany paneling strips and ventilator sash give the interior a pleasing appearance. The hardware throughout has dull nickeled bronze finish. The carpet in the main section is the conventional Pullman design and green color. Twenty-four wicker chairs upholstered in brown leather line the two sides of the main compartment of the car. A small settee of the same construction with accommodations for two has been placed at the forward end of the compartment directly under the large oval mirror in the partition. The smoking compartment contains four of the same type of individual chairs and also two compartments, one on each side of the car, with leather-upholstered facing seats. A table has been mounted between each pair of seats, in order to provide facilities for card playing.

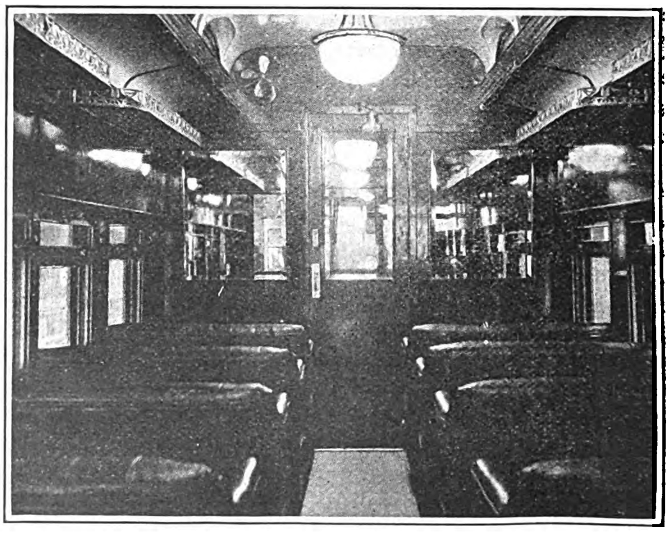
As the motorman's cab occupies only one side of the front end, it has been possible by including part of the front vestibule in the smoking compartment to obtain an observation front end. It is the custom for passengers in the smoking compartment to move the individual chairs into such a position that the view forward can be appreciated.

At the rear of the car, the platform has been partitioned off by means of long glass windows and a long glass paneled door. The step well has been inclosed by means of a trapdoor. Suitable folding chairs have been placed in this space, providing an inclosed observation platform, which is comfortable during all seasons of the year. This car is run as a single unit on the Watertown line of the company, a charge of 25 cents in excess of the regular fare being made.

COACH HAS UNIQUE FEATURES

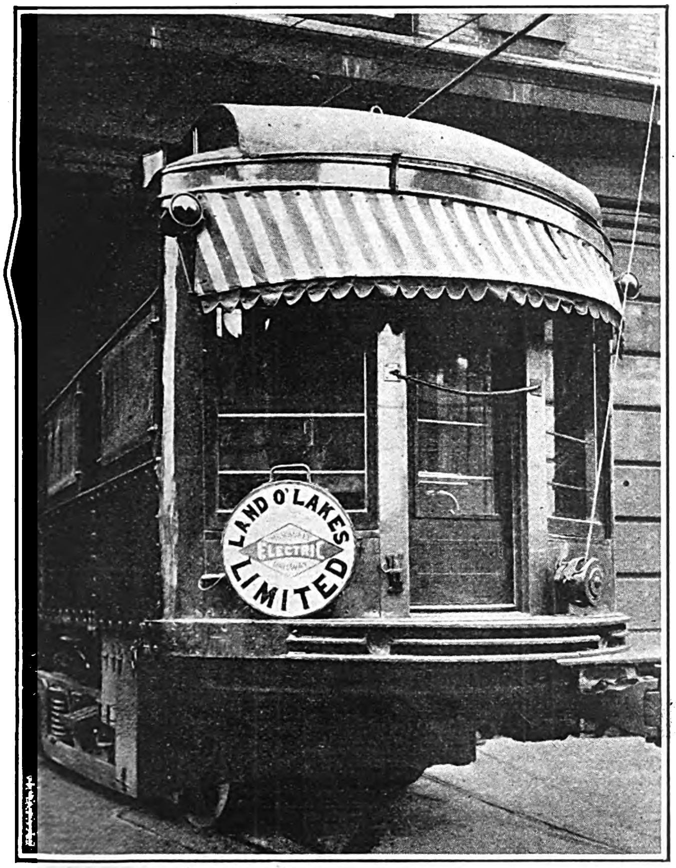
In the coach, which was built upon the same type of sub-frame as the parlor car, the same interior finish is used as in the parlor car, but the separation between the smoking compartment and the rest of the car is accomplished by means of a glass paneled partition with swinging door. The vestibule at the forward end has been incorporated in the smoking compartment in a manner similar to that on the parlor car. The toilet and heater compartments have been located at the rear, however, the latter being on the rear platform. The outstanding feature of this car is the 23 heavily upholstered, deep-cushioned, non-reversible seats which have been spaced at an average of 39-in. centers opposite the windows on each side of the car. As will be seen in an accompanying illustration, the seats have upholstered open-frame arms at both the aisle and window ends. They were manufactured by the Hale & Kilburn Company and are completely covered with


Wicker Chairs with Brown Leather Upholstering Are Used in the Main Compartment of the Parlor Car. The Interior Finish Is Highly Polished Red Mahogany


Heavily Upholstered, Low-Back, Deep-Cushioned Seats Are Used Throughout the De Luxe Coach. Beyond the Partition Is the Smoking Compartment

dark brown "Zapon" leather. These seats have relatively low backs, but because of the heavy upholstering they are very comfortable. A rubber mat extends the full length of the car, being divided into two sections at the partition between the smoking compartment and the main section of the car. Parcel racks of dull nickeled bronze finish are made up in sections approximately 4 ft. long, and are mounted above the single sash window.

In this car as well as the parlor car, the upper sash has been eliminated, resulting in a wide letterboard on the outside and an imposing mahogany panel on the inside. As a substitute for the customary window guards on the outside, both of these cars have been provided with heavy copper screens. These are made in individual sections to fit each window, and are arranged so that they may be removed and replaced with storm sash during the winter months.



The Inclosed Rear Vestibule Provides an Observation Platform Sheltered from Wind and Rain

On each side of the bulkhead partition between the two compartments of the car has been mounted a 10-in. non-oscillating electric fan. The lighting fixtures in both cars consist of transparent bowl shades suspended by nickeled bronze fixtures. Each bowl contains a 200-watt, 50-volt lamp operating in series with four others connected to a low-voltage regulator which receives its energy from the trolley. This arrangement has done much to eliminate the fluctuations of light due to the irregularities of the trolley voltage.

Both of these cars have a striking exterior appearance. They are painted with Pullman green below the letterboard and chrome yellow above. Lettering is done in gold, edged with black. The under rigging and trucks of the cars have been painted green, while a bit of attractiveness has been added to these parts of the car by spray painting the wheels chrome yellow. Each car is provided with two trolley poles, although both are single end operated. Provision has been made for train operation, if it is found desirable, by placing receptacles for both the control and bus line jumpers at the ends of each car.

With these two cars in service and others in the process of construction at the shops, the company will be in position to furnish to its patrons over the interurban line de luxe service both at the normal rate of fare and at an excess fare. It is the intention of the company to offer to the traveling public accommodations as comfortable as those found in steam railroad practice.

Change Receptacle Facilitates Fare Collection

TO SPEED UP the fare collection on one-man cars, the Youngstown Municipal Railway has installed near the fare box a simple change receptacle. This has facilitated the work of the operator to such an extent that he is able to take care of two passengers in about the same time he formerly devoted to one.

The cash fare of 8 cents or a metal token is collected in a Cleveland fare box at the time the passenger leaves the car. When the operator is tendered a coin for making change, such as a dime or a quarter, he places the proper change in the change receptacle, from which it is removed by the passenger who deposits the fare in the box. By placing the change in the receptacle the operator does not have to wait until the passenger extends his hand, but may turn his attention to the next passenger.

When several passengers are leaving the car at the same stop, the operator places the change for the first passenger in the receptacle, while the change for the second passenger is given directly to him. By the time the first passenger has recovered his change from the receptacle, the second passenger has received his change from the operator. Thus both passengers have been served and are prepared to drop the proper token or cash into the fare box at approximately the same time. Following passengers are treated in the same manner, every other one receiving his change in the receptacle.

The receptacle is made from a block of wood and finished 4 in. in diameter and 1½ in. thick, cupped out on its upper surface to a depth of ½ in. It is fastened by means of a wood screw to a sheet-iron bracket, which in turn is fastened to the fare box stanchion, or, in the case of the recently rebuilt double-truck cars, to the braces which extend from the fare box stanchion to the inside of the platform dash.

This simple device is now being made standard equipment on all cars and buses operated by the Youngstown Municipal Railway. It was designed and made in the Hazelton car shop of the company.

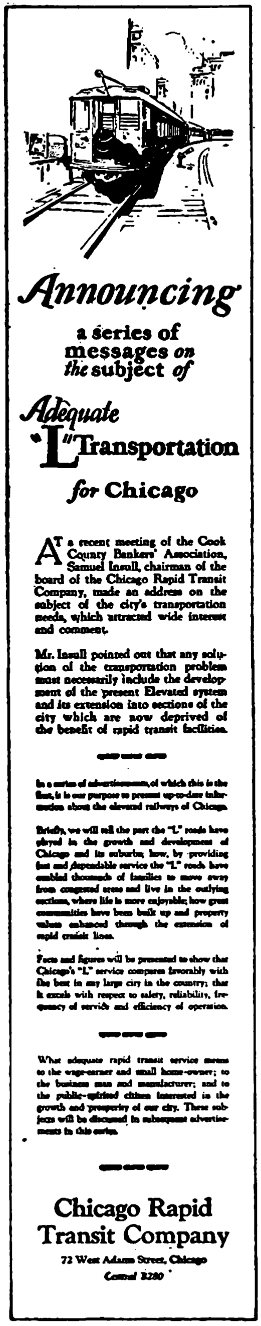
A thirty-six-page booklet containing a map of railway routes, terminals and bus lines has been prepared by the United Railways & Electric Company, Baltimore, Md., dedicated to the people of the city and vicinity. The pamphlet contains some information about the historic beginnings of the United, the car lines of today, employees, power repair shops, safety system and many other pertinent facts to show that the system is part and parcel of the life of the people.

Newspaper Advertisements Promote Sale of Stock

A SERIES of attractive advertisements has appeared recently in the daily papers of Chicago setting forth the development in service rendered by the Chicago Rapid Transit Company. These ads appeared first in conjunction with the good-will campaign inaugurated by the company a short time ago to serve as a forerunner of the sale of 7.8 per cent prior preferred stock.

The advertising campaign has been handled by a local advertising agency in Chicago, the ads being altered in the various daily papers so that one appeared in each paper on a different day before the next one was released. Typical examples of these advertisements are shown in the accompanying illustration. Each advertisement is two columns wide and extends the entire length of the page. At the top of every advertisement is a line cut showing some view characteristic of the elevated system, while immediately below this in graduated type is reading matter setting forth the achievements of the system or reasons for purchasing the preferred stock. The slug line between the various size type represents a three-car elevated train, while at the bottom the name "Chicago Rapid Transit Company" has been set in large type. Wherever possible they have been run near the edge of the page, as near the front of the newspaper as possible.

These advertisements have been sent out by the Utilities Securities Company, a stock selling company handling the work for the Chicago Rapid Transit Company. Gratifying success has marked the progress of this campaign up to the present time, as has been told in previous issues of this paper. After the completion of the campaign it is the intention of the company to continue using paid advertising space in the daily papers, as well as billboard advertisements, to set forth the advantages of rapid transit service to the people of Chicago.



Announcing

a series of messages *on the* subject *of*

Adequate "L" Transportation

for Chicago

AT a recent meeting of the Cook County Bankers' Association, Samuel Insull, chairman of the board of the Chicago Rapid Transit Company, made an address on the subject of the city's transportation needs, which attracted wide interest and comment.

Mr. Insull pointed out that any solution of the transportation problem must necessarily include the development of the present Elevated system and its extension into sections of the city which are now deprived of the benefit of rapid transit facilities.

In a series of advertisements, of which this is the first, it is our purpose to present up-to-date information about the elevated railways of Chicago.

Briefly, we will tell the part the "L" roads have played in the growth and development of Chicago and its suburbs; how, by providing fast and dependable service the "L" roads have enabled thousands of families to move away from congested areas and live in the outlying sections, where life is more enjoyable; how great communities have been built up and property values enhanced through the extension of rapid transit lines.

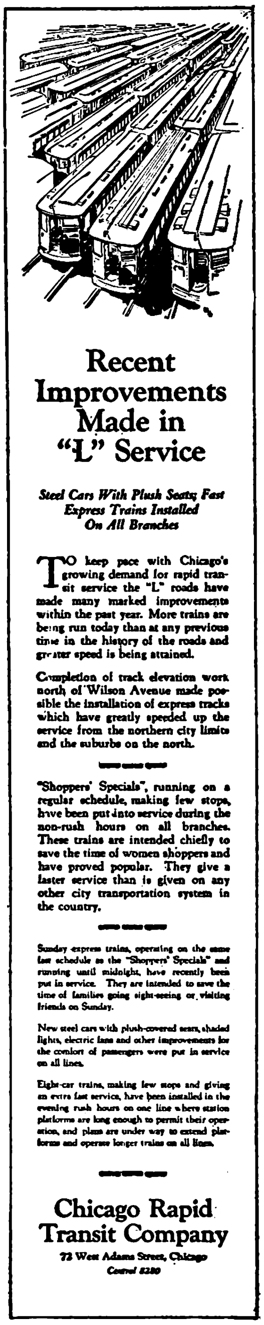
Facts and figures will be presented to show that Chicago's "L" service compares favorably with the best in any large city in the country; that it excels with respect to safety, reliability, frequency of service and efficiency of operation.

What adequate rapid transit service means to the wage-earner and small home-owner; to the business man and manufacturer; and to the public-spirited citizen interested in the growth and prosperity of our city. These subjects will be discussed in subsequent advertisements in this series.

Chicago Rapid Transit Company

72 West Adams Street, Chicago

Central 8280



Recent Improvements Made in "L" Service

Steel Cars With Plush Seats; Fast Express Trains Installed On All Branches

TO keep pace with Chicago's growing demand for rapid transit service the "L" roads have made many marked improvements within the past year. More trains are being run today than at any previous time in the history of the roads and greater speed is being attained.

Completion of track elevation work north of Wilson Avenue made possible the installation of express tracks which have greatly speeded up the service from the northern city limits and the suburbs on the north.

"Shoppers' Specials", running on a regular schedule, making few stops, have been put into service during the non-rush hours on all branches. These trains are intended chiefly to save the time of women shoppers and have proved popular. They give a faster service than is given on any other city transportation system in the country.

Sunday express trains, operating on the same fast schedule as the "Shoppers' Specials" and running until midnight, have recently been put in service. They are intended to save the time of families going sight-seeing or visiting friends on Sunday.

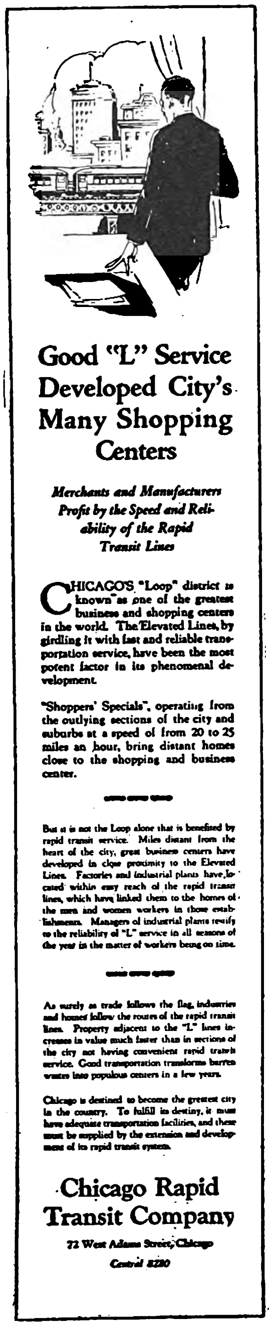
New steel cars with plush-covered seats, shaded lights, electric fans and other improvements for the comfort of passengers were put in service on all lines.

Eight-car trains, making few stops and giving an extra fast service, have been installed in the evening rush hours on one line where station platforms are long enough to permit their operation, and plans are under way to extend platforms and operate longer trains on all lines.

Chicago Rapid Transit Company

72 West Adams Street, Chicago

Central 8280



Good "L" Service Developed City's Many Shopping Centers

Merchants and Manufacturers Profit by the Speed and Reliability of the Rapid Transit Lines

CHICAGO'S "Loop" district is known as one of the greatest business and shopping centers in the world. The Elevated Lines, by girdling it with fast and reliable transportation service, have been the most potent factor in its phenomenal development.

"Shoppers' Specials", operating from the outlying sections of the city and suburbs at a speed of from 20 to 25 miles an hour, bring distant homes close to the shopping and business center.

But it is not the Loop alone that is benefited by rapid transit service. Miles distant from the heart of the city, great business centers have developed in close proximity to the Elevated Lines. Factories and industrial plants have located within easy reach of the rapid transit lines, which have linked them to the homes of the men and women workers in those establishments. Managers of industrial plants testify to the reliability of "L" service in all seasons of the year in the matter of workers being on time.

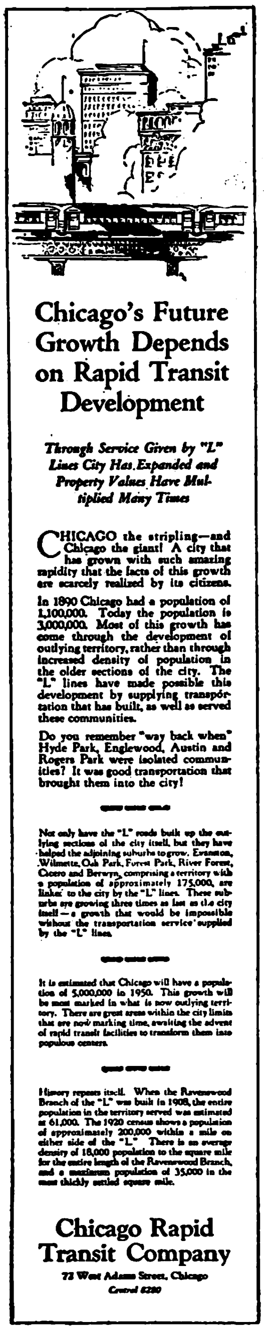
As surely as trade follows the flag, industries and homes follow the routes of the rapid transit lines. Property adjacent to the "L" lines increases in value much faster than in sections of the city not having convenient rapid transit service. Good transportation transforms barren wastes into populous centers in a few years.

Chicago is destined to become the greatest city in the country. To fulfill its destiny, it must have adequate transportation facilities, and these must be supplied by the extension and development of its rapid transit system.

Chicago Rapid Transit Company

72 West Adams Street, Chicago

Central 8280



Chicago's Future Growth Depends on Rapid Transit Development

Through Service Given by "L" Lines City Has Expanded and Property Values Have Multiplied Many Times

CHICAGO the stripling—and Chicago the giant! A city that has grown with such amazing rapidity that the facts of this growth are scarcely realized by its citizens.

In 1890 Chicago had a population of 1,100,000. Today the population is 3,000,000. Most of this growth has come through the development of outlying territory, rather than through increased density of population in the older sections of the city. The "L" lines have made possible this development by supplying transportation that has built, as well as served these communities.

Do you remember "way back when" Hyde Park, Englewood, Austin and Rogers Park were isolated communities? It was good transportation that brought them into the city!

Not only have the "L" roads built up the outlying sections of the city itself, but they have helped the adjoining suburbs to grow. Evanston, Wilmette, Oak Park, Forest Park, River Forest, Cicero and Berwyn, comprising a territory with a population of approximately 175,000, are linked to the city by the "L" lines. These suburbs are growing three times as fast as the city itself—a growth that would be impossible without the transportation service supplied by the "L" lines.

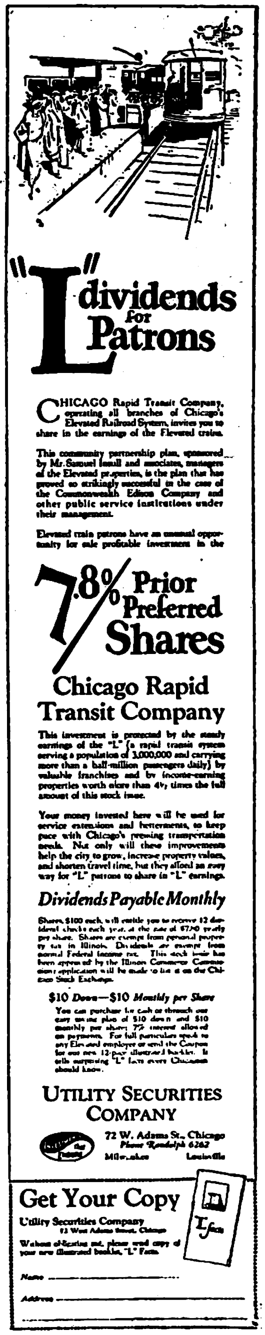
It is estimated that Chicago will have a population of 5,000,000 in 1950. This growth will be most marked in what is now outlying territory. There are great areas within the city limits that are now marking time, awaiting the advent of rapid transit facilities to transform them into populous centers.

History repeats itself. When the Ravenswood Branch of the "L" was built in 1908, the entire population in the territory served was estimated at 61,000. The 1920 census shows a population of approximately 200,000 within a mile on either side of the "L". There is an average density of 18,000 population to the square mile for the entire length of the Ravenswood Branch, and a maximum population of 35,000 in the most thickly settled square mile.

Chicago Rapid Transit Company

72 West Adams Street, Chicago

Central 8280



"L" dividends for Patrons

CHICAGO Rapid Transit Company, operating all branches of Chicago's Elevated Railroad System, invites you to share in the earnings of the Elevated trains.

This community partnership plan, sponsored by Mr. Samuel Insull and associates, managers of the Elevated properties, is the plan that has proved so strikingly successful in the case of the Commonwealth Edison Company and other public service institutions under their management.

Elevated train patrons have an unusual opportunity for safe profitable investment in the

7.8% Prior Preferred Shares

Chicago Rapid Transit Company

This investment is protected by the steady earnings of the "L" (a rapid transit system serving a population of 3,000,000 and carrying more than a half-million passengers daily) by valuable franchises and by income-earning properties worth more than 4½ times the full amount of this stock issue.

Your money invested here will be used for service extensions and betterments, to keep pace with Chicago's pressing transportation needs. Not only will these improvements help the city to grow, increase property values, and shorten travel time, but they afford an easy way for "L" patrons to share in "L" earnings.

Dividends Payable Monthly

Shares, $100 each, will entitle you to receive 12 dividend checks each year, at the rate of $7.80 yearly per share. Shares are exempt from personal property tax in Illinois. Dividends are exempt from normal Federal income tax. This stock issue has been approved by the Illinois Commerce Commission; application will be made to list it on the Chicago Stock Exchange.

$10 *Down*—$10 *Monthly per Share*

You can purchase for cash or through our easy saving plan of $10 down and $10 monthly per share; 7% interest allowed on payments. For full particulars speak to any Elevated employee or send the Coupon for our new 12-page illustrated booklet. It tells surprising "L" facts every Chicagoan should know.

UTILITY SECURITIES COMPANY

72 W. Adams St., Chicago
Phone Randolph 6262
Milwaukee Louisville

Get Your Copy

Utility Securities Company
72 West Adams Street, Chicago

Without obligating me, please send copy of your new illustrated booklet, "L" Facts.

Name ______________________

Address ______________________

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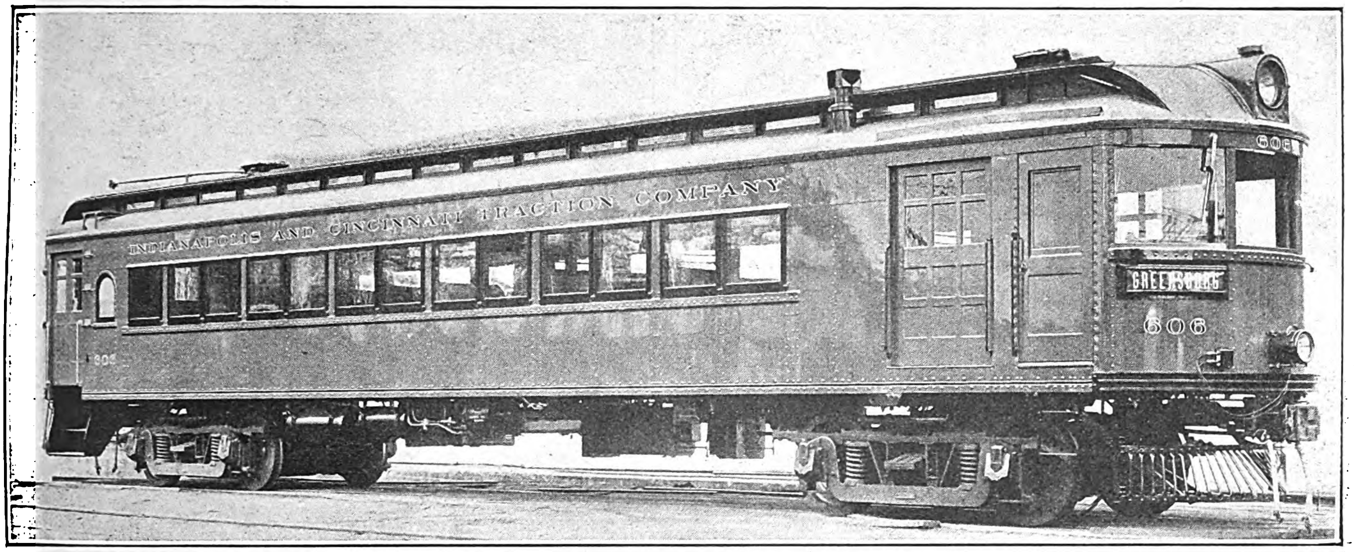
Typical Examples of Newspaper Advertising in Chicago Rapid Transit Company Stock Campaign


INDIANAPOLIS AND CINCINNATI TRACTION COMPANY
GREENSBURG
606

Twelve New Steel Passenger Cars of This Type Have Been Placed in Service. They Are Designed for Use Both in Local and Limited Service

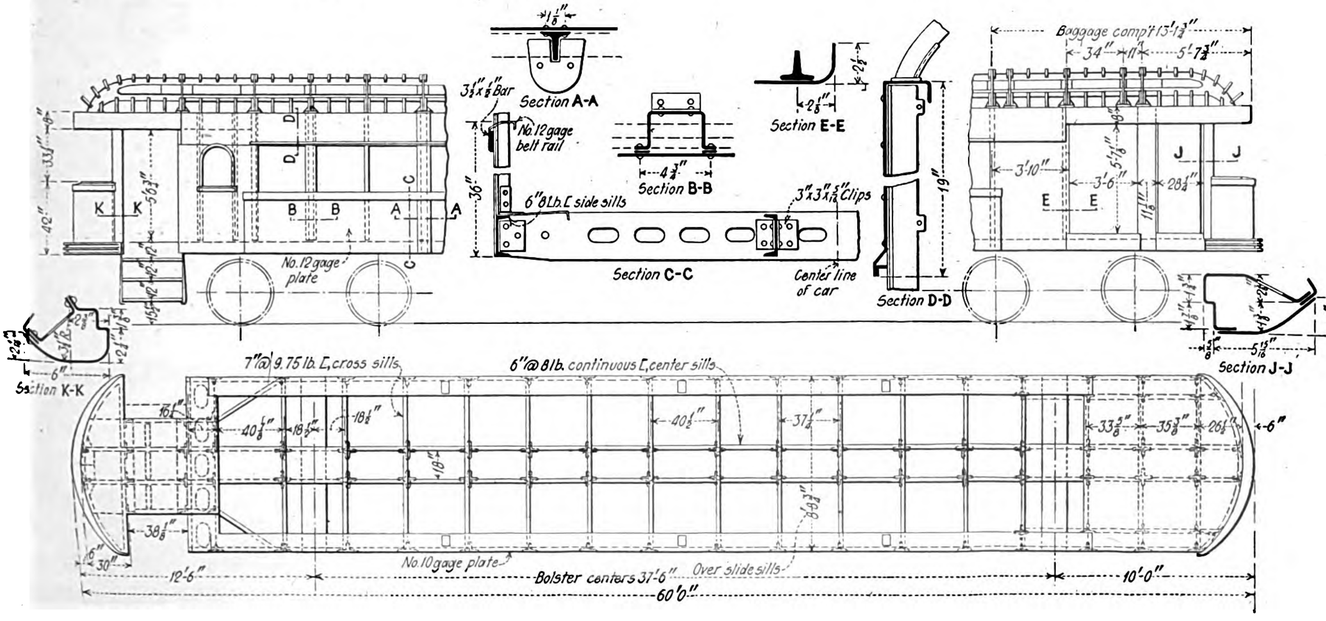
How the Indianapolis & Cincinnati Line Was Rehabilitated

Third Article

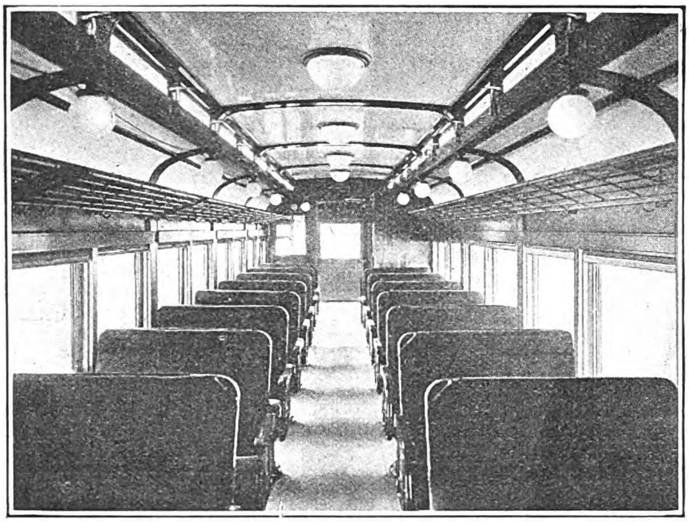
When This Road Was Rehabilitated It Was Entirely Re-equipped with Modern Light-Weight Passenger Cars—These Have Been Designed for Large Carrying Capacity and High Speed—The Freight Cars Also Have Been Modernized

THE Indianapolis & Cincinnati Traction Company, which recently has converted its entire system from the 3,300-volt single-phase system to 600 volts d.c., is an example of what can be accomplished in modernizing an existing property to obtain improved operating conditions. The general features of the new installation and the automatic substation equipment have already been described in ELECTRIC RAILWAY JOURNAL in two articles published in the issues of July 26, page 113, and August 2, page 163. This, the third and last article of the series, describes the new car equipment installed on the road.

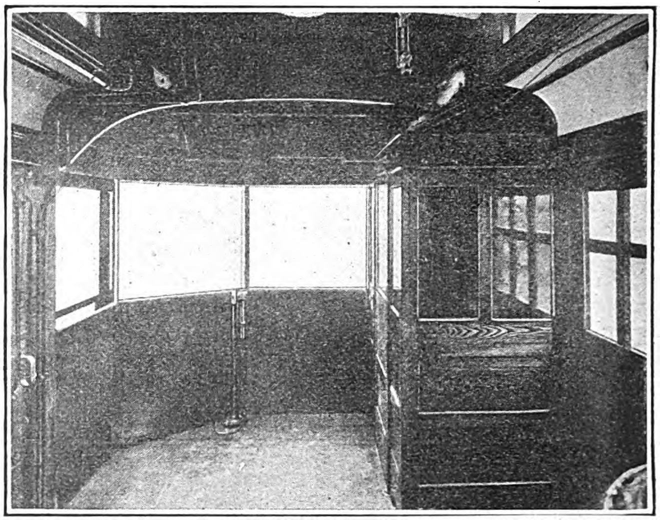
Conforming in general arrangement to the standard interurban design which has been considered particularly suitable to the requirements on most of the lines in the central territory, the new cars of the I. & C. are provided with passenger, smoking and baggage-express compartments. Although built with all-steel framing construction, they are considerably lighter than the wooden cars which they replace.


Section A-A
$3\frac{1}{2}'' \times \frac{1}{2}''$ Bar
No. 12 gage belt rail
Section B-B
Section E-E
6" 8 Lb. [side sills
$3'' \times 3'' \times \frac{5}{16}''$ Clips
Section C-C
Center line of car
Section D-D
Baggage comp't 13'-1¾"
No. 12 gage plate
Section K-K
Section J-J
7" @ 9.75 lb. [, cross sills
6" @ 8 lb. continuous [, center sills
No. 10 gage plate
Bolster centers 37'-6"
Over side sills
12'-6"
10'-0"
60'0"

Framing Details of the New Passenger Cars



Looking Toward the Rear in the Passenger Compartment. Plush Seats, Mahogany Finish and Carefully Arranged Lighting Assist in Providing Passenger Comfort



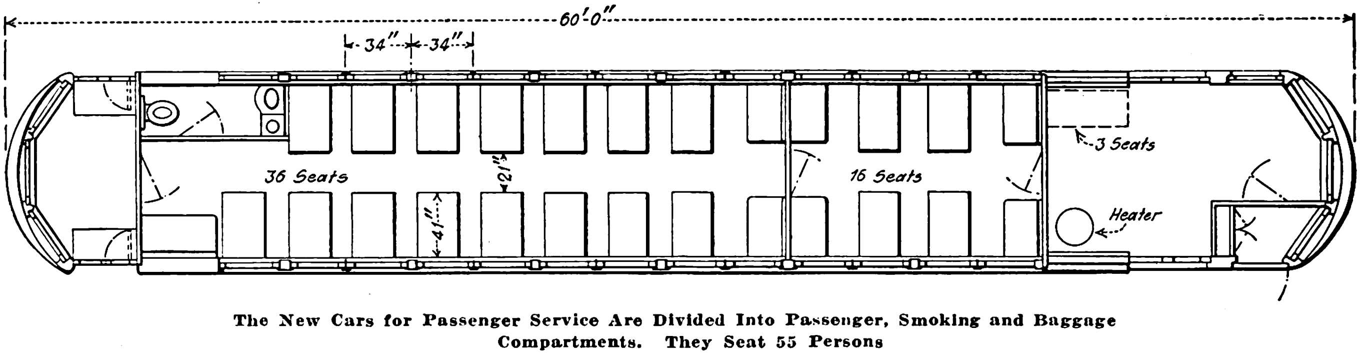
The Arrangement of the Motorman's Compartment in the Right-Hand Corner Gives Passengers a Clear View Ahead. The Water-Storage Tank Is Seen Above

Pleasing appearance and passenger comfort were two paramount objects in the design. Consequently, careful attention was given to lines, finish, trim and illumination. In addition, full-upholstered plush seats are spaced on liberal centers, the floors are covered with linoleum, liberal heating capacity is provided, and careful attention has been given to various details, such as sanitary water coolers, large wash room and toilet, and convenient racks for hand baggage. The requirements for obtaining easy riding of the cars were carefully studied by the truck manufacturer, and the Baldwin trucks which were finally developed give the new cars such improved riding qualities over the existing roadbed that an immediate favorable reaction was expressed by passengers.

An accompanying drawing shows the general arrangement of the floor plan. The cars are 60 ft. long over all and approximately 8 ft. 11 in. wide. The main compartment seats 36 passengers, the smoking compartment seats 16, and there is a folding seat in the baggage compartment with capacity for three additional passengers. The seats are spaced on 34-in. centers and are non-reversible. They are 41 in. wide, leaving an aisle width of 21 in. Those in the main passenger compartment are upholstered in Tuscan red plush, while brown Fabrikoid is used in the smoking compartment. The floor is made of two thicknesses of ⅞-in. yellow pine, one laid longitudinally and the other cross-wise of the body. The two layers are separated by building felt, and the entire floor is covered with ¼-in. linoleum.

At the front end of the car the motorman's compartment is placed in the right-hand corner. Plate glass is used in all of the front windows, that in front of

Length over all		60 ft. 0 in.
Height, rail to top of trolley board		12 ft. 10 in.
Entrance door opening, clear		2 ft. 6 in.
Height, rail to car floor		4 ft. 3¼ in.
Baggage door opening		3 ft. 6 in.
End bulkhead door opening		2 ft. 9 in.
Partition door opening		2 ft. 0 in.
Seating capacity:		
Main compartment	36	
Smoking compartment	16	
Baggage compartment	3	
Total	—	55
Width of seats		3 ft. 5 in.
Width of aisle		1 ft. 9 in.
Truck centers		37 ft. 6 in.
Side post centers		2 ft. 10 in.
Total weight		82,000 lb.
Builder of body		Cincinnati Car Company
Headlining		Agasote
Interior trim		Mahogany-faced Haskelite
Type of roof		Monitor
Air compressor		Westinghouse DH-25
Bumpers		Hedley anti-climbers
Car signal system		Cord-operated air valve, conductor to motorman; cord-operated bell, motorman to conductor: Consolidated single-stroke bell signal for train operation.
Car trimmings		Dayton statuary bronze
Control		Westinghouse, HLF
Couplers		Tomlinson radial M. C. B.
Curtain fixtures		Curtain Supply ring 90
Curtain material		Double-faced Pantasote
Destination signs		Hunter illuminated
Gears and pinions		Nuttall helical
Hand brakes		Peacock
Heater equipment		Peter Smith OC-2
Headlights		Electric service—deck-HDB, 12 in.: city service, 9 in., T-96 portable
Journal boxes		Symington
Motors		Four Westinghouse 548-C-7, inside hung
Sanders		Ohio Brass
Sash fixtures and trapdoors		O M. Edwards
Seats		Hale & Kilburn
Seating material		Plush in main passenger compartment, Fabrikoid in smoker
Step treads		Cincinnati Car
Trolley catchers		Knutson No. 5
Trolley base		Nuttall No. 13
Trolley shoes		Miller
Trucks		Baldwin
Ventilators		Nichols-Lintern deck fixture
Wheels		36-in. rolled steel
Power saving device		Economy meters

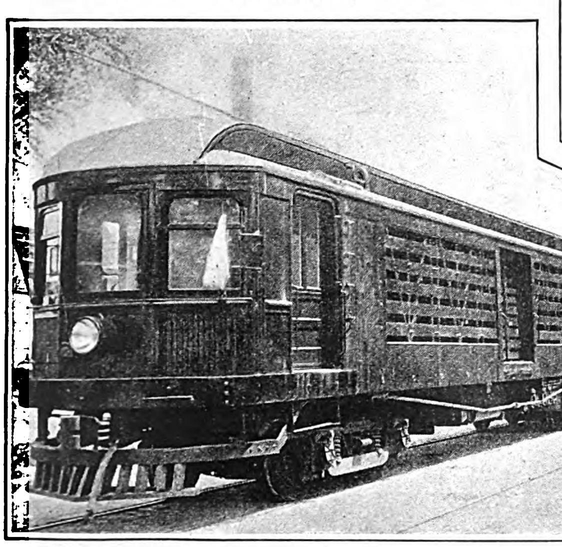


The New Cars for Passenger Service Are Divided Into Passenger, Smoking and Baggage Compartments. They Seat 55 Persons

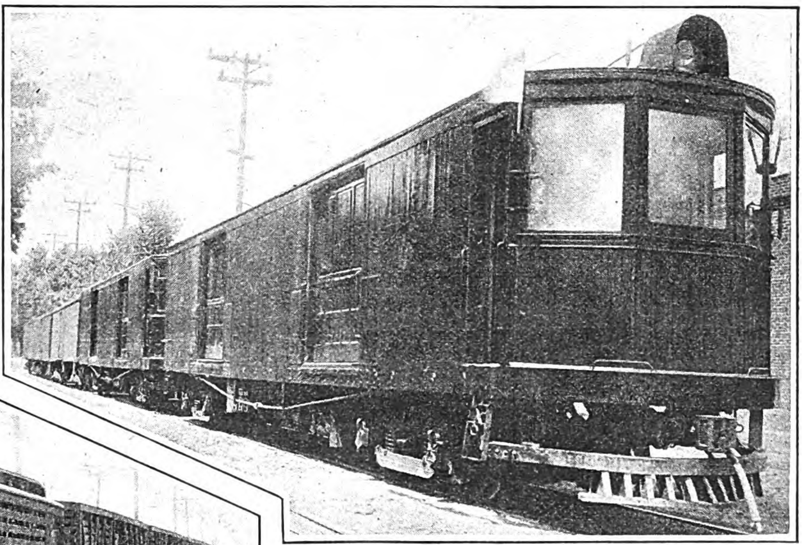
the motorman being ½ in. thick to decrease frosting and at the same time provide increased safety when operating at high speeds. The glass lines in the partition between the various compartments are lined up so as to give passengers, even in the rear compartment, a view through the front windows.

STEEL FRAMING DESIGNED FOR HIGH SPEED

Substantial steel frame construction was adopted to provide the maximum of safety for high operating speeds. The 6-in. 8-lb. channel side sills are carried on a line from the rear corners of the body around the front end to form a backing for the front bumper. Two center sills of this same material extend continuously from the front to the rear bumper. The cross-sills are 7-in. 9.75-lb. channels and are spaced on centers varying from 33⅝ in. to 40⅞ in. Where they intersect the longitudinal center sills, they are punched out in the web, so that the longitudinal sills extend through continuously. The fastenings at these intersections are made of 3-in. x 3-in. x $\frac{5}{16}$-in. angle brackets riveted in place. The first cross-sill at the front end of the body extends across between the ends of the bumper. Between this sill and the bumper a No. 12 gage steel plate, 26½ in. wide, is riveted in place to form additional reinforcement. The rear end framing is similarly reinforced. The rear platform step wells are formed by tying the body underframing together with two cross-channels covered with a No. 12 gage plate, 16¼ in. wide, and then supporting the rear bumper construction on the extensions of the center sills and supplementary channels spaced so as to give the proper opening for the step wells.



Livestock Transportation Constitutes a Considerable Share of the Company's Freight Business. This Type of Rebuilt Motor Car Has a Cabin at the Rear for the Accommodation of Farmers Taking Their Stock to Market



The Freight Motor Cars Have Four 145-Hp. Motors. It Is Expected the Improvement in Service Will Result in a Substantial Growth in Freight Business

Built-up type box bolsters are spaced on 37-ft. 6-in. centers. Each consists of a 15-in. x ¾-in. top plate and a 10-in. x ⅞-in. bottom plate, fastened together by a $\frac{5}{16}$-in. web plate and further reinforced with plates and angles to give a rigid box structure. The underframing is further reinforced by No. 10 gage steel plates riveted longitudinally to the top of the side sills and the ends of the cross-sills.

From the side sills to the belt rails, No. 12 gage plates, 36 in. wide, form the flat side sheathing. Alternate side posts are made of pressed box form, and the others are made of structural T section. The No. 12 gage steel letterboards are 19 in. deep, leaving side window openings 28¼ in. high. No top sash is used.

Vestibule and body corner posts are of steel box construction. Steel panel piers are carried up to the letterboard at the four corners of the car body, and at the rear end these are cut to form small arched windows.

The roof is of the monitor type and is supported on a combination of wood and steel carlines. This is further reinforced by steel headers in the baggage compartment, and by the bulkhead at the rear end of the body and the partition structure between compartments.

A large toilet is equipped with metal wash bowl, and a supply of water is assured by a large storage tank carried overhead in the baggage compartment. The interior of the body is finished with mahogany-faced Haskelite, which is natural color and rubbed to a dull finish. Absence of a top sash gives considerable space above the windows, which is utilized for the storage of parcels and hand luggage. Substantial racks are provided, and they are sloped up at an angle to prevent parcels from falling.

Careful attention was given to the subject of interior illumination. The installation adopted was designed to give the interior of the car a cheerful appearance. High-grade railroad-type fixtures are used. These consist of five indirect dome lights in the main passenger compartment and two in the smoking section. Center lights with direct reflectors in the baggage compartment, and two lights in the front sign box, are wired in series with the center body lights so as to form two circuits of five lights each, arranged so that one of the sign box lights is in each circuit. Additional illumination is provided in the passenger compartments by angle bracket fixtures, carrying inclosed globe shades. All lamps are 56-watt mill type. The lights on the rear platform are arranged so as to illuminate the steps. Rear marker lamps are wired so that each is in a separate body circuit. For additional safety, the regular type of oil marker lamps is carried.

For the present the new cars will be used for both local and limited service. They are equipped with Westinghouse 548-C-7 box-frame motors, rated at 105 hp., 925 r.p.m. on 600 volts. These motors are arranged for field control, with helical gearing of 21:68 ratio.

The control is Westinghouse HLF multiple-unit equipment, and the air compressors are of the Westinghouse DH-25 type. These cars are all equipped with Miller trolley shoes.

Four freight motor cars have been equipped with Westinghouse 557-A-7 box-frame motors. These are rated at 145 hp., 1,000 r.p.m. on 600 volts. They are also arranged for field control and are geared 16:61. When the extension to Cincinnati is made, it is the intention to utilize the new passenger motor cars for local service entirely, and to equip new limited passenger cars for the Cincinnati run with the same motor equipment as that selected for the freight motor cars. In this way the entire system will be standardized on two motor equipments, one for local service and one for limited and freight service.

The present new passenger cars have a total weight of 82,000 lb. Of this amount, 14,000 lb. is in the steel body framing. Some of the principal dimensions and items of equipment are listed in the table on page 204.

Honor System of Fare Collection Speeds Passenger Movement

Beaver Valley Lines Have Abandoned Zone Checks on One-Man Cars and Depend Upon the Honesty of the Passengers to Prevent Over-Riding

By H. O. Allison
Commercial Manager Beaver Valley Traction Company

Since March 30, 1924, the issue of zone checks on the lines of the Beaver Valley Traction Company, New Brighton, Pa., has been dispensed with and passengers are permitted to pay fare to their destinations without being "tagged." Moreover, if the ride purchased requires transfer to another route the passenger is given a transfer, which does not, however, indicate the desination to which fare has been paid. The length of the ride taken after fare has been paid depends solely on the honesty of the patron. The elimination of zone checks has been influential in speeding up the service.

There are eight 5-cent zones on the property. In addition, one-zone, two-zone, three-zone, all-zone and school passes are sold. Beginning with the installation of the one-man cars, it was thought necessary to tag passengers in order to prevent over-riding. For that purpose a check was issued at the time fare was paid, showing by punch mark the zone in which the passenger boarded and the zone to which he was going. In theory the operator was supposed to examine the zone checks returned when the passengers alighted and in this way discover any one trying to over-ride.

All this has now been done away with. The present method of fare collection is very simple. A passenger when boarding, if in doubt about the rate of fare to the point where he desires to go, is informed by the operator, and the exact change is then deposited in the fare box. Regular riders know the amount to deposit and proceed immediately into the car. There is no use of zone checks, no pledge of honesty and no attempt by the operator to remember the passenger's face and the point to which fare was paid.

TIME OF PASSENGER INTERCHANGE, BEAVER VALLEY TRACTION COMPANY

	Average Seconds per Passenger			
Standard Birney Car	Boarding	Alighting	Boarding and Alighting	All Passenger Interchanges
With identification slips	3.67	3.18	3.18	3.31
Without identification slips	3.28	2.37	2.87	2.81
Converted double-truck one-man car				
With identification slips	4.47	3.35	3.70	3.81
Without identification slips	3.37	2.79	2.96	3.02
New double-truck one-man car				
With identification slips	3.81	3.33	2.65	3.15
Without identification slips	3.68	3.12	2.54	3.12

About 14,000,000 passengers are carried annually by the Beaver Valley lines. There are four transfer points. At one of these transfer can be made and a 20-cent ride taken free. At another a 10-cent transfer ride is possible. On another division, irrespective of transfers, a passenger might possibly board a car, pay a single 5-cent fare and ride through seven zones. Careful checks have been made of the passengers boarding and alighting by zones, however, and these have been compared with the fares paid. This investigation has shown that there is practically no dishonesty. A few fares are lost, of course, but the company believes that fewer are lost under this system than under the old check and hand collection system.

A traffic survey shows that 65 per cent of the rides sold on this railway are for one zone, 25 per cent for two zones and 10 per cent in three or more zones. This was an influential factor in bringing about the decision to abandon the check system. With 90 per cent of the riding in one or two zones, it seemed essential that the procedure of fare collection be simplified. Each zone is approximately 2 miles long. Under the old system the operator in collecting fares sometimes was brought into contact with the passenger three distinct times in less than 3 miles. Under the present system the only contact is when the fare is first paid. There is also a saving in the cost of zone checks and the time consumed to issue and collect them. A faster schedule is being maintained and is expected to save the company several thousand dollars a year. The time saved in passenger interchange is shown in the accompanying table.

Numerous expressions of opinion favorable to the change have been received by the railway. The riders seem to feel that they have been relieved of a considerable nuisance by the abandonment of the zone check system. Local newspapers have commented favorably on the innovation. The railway took advantage of the occasion to indulge in skillful publicity work, telling its patrons how it proposed to abandon the system of tagging them.

Railway revenue does not show any increase due to the change in method of fare collection. Some industrial depression has been experienced in this region since the new system was inaugurated, making the receipts approximately 5 per cent less than a year ago. A careful count made on three lines that formerly used the zone check and where the honor system is now in operation showed that receipts decreased approximately 6½ per cent as compared with the figures under the old method of collection. On two lines which operate in one 5-cent zone only and zone checks have never been used the decrease in revenue was 11 per cent. This appears to show conclusively that whatever decrease exists is due to the industrial depression.

Association News & Discussions

Substitution of Bus for Car Will Not Aid Traffic Movement

THE removal of tracks from the streets and the substitution of buses for the electric railways, a plan which has been suggested to increase the capacity of existing streets, would make congestion worse instead of relieving it. This was brought out by J. A. Miller, Jr., assistant editor ELECTRIC RAILWAY JOURNAL, in the discussion of a paper by Arthur S. Tuttle, read before the City Planning Division of the American Society of Civil Engineers. Other discussions of this paper appeared in ELECTRIC RAILWAY JOURNAL for May 31, 1924.

The assertion was made by Mr. Tuttle in his paper that the economic advantages of the surface car over the bus in street capacity used have been lost to a considerable extent in crowded sections of the city because of the reduction of speed. Experience in other cities where large numbers of buses have been operated, Mr. Miller said, does not confirm this assertion. On the contrary the superiority of the street car over the bus is most evident where congestion is the greatest.

In order to reduce the cost per passenger-mile of motor-bus operation to approximately that of electric railway operation, bus development in the United States has been confined largely to vehicles operated by one man. This places a restriction on the carrying capacity, which may vary from 30 up to 50 as a maximum. Under the same conditions of loading, a street car can carry from 100 to 150 passengers. It is evident, therefore, that there would have to be three to four times as many units on the street to carry all the traffic by bus. The resulting congestion would be much worse than the present condition.

Extensive investigation made by Mr. Miller over a period of years developed the fact that in congested districts, with buses and cars operating in active competition on the same streets, the bus was not more than 10 to 20 per cent faster than the car. This apparent superiority in speed resulted primarily from the fact that the bus was making no attempt to handle all the traffic, but was simply providing a sort of express service for the limited numbers of persons whom it would accommodate. Time was saved because the buses received capacity loads at or near the beginning of the route and proceeded without making additional stops. From this it is clear that the greater speed of the bus is the direct result of its smaller carrying capacity.

The slight superiority in speed, however, is not enough to offset the 200 to 300 per cent increase in the number of units which would be required if buses were to carry the entire traffic. Although the use of double-deck buses would reduce somewhat the number of units needed, their greater carrying capacity would increase the number of stops required, and this, coupled with the delays incident to passengers climbing upstairs and downstairs, would reduce their speed to a rate somewhat slower than that of the street car. It appears, therefore, that the theory of lessening traffic congestion by the substitution of buses for street cars is not sound. Moreover, mass transportation by bus is unquestionably more expensive than by rail.

In the earlier discussion, it was stated that wheel traffic in New York City is gradually absorbing that formerly carried by rail, because more people are riding in motors and fewer on street cars and in subways. Statistics do not bear out this contention, Mr. Miller said. The figures of the Transit Commission, given in the accompanying table, show more passengers being carried by the railways in New York every year, the number in 1923 being approximately 14 per cent greater than in 1920.

REVENUE PASSENGERS CARRIED IN NEW YORK, N. Y.

Year	Surface Lines	Rapid Transit Lines	Total
1920	941,420,788	1,331,915,745	2,273,336,533
1921	977,652,062	1,418,649,471	2,396,301,533
1922	1,052,968,891	1,438,239,919	2,491,208,810
1923	1,071,736,876	1,506,076,001	2,577,812,877

It is very easy to say that all rail traffic should go underground. However, in view of the constantly increasing traffic on all the railways, how can sufficient subways be built quickly enough to permit the removal of surface and elevated lines? No one has yet been able to suggest a method.

As neither the substitution of buses nor the building of more subways is a feasible method of handling the passengers now carried on the surface, railway tracks must remain in the streets. It would be possible, however, to increase the capacity of existing streets by speeding up the movement of traffic. The present low speed of surface cars, which is used as an argument against them, is to a considerable extent the result of conditions that can be remedied. If traffic were regulated so that the tracks were kept clear for the cars and not obstructed by motor and horse-drawn vehicles of every description, and if traffic officers were encouraged to make a greater effort to co-ordinate their signals with the movement of cars, a substantial increase in speed for all traffic would be possible with no expense to any one.

It would be very unfortunate, Mr. Miller concluded, if the public became imbued with the idea of tearing up the car tracks in New York before an adequate substitute has been found to handle the tremendous traffic. Although such a step may not actually be contemplated, the frequent talk to this effect, whatever its purpose, is creating a feeling of doubt and uncertainty in the public mind which is working a great hardship on railways and seriously interfering with their program of reconstruction and improvement.

The Development of the Street Car

At a Meeting Held in St. Louis Members of the Birney Club Hear About Early Car Builders

THE present street car shows some traces of its development from the omnibus in the concave side panel used on many urban cars, according to a talk by W. H. Mackle of the American Car Company, given at a meeting of the Birney Club, at St. Louis, May 26. The first car for a city passenger service was built in New York in 1831 by John Stephenson for the New York & Harlem Railroad and was very similar in general appearance to a bus with the driver's seat on top. As late as 1850, street cars with these elevated seats were in use. Mr. Mackle also gave particulars of the street car building industry. A brief summary of this portion of his paper follows:

The work of John Stephenson has been mentioned. In the early '60s a company engaged in the building of passenger steam cars and horse cars in Philadelphia was that of Murphy & Allison, but in 1868 the plant was destroyed by fire and the building of horse cars was given up. J. G. Brill and his son, G. Martin Brill, had been connected with the company, and when the decision was reached to give up the construction of horse cars, they decided to start a plant of their own, which they did the following year. J. G. Brill was a genius in devising useful improvements in woodworking machinery that not only lessened labor but produced more accurate work. G. Martin Brill was an executive of high rank. Later, a younger brother, John A. Brill, entered the business with many creative ideas, which later materialized in truck construction and furnished the foundation of all the street car trucks that followed. His power of business vision in being able to interpret the shadows forecast by the coming of further developments in the car industry also rendered him of great service to the company.

In 1858 Andrew Wight, who had been employed at the John Stephenson works in New York, started a shop in St. Louis to repaint and repair omnibuses and later to build them. In 1867 he produced his first street car, and in 1879, on the death of Mr. Wight, Frederick D. Brownell became president of the company. While the product of these works was excellent, Mr. Brownell did little to advance the design of cars except to build the "Accelerator" car, which was short-lived. In 1883 the Laclede Car Company of St. Louis was organized in St. Louis by William Sutton, previously of the Brownell Car Company, and in 1887 the American Car Company was also organized in St. Louis by Mr. Sutton and others. In 1902 the American Car Company became a subsidiary of the J. G. Brill Company. In 1885 the St. Louis Car Company was organized by P. M. Kling, who had previously been superintendent of the Brownell Car Company.

Receiving and Disposing of Claims*

By J. H. Handlon

Claim Agent Market Street Railway

SOME claim agents, in questioning claimants who call at the offices, are quite satisfied with receiving beforehand a brief synopsis of the claimant's version of the accident, alleged injuries, alleged losses and expectations, together with comments as to the individuality of the claimant. While this makes it convenient for the agent to review the claim at a glance, such a slipshod practice has a bad effect upon the investigator assigned to gather the facts, because he is then disposed to digest too briefly what he learns from the witnesses.

There are claim agents who adhere strictly to their rule requiring all claimants who call at their offices to prepare statements in their own handwriting, telling their version of the accident, injuries etc. There is some merit in such a plan, although it has its defects. For instance, claimants are not always in a pleasant frame of mind when they call at the office. In our community, many claimants would immediately turn on their heels and hurry to the office of an attorney if they were asked to write down the facts of their claims. Again, claimants may be illiterate, or unfamiliar with the exact location of the accident, directions, etc.

A much better plan is to have the person who talks to the claimant prepare for the claimant's signature a statement in which are embodied all of the details of the accident. The exact words of the claimant should be quoted as much as possible. Needless to say, the injuries and losses as stated by the claimants and the expectations of the claimants should also be noted and then the claimant requested to write on the statement, in his own handwriting, the words "I have read the above statement and I find the same to be correct." Care should be taken to see that the claimant affixes his signature to each page of his statements and, if possible, the signatures of witnesses should also be secured.

As for those who telephone with a view of presenting claims, it would appear advisable to induce them, if possible, to call at the office, for there are usually facilities at the claims department, not provided elsewhere, for taking statements, and there is less likelihood of interference from relatives or neighbors. If the claimants object to this or they are unable to call, for some reason or other, then it would appear advisable to call upon them. They can then be given printed requests to call for examination by the company's examining surgeon and directed where to submit their damaged wearing apparel or other property to the company's appraisers for inspection and report.

Should the claim be presented in writing for damage to property and no attorney be involved, it is advisable that the letter replying to their communication contain a request that they call at the office, bringing with them the names and addresses of their witnesses. If an attorney writes relative to a claim, far better results are obtained when the company representative calls upon him in acknowledgment of his letter and arrangements are made through him, if possible, to interview the claimants and their witnesses. Attorneys as a rule dislike the annoyance of being compelled to handle the details of a claim, and therefore the representative of the claims department can relieve the attorney of this annoyance by arranging for the injured persons to call at the medical department or assisting them to prepare their statement of losses and expenses, securing the original bills, etc.

Safety Congress at Louisville

THE entire program for the 1924 meeting of the National Safety Council, at Louisville, Ky., Sept. 29 to Oct. 3, has not yet been completed, but that for the Electric Railway Section and for the joint meetings of that section and the Public Utilities Section has been announced. At the first session of the Electric Railway Section, on Tuesday morning, Sept. 30, a paper on "Overcoming the Hazards of Motor Bus Operation" will be delivered by R. N. Graham, manager of railways Pennsylvania-Ohio Electric Company, Youngstown, Ohio. This paper will be discussed by G. R. Radley, safety engineer the Milwaukee Electric Railway & Light Company, and by G. B. Powell, secretary Kentucky Carriers, Inc., Louisville. At the same session J. C. Carpenter, general manager Texas Power & Light Company, Dallas, will read a paper on "Why We Are Interested in Safety."

At the second session on Thursday morning, Oct. 2, R. R. Hadsell, general superintendent of transportation New York State Railways, Rochester, will present the report of the committee on award systems. "Interesting School Children in Safety on the Streets" will be the subject of a paper by Isaiah Gordon, Bureau of Safety, Chicago.

At the joint meeting of the Public Utilities Section and the Electric Railway Section to be held on Wednesday, Oct. 1, the place of the electric railway in community safety extension will be told by L. H. Palmer, vice-president and general manager United Railways & Electric Company, Baltimore. Homer Niesz, manager of industrial relations Commonwealth Edison Company, Chicago, will present a paper on "Instruction and Observance of Safety Rules in Station and Substation Operations." The highway traffic problem will be the subject of a paper by R. O. Mason, superintendent of transportation Philadelphia Electric Company.

Conference on Street and Highway Safety

SEVERAL meetings of committees on the Conference on Street and Highway Safety have been held during the past few weeks and several are scheduled during this month. The organization of the conference, of which Col. E. B. Barber is director and Ernest Greenwood is secretary, includes eight committees, as follows:

Committee on statistics, with W. M. Steuart, director Bureau of Census, as chairman. This committee has appointed a sub-committee on survey of available accident statistics and one on standardization of accident reporting forms and procedure. Two questionnaires have been distributed; one on legislation on accident reporting and the other on traffic accidents.

Committee on traffic control, of which Roy S. Britton, president Automobile Club of Missouri, is chairman. This committee has appointed four subcommittees, as follows: Licensing of drivers, city traffic, rural traffic, legislation.

Committee on engineering and construction, of which Frank Page, chairman North Carolina State Highway Commission, is chairman.

Committee on city planning and zoning, of which F. A. Delano, formerly vice-governor Federal Reserve Board, is chairman. Sub-committees have been appointed on: Decentralization and zoning, other city planning measures for relief of congestion and traffic hazards.

Committee on insurance, of which S. S. Huebner, University of Pennsylvania, Philadelphia, is chairman. Subcommittees have been appointed on: Causes and location of accidents, liability legislation, certification of titles and theft prevention, rating, safety promotion activities of insurance carriers.

Committee on education, of which J. W. Whitney, National Bureau of

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*Abstract of a paper presented at the annual convention of the Pacific Claim Agents' Association, Spokane, Wash., July 23-25, 1924.

Casualty and Surety Underwriters, New York, is chairman. Sub-committees of this committee are on: Education in the schools, special training, education of the public.

Committee on motor vehicles, of which C. F. Kettering, General Motors Research Corporation, Dayton, Ohio, is chairman.

Public relations committee, of which George M. Graham, Chandler Motor Company, Cleveland, Ohio, is chairman.

Future of Traction Securities*

By F. R. Coates

Henry L. Doherty Company, New York City

TEN or fifteen years ago the securities of electric railways were held in high regard by the investing public. Then came the World War with its period of inflated prices, during which the industry suffered severely, due principally to its inability to adjust rates of fare to meet the rising costs of operation and increased taxes. To add to their difficulties, the electric railways were threatened at that time with an unregulated competitor, the jitney bus. The credit of the traction companies became impaired and their securities—once looked upon as excellent investments—were shunned by the investment banker and the general public.

The present improved condition of the traction industry is real and permanent. One of the most important factors contributing to its recovery has been the breaking down of the 5-cent fare barrier. The average rate of fare today is 7.4 cents. We are not so much concerned, however, with the exact average rate of fare. The significant thing is that there has been a recognition on the part of the public and the duly constituted regulatory authorities that any flat rate of fare is an economic error. The public has become educated to the fact that only by permitting the electric railways to earn sufficient to meet all expenses and to pay a fair return on its invested capital can these utilities give the service desired and expand their facilities to meet the constantly increasing transportation requirements. Another contributing factor is the realization by the public that destructive unregulated competition is unsound and inevitably results in a condition detrimental to the public interest and welfare.

The improved condition of the traction industry is reflected in its operating statistics. Operating revenues of electric railways, according to figures published by the American Electric Railway Association, have increased 47 per cent since 1917 and are now close to $1,000,000,000 annually. The operating ratio, which rose from 65 per cent in 1917 to 80 per cent in 1920, has fallen to 74.1 per cent. Last year nearly 16,000,000,000 passengers were carried on electric railways in ths country—the greatest number carred in the history of the industry.

Another indication of the improved condition of the industry is found in an examination of the receiverships during the past six years. The maximum number occurred in 1919, when 48 companies, comprising 3,781 miles of track, went into receivership. By the end of 1923 the number of companies going into receivership had fallen to 12 with a total mileage of 333. In 1924 several companies, including one of the larger properties, emerged from receivership, making a further substantial decline.

Another encouraging feature is found in a statement recently issued by the American Electric Railway Association regarding the number of companies that have been wholly or partly relieved from unjust expense of maintaining pavement that is not used and not destroyed by them. There have been forty-six cases where street railways have been relieved from their paving burdens and, in addition, two states, Connecticut and Massachusetts, have enacted state-wide relief. In most of these cases the relief has been permanent, affording savings of many millions of dollars to the street railways and to the car riders.

There is no other transportation medium in existence that can perform the services being performed by the electric railways of this country. Electric railways, however, recognize the peculiar advantages of the motor bus as a supplement to rail service and are making use of this medium to an increasing extent. Today there are approximately 150 electric railways operating more than 1,600 motor buses in various kinds of service. Buses are valuable as feeders to the rail lines and for developing new territory until the traffic warrants rail lines. Buses also can be used in de luxe express and tourist service. Their operation, however, can be more efficiently conducted by experienced transportation agencies such as the traction companies. Furthermore, the best interest of the public will be served when the two forms of transport are properly co-ordinated in a single system under one reliable management.

There are also those who profess to see a decreasing demand for public transportation as a result of the increasing growth in the ownership of private automobiles. The answer to those people is that statistics show that although automobile registrations increased from 5,101,000 in 1917 to 12,880,000 in 1923, the passengers carried on electric railways increased during the same perid, from 14,506,000,000 to 15,989,000,000. And if we add to the passengers carried on electric railways, those carried on buses, the constantly increasing demand for public transportation is even more pronounced. Furthermore, there is reason to believe that competition from the privately-owned automobile has nearly reached its peak.

Other signs of more prosperous times and of a re-establishment of the confidence of investors in electric railway securities, are evidenced by the issuance of more than $48,000,000 of traction securities in the first six months of this year. Last year electric railways in this country were purchasers of such materials and equipment to the extent of $282,000,000. This year, nearly $100,000,000 have been expended alone for new track construction or reconstruction. Through intensive public relations activities, publicity and advertising, electric railways are now merchandising transportation. Electric railways have made greater progress in the last five years in the development of good public relations than they ever had during the previous thirty years of their existence.

The American Electric Railway Association now maintains an advertising section which co-operates with individual companies, state committees on public utility information, newspapers, magazines and other publicity and advertising channels. This department has access to all facts and figures in the possession of the association and is authorized to make them public. Every effort is being made to tell the whole story of the electric railway situation to the public hiding nothing.

The motor bus gives the electric railways a new tool, adding flexibility to existing facilities. No longer will it be necessary for an electric railway to make a heavy investment in track and overhead lines into a newly-developed territory where the amount of traffic may not justify such facilities for a number of years. The motor bus can be used for such extensions. Furthermore, the motor bus may be utilized to reduce deficits on lines operating in sparsely-settled sections of the community which never have built up sufficiently to justify the rail lines installed years ago.

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*Abstract of paper presented at the eleventh annual business conference of the Babson Organization, Babson Park, Mass., Aug. 8, 1924.

American Association News

Posters on Traffic Delays

THE committee on manufacturers' co-operation and the advertising section of the American Association have prepared a series of traffic posters designed to show some of the most important causes for traffic delay, such as slowly moving trucks on the track, parked cars, etc. These posters are printed in colors and are intended particularly for use by manufacturer companies of the association. They will be supplied free of charge on application to association headquarters.

Engineering Manual Is Now Ready

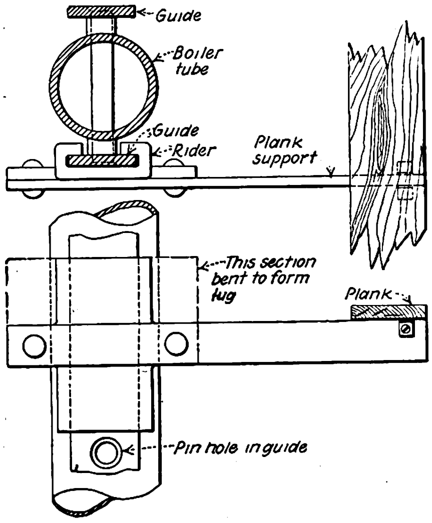
ANNOUNCEMENT is made at the American Electric Railway Association headquarters that the new edition of the Engineering Manual is now ready for distribution. The Manual is issued in book form and is available both to members and non-members. The new arrangement was described quite fully in the issue of the ELECTRIC RAILWAY JOURNAL for May 3, 1924, page 705. In that article was also given a schedule of prices, both for the bound volume and general sections.

Maintenance of Equipment

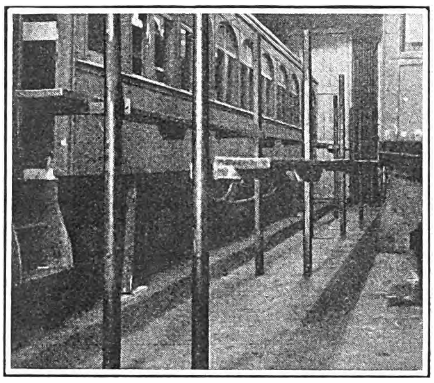
Adjustable Scaffolding for Car Body Work

REPAIR and painting work on car bodies at the Decatur shops of the Illinois Traction System is greatly simplified by the use of adjustable scaffolding. The vertical supports for the scaffolding are made of 3½-in. boiler tubes, which are embedded in the concrete floor to a depth of 3 ft., and have a height of 8 ft. above the floor. The supports are spaced 12 ft. apart along the line of the track, being placed so that the edge of the plank forming the scaffold is approximately 18 in. from the side of the car.

On each side of the boiler tube is riveted a 2-in. x ½-in. steel guide spaced ⅜ in. from the tube by means of ⅜-in. spacers through which pass five countersunk flat-head rivets which hold the guide to the tube. The rider on this guide is made up from a piece of ⅜-in. steel, 6 in. square. This is so cut at the corners that four lugs may be formed which are bent so as to grip the guide rail but at the same time permit the rider to slide freely. To this rider is riveted a piece of ½-in. x 2½-in. steel which serves as the support for the planking. At the end of this support is a small angle to which the planking is fastened.



A Rider Made from a piece of ⅜-In. Steel Travels on a Guide Riveted to the Boiler Tube Supports



This Scaffolding, Used in the Shops of the Illinois Traction System, Is Adjustable for Height and Facilitates Work in the Construction and Paint Departments

Holes have been drilled in the guides at various points so that a removable pin may be inserted below the rider to hold the scaffolding at the proper height for convenient working on the side, windows and roof of the car.

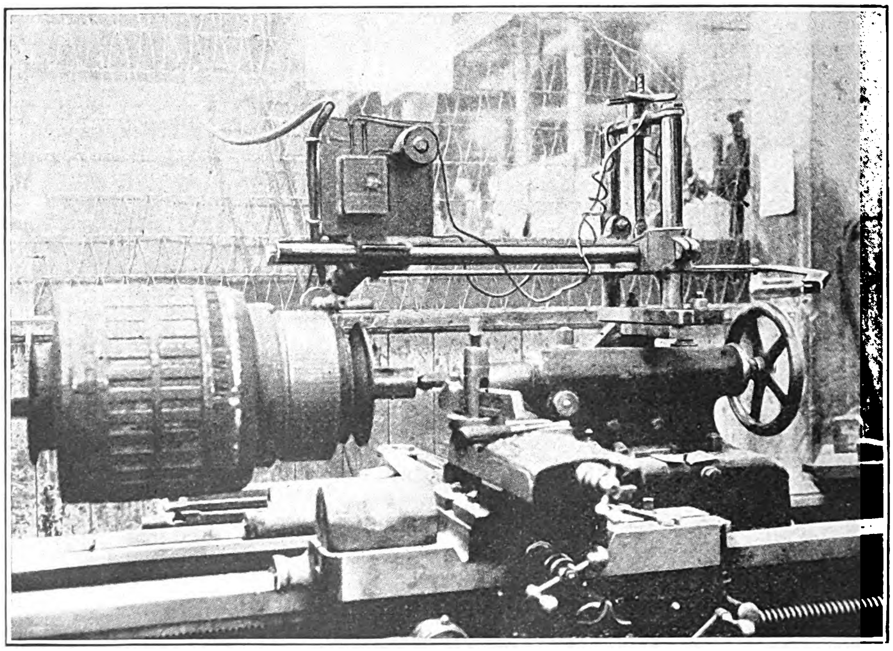
In the paint shop a double scaffolding made up in four sections is used. The end supports of this installation have no guides on the outside, but the intervening posts have guides and riders on both sides in order to accommodate one end of both planks. Not only is this a serviceable installation but its neat construction adds materially to the appearance of the various departments of the shop.

Commutator Slotter on Lathe

AFTER the turning of a railway motor commutator, grooving or slotting usually follows. The arrangement used in the Denver Tramway shops for performing both operations on the same lathe has the advantage of avoiding the necessity of moving the armature from one machine to the other. Once the armature is mounted in the lathe the commutator is finished completely in the one machine.

As shown in the accompanying illustration, a carrier clamped to the tail-stock of the lathe has both a vertical and horizontal carriage, the latter being mounted on two long guides fastened directly to the vertical carriage. The vertical motion is obtained by means of a hand wheel and lead screw. The horizontal carriage is controlled by a long curved hand lever shown in the illustration.

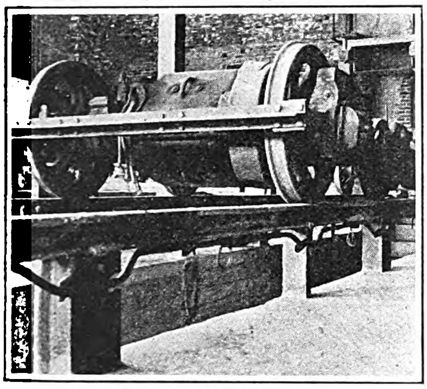
In practice, the vertical adjustment is used to set the milling saw for the correct depth of cut, and the slots are then milled by moving the horizontal carriage back and forth by means of the hand lever. The saw is driven by a small motor

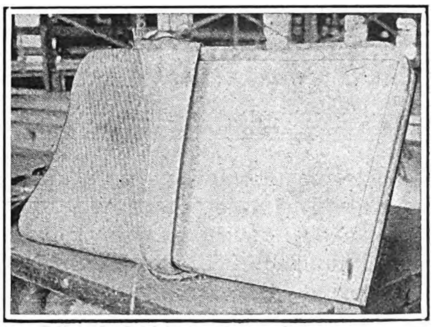


This Commutator Slotter Used in Denver Is Mounted Directly on the Lathe mounted on the horizontal carriage. This is hidden in the illustration by the small control board. The armature is rotated from slot to slot by hand.

Raised Track for Truck Overhauling

WORK of truck overhauling can be done more efficiently and with less tiring efforts by workmen if the trucks are raised to a height that makes it unnecessary for the workmen to bend over in making repairs. Realizing this fact, the Eighth Avenue Railroad, New York City, has provided a special construction for its truck-overhauling tracks at the new 155th Street shops. The walk alongside the track is depressed 18 in. below the top of the rail. Pits are provided 5 ft. deep below the top of the rail. The rails are mounted on columns formed of steel channels, which are inserted in the concrete structure forming the walk and pit walls. Traveling telpher cranes serve the track and facilitate removal of heavy parts during the overhauling. The raised portion of the floor alongside the depressed walk also serves as a bench.


Truck Raised to Convenient Height to Facilitate Truck Overhauling


This Light Steel Sheet Prevents Vandals Cutting Seat Backs in Omaha

Sheet Metal Protects Rattan Seats

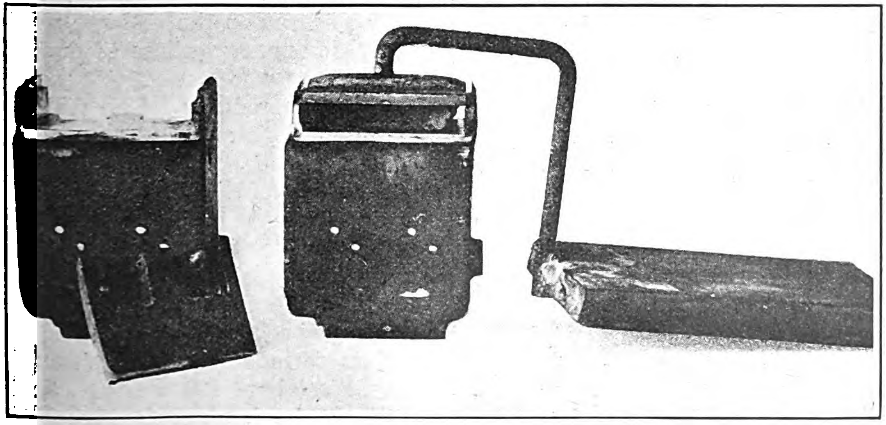
IN OMAHA, trouble has been experienced in the past from malicious passengers cutting the backs of rattan seats with a knife or other instrument. It has been found that the greatest damage is done when the knife is forced through the rattan and then a long jagged cut made.

To protect seats from this vandalism, the Omaha & Council Bluffs Street Railway, under the supervision of T. E. Wood, master mechanic, has adopted the practice of inserting a piece of light-gage galvanized steel behind the rattan, as shown in the accompanying illustration. This protection materially reduces the amount of damage done to the seats.

How Worn Brush-Holders Are Reclaimed at Detroit

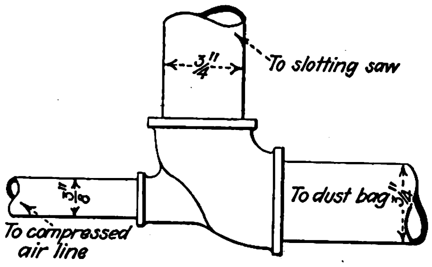
AN INTERESTING method of reclaiming worn brush-holders has been developed in the shops of the Department of Street Railways, city of Detroit, as the result of a study by H. S. Williams, assistant superintendent of equipment. This consists of cutting out the front face of the holder, building up the worn brush way by brazing, and then brazing the front of the holder back into place.

The front face of the holder is cut out with a gang miller, which leaves a shoulder on the two sides so that the brazing material can be readily built in when the front is replaced. After the front is cut out the worn portions of the brush slot are filled in with brass. The next operation is to machine this slot on the milling machine. A disk grinder is used to true up the back surface of the piece cut out of the holder, and the last operation then consists of brazing this piece back into place. Standard steel blocks are placed in the holder so that the slot will be of proper size when the operation is completed. The total cost of the operations described is $2.50 less per holder than the cost of making and machining new castings.


Condition of the Holder After the Front Has Been Milled Out, Also the Method of Holding the Parts Together for the Last Brazing Operation

Pipe Tee Used to Produce Vacuum for Dust Removal

AS AN auxiliary to its commutator slotting machine, the New York Central Railroad in its Harmon shops has a vacuum attachment for drawing off the copper and mica dust as the commutator is slotted. This supplements the larger and more elaborate vacuum cleaners used for cleaning out inaccessible places in rolling stock and equipment.



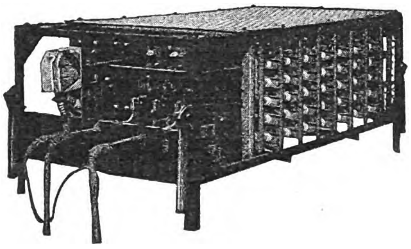
Connection to Tee for Removing Dust by Producing Vacuum

A $\frac{3}{4}$-in. pipe connection extends down close to the slotting saw, and the other end of the vacuum attachment has a bag for receiving the dust. The novel part of the construction lies in the fact that a standard wrought-iron pipe tee is used to produce the vacuum. An accompanying illustration shows the connection. The tee is $\frac{3}{4}$ in. x $\frac{3}{8}$ in. x $\frac{3}{4}$ in., with the $\frac{3}{8}$-in. outlet connected to the shop air supply, which has compressed air at 125 lb. pressure. The $\frac{3}{4}$-in. outlets lead to the commutator slotting saw and to the bag as indicated. The expansion of the air from the $\frac{3}{8}$-in. pipe into the $\frac{3}{4}$-in. chamber of the tee produces the vacuum and the dust is drawn off as indicated.

New Equipment Available

Arc-Welding Rheostat

The Westinghouse Electric & Manufacturing Company has recently developed a new arc-welding rheostat which is compact and of light weight. The over-all dimensions are such that it can be taken on a street car platform, work car or in a small automobile. It is especially suited for welds between rail sections, cupped and battered rail ends and for special trackwork on crossovers, frogs, and switch points made of steels high in manganese or carbon. The rheostat has 15 steps of adjustment, so that when connected to any trolley line voltage between 400 and 650 volts, it will deliver from 60 to 210 amp.


Light-Weight Arc-Welding Rheostat

The control panel is mounted on the front and is protected from the resistor units by a metallic heat shield. This panel contains a 250-amp. magnetic contactor which is remotely controlled by a foot master switch which enables the operator to open and close the contactor when changing electrodes or for any other purpose. Four single-pole knife switches are also mounted on the panel for obtaining the required variation of welding current.

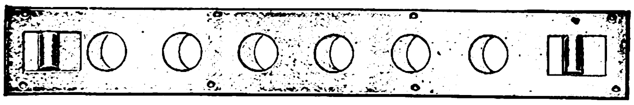
The resistance element consists of a number of alloy resistor units supported horizontally and insulated from the welded angle-iron frame.

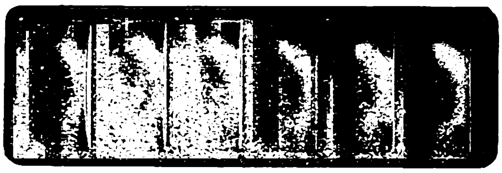
Adjustable Ventilator for Buses

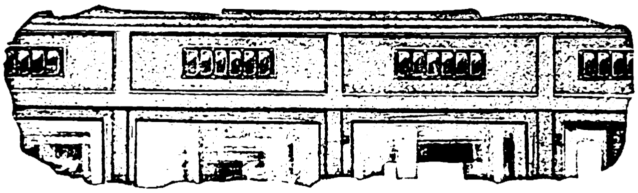
A Hunter ventilator designed particularly for installation in the side panels directly above the windows of auto buses has just been placed on the market by the Electric Service Supplies Company. The new feature of this device is the arrangement by which it is adjustable from the inside of the vehicle so that passengers can control the ventilation.

The exterior portion of the ventilator is a pressed copper louvre plate with screw holes at the corners for attaching it to the body. This is so designed that it will allow the entry of the necessary amount of air but will prevent drafts and keep out the rain. The louvre is painted with one baked priming coat ready for finishing in any desired color.

When the louvre plate is installed a 1-in. diameter hole is drilled through the wood directly opposite each opening. On the inside of the panel a perforated polished brass plate is attached by screws and is so located that the perforations are in line with the holes in the panel. Under this perforated plate is a perforated slide which regulates the amount of ventilation.

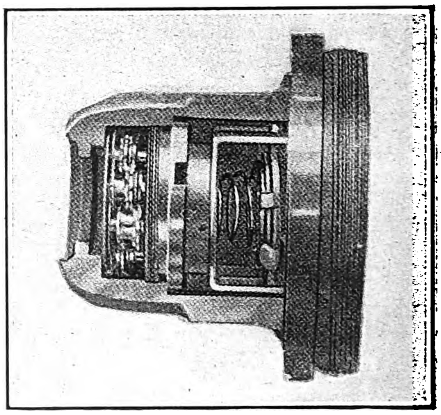

Perforated Slide Plate


Copper Louvre Plate


Exterior Appearance of a Bus Equipped with Hunter Ventilator

Mileage Recorder for Buses and Trucks

An improved device for recording bus and truck mileage is now being placed on the market by the Ohmer Fare Register Company, Dayton, Ohio, under the name of Ohmer Hub-Odometer. This is a redesigned and improved form of recorder previously made by the American Taximeter Company and is arranged for installation on the wheel in place of the hub cap. The driving mechanism automatically engages the end of the axle and no assembly or adjustment is necessary.


Section of the Recorder

OHMER FARE REGISTER CO.
OHMER
PAT'D 2-15-21
DAYTON, O.
0 0 0 0 2 7
End View Showing Dial

The figures on the dial are always right side up, regardless of the position of the wheel, so that errors in reading are reduced. The dials are arranged with six figures, starting with tenths of a mile, so that a total mileage of 99,999.9 miles is recorded, after which the dials return to zero and begin to register again. The recorder always registers forward whether the truck is running forward or backward.

This form of recorder should be of material assistance to electric railways having service trucks or buses which require maintenance on a mileage basis.

The News of the Industry

Twin City Rapid Transit Buys Competitor

Suburban Motor Company Taken Over Under Plan for Co-ordination of Lines

The Twin City Rapid Transit Company, Minneapolis, Minn., has purchased the stock and assets of the Twin City Motor Bus Company and on Aug. 1 began to operate buses between Minneapolis and St. Paul and between St. Paul and White Bear Lake, a suburb, under the same conditions, schedules and rates of fare as have prevailed heretofore. The price paid was about $500,000.

This is the most important competitor of the railway between the Twin Cities and between St. Paul and White Bear Lake points. The purchase includes forty buses and the company's headquarters and shops at 164 West Fifth Street, St. Paul. H. L. Bollum, president and manager of the bus company, will continue as manager under the ownership of the railway.

Buses are operated between the Twin Cities on varying schedules according to the time of day and peak loads normally prevailing. The fare is 25 cents between any two points. The fare on the Minneapolis-St. Paul trolley line, which the bus system parallels in the city limits, is 6 cents between any two local points and 12 cents from either city to the other, with transfers. The bus line, being an independent corporation, will not issue nor accept transfers to or from trolley lines.

The bus line is not under supervision of the Minnesota Railroad and Warehouse Commission. That body determines the rates of fare charged on the electric railways.

The Twin City Rapid Transit Company has no present plans to buy other competing interurban bus lines. Neither does it plan to change the equipment on the line it has purchased. That equipment is exceedingly modern and the service is satisfactory to patrons.

NEW MOVE PROBABLY ONLY A START

This purchase is the first step toward consolidation of all the bus service on lines competing with the railway, to be accomplished by some plan not determined. Some of the car lines paralleled by bus service are the Stillwater, Lake Minnetonka, South St. Paul, all suburban lines.

Whether this plan will be accomplished at once or at some future date is not known. Neither is it known whether the plan will involve taking over present bus lines by purchase or installing new bus systems.

In the purchase of the Twin City Motor Bus line the railway has a nucleus for extending bus operation wherever it is feasible. As Vice-President T. Julian McGill explained:

> The purchase of the fleet of buses is in line with the policy of electric railways in other large centers. The motor bus has come to be regarded as an integral part of a modern city transportation system and electric railways have been supplementing their service with fleets of buses. It is felt that one company can better co-ordinate these systems and operate them more efficiently and economically.

Suit to Secure Back Pay in Des Moines Lost

The long-drawn-out suit of railway men in Des Moines, Iowa, to recover $58,000 back pay under the old Kirbye wage award ended with failure recently when Judge Martin J. Wade in the federal court held against them. The car workers, however, were permitted to keep $68,000 which has been paid them under the award. The judge held the Kirbye award expressly provided that the wages allowed should be paid only if there were earnings to pay, so that legally, morally or honestly there was no way the "back pay" could be allowed, since sufficient earnings did not come in. He said further that if the law were strictly enforced the men probably would never have received the money they did, but his opinion at that time concerning the ability of the company to pay was based on the feeling that sufficient earnings would be produced. The hopes of the court in this respect were never realized.

Detroit Municipal Railway May Run Buses

Buses of a design said to be entirely new are in prospect for operation on long hauls by the Detroit Department of Street Railways. According to an announcement made by acting Mayor Joseph A. Martin the Street Railway Commission has decided that a great benefit would accrue to the riding public were the city promptly to plan and develop a rapid transit motor system and co-ordinate it with the present trolley service. The commission does not aim to compete with the Detroit Motorbus Company.

One of the new buses is expected to be received soon and the prospects appear good that before late fall a fleet of buses will be placed in operation sufficient to supplement one of the main trolley lines. It is not intended that all routes will follow trolley lines. Stops will be far enough apart to give genuine rapid transit service without interfering with railway traffic.

The Street Railway Commission recognized the advantages afforded by a study of the operation of buses under the control of the Detroit Motorbus Company and gained much through the experience of that company.

Council Files Tacoma Grant Without Action

Railway & Light Company Seeks New Blanket Franchise Covering All Properties

There will be no new franchise for the Tacoma Railway & Power Company, Tacoma, Wash., considered or submitted to the people this fall, according to action of the City Council recently, when it voted, as a committee of the whole, to file, without action, the franchise proposed by the company. The grant contains a provision that it be submitted to the people at the Sept. 9 election. Some of the Councilmen are understood to be opposed to the conditions of the grant on the ground that it could be readily claimed that the action of the people in a vote, whether for or against the franchise, had no force, and that the new franchise is binding.

PETITIONS CIRCULATED ON CARS

The Tacoma Railway & Power Company has placed petitions on its cars asking that the City Council submit to a vote of the people at the coming primary election the franchise proposed by the company. Many street car patrons have signed the petition. It is being presented in two forms; one a card to be signed by an individual, the cards being given to purchasers of weekly passes; the other, petitions designed to be signed by a number of other persons, and both forms were handed out by street car conductors. In addition, the company is conducting a newspaper campaign in favor of the franchise.

The franchise which the company proposes would repeal all existing franchises, do away with gross earnings tax, paving between tracks, free rides for city employees and other present requirements. It would provide for supplemental or substituted bus services and otherwise alter conditions for the company, leaving the fare question to state laws regulating such matters.

MAYOR CRITICISES COMPANY

Immediately upon the circulation of the petitions, Mayor Fawcett issued an open letter to the public, urging citizens to refrain from signing the petitions, and attacking the motives of the traction company in preparing its proposed new franchise. Mayor Fawcett is strongly opposed to granting long franchises, stating that transportation may entirely change within the next five years.

The Mayor also took action at once following the petition circulation to bring to a head the matter of transfer payments between the city and company. He introduced a resolution that later was passed by the Council which provides that the city will pay 3 cents for its transfers taken up by the company and will receive the same amount for those of the company taken by its line. Heretofore the exchange has been on the basis of 3 cents for a company transfer and 2 cents for a municipal transfer.

Bus Line Permit to Pacific Electric Railway Affirmed

The Railroad Commission of California on July 24 passed upon the application of the Pacific Electric Railway for a bus franchise on Pico Boulevard from the terminus of the Los Angeles Railway's local Pico Boulevard street car line in Los Angeles to the city of Santa Monica. That body has affirmed its former order with modifications as to the fare schedules. These changes in the order are in the proposal of the railway to give transfers from its proposed Pico Boulevard bus line to its local railway lines operated in the Santa Monica Bay district and in reduction of the bus fares formerly proposed for use between intermediate points. In the revised order of the commission no reduction is made from the through or round trip rates that are now in force on the company's rail lines.

The matter came up on rehearing last May. The Santa Monica interests and three other automotive transportation lines competing for the Pico Boulevard bus line franchise at the time of the various hearings contendend that the fares of the Pacific Electric Railway as proposed to be charged on the bus line were higher than those in the schedules filed by the three other bus companies and higher than compatible with public interest. At the rehearing the commission stated that one of the points to weigh heavily in issuing the bus franchise was the financial responsibility of the various applicants to carry out the franchise conditions.

The revised order of the commission awarding the franchise to the Pacific Electric Railway cites that the company claims that 85 per cent of the travel on its lines is on commutation tickets.

Five-Cent Fare Clause Dangerous, Says Niagara Falls Councilman

An unusual procedure is being followed by Clark Shipston, a member of the City Council at Niagara Falls and a prominent wholesale merchant in the city, to awaken public sentiment in favor of the enactment of a resolution by the City Council of Niagara Falls, which would suspend the 5-cent fare clause in the franchise of the International Railway and allow it to appeal to the Public Service Commission for a readjustment of fares in the city.

Newspaper advertisements are being published by Mr. Shipston at his own expense in which he says there is danger that the Public Service Commission will allow the company to abandon other local lines in the city because the present rate of fare is not sufficient to pay operating expenses and give the International Railway a fair return on its investment.

One of the series of advertisements, "To the Street Car Riding Public" of Niagara Falls recalls the fact that the railway has been allowed to abandon its Sugar Street local line because it is losing money. The statement adds:

> If this line of reasoning is followed out, how soon and how many other local lines will they be allowed to abandon?
>
> The commission refused to consider an increased fare on the ground that the rate is fixed by franchise agreement, and the commission has no power to act. The commission has agreed to consider the question of a raise in fares provided the City Council consents.
>
> The question for the people of this city to decide is this: "Do we want to insist upon the terms of the franchise and keep the 5-cent fare with the possibility of less lines and poor service with continued litigation; or do we want to suspend the 5-cent fare part of the franchise and allow the Public Service Commission to look into the question of fares, with a view to giving the International Railway a rate that would be sufficient for operating expenses and a fair return on its investment?
>
> I am your servant and will do your bidding. Write to the Mayor and Councilmen. Let us have your view that we may be guided by the wishes of the street car riding public.

The International Railway has asked for permission to raise its fares in Niagara Falls from 5 cents to 7 cents, with four tokens for 25 cents. This is the same rate charged by the company in the city of Buffalo.

Mr. Shipston has been receiving letters of commendation for his series of advertisements asking the car riders for their views on the subject. It is generally believed the Council will vote to modify the 5-cent fare clause in the railway's franchise and the commission will thus be enabled to investigate conditions and consent to a rate increase.

Buses Menace Worcester's Suburban Railway Lines

Railway Finds Itself About at End of Rope in Places Where Unfair Competition Has Been Fostered to the Detriment of Its Earnings —Suspensions Appear to Be Inevitable

LICENSE boards and boards of selectmen in Worcester and vicinity, flooded with petitions for bus permits, have found in nearly every instance an overwhelming sentiment for motor transportation even in the face of statements by railway officials that the operation of jitneys would cut into profits to such an extent that the trolleys would be forced to suspend service.

In practically every instance, however, the statements made in its own behalf by the railway have been interpreted as an ultimatum that if the townspeople permitted bus competition the trolley service would be discontinued. Despite the contentions of trolley officials, sentiment at the town meetings held in several places has revealed the real depth of the feeling engendered by the communications.

The most significant expression recently has been in Leicester, a suburban community about 5 miles from Worcester city hall. One of the main city lines of the Worcester Consolidated Street Railway runs to the Leicester line and is not affected by any decision that the trolley officials may make regarding the future of the so-called Spencer and Leicester line. Leicester is served from the city line by the same cars that serve Spencer, a community of about the same size 12 miles from Worcester.

There are buses to Spencer and there is no question but that they have interfered to no small extent with profits of the trolley line. A year or so ago the Consolidated equipped the Spencer and Leicester line with one-man cars. There was no opposition to this move, but it has been noticeable since then that the bus patronage over this route has been on the increase.

Selectmen of Leicester were informed recently by the railway that the line would be discontinued unless the earnings increased. Immediately the impression spread that an effort was to be made to fight the bus by having the Selectmen refuse permits for operation of such conveyances. The Selectmen put the matter to a test vote in town meeting and Leicester registered itself almost unanimously in favor of continuing the bus lines to Worcester.

Henry C. Page, general manager of the Worcester Consolidated, says the vote does not finally settle the question whether the trolley service on the Spencer-Leicester line will be abandoned. He indicates, however, a strong probability that if the buses continue the trolley service will be discontinued. Before any definite decision is reached the Selectmen of Leicester must take formal action. If they carry out the wishes of the townspeople—and there is no reason to believe they will not—then the Consolidated directors will determine the future policy with respect to the trolley line. Mr. Page said:

> The company has made no threat. My letter to the Selectmen simply said that the Consolidated could not continue to operate its cars in Leicester and Spencer unless more money was forthcoming from passengers carried and that it was our opinion that this could not be while both buses and trolleys were doing business. Our cars on that line are now operating at a loss. Therefore if the Selectmen vote to permit the buses to continue I have no doubt our directors will decide to discontinue the running of cars in the two towns.

The Selectmen of Leicester gave the railway an opportunity to be heard at the town meeting but the company sent no representative. Ex-Mayor Percy Wheeler of Gloucester, where the railway quit and where local service is being given entirely by bus, explained the situation there.

The state of affairs at Leicester is typical of the general situation in Worcester and vicinity. Auburn, another suburban community about 5 miles from the city hall, asked to decide on operation of bus lines, voiced its approval of the buses. Three applications for bus licenses had been received by the Selectmen. Justly or unjustly, Auburn people denounced the Consolidated, its service, its fares and other features. It was charged that the traffic was not handled properly by the railway in that it virtually made the Auburn line a sidetrack.

The one exception has been in Oxford where the commuters have expressed a decided opinion in favor of trolleys. Seven hundred attended the town meeting during the week ended Aug. 4 when arguments were heard for and against granting bus permits to Lawrence Wiley and Ralph Davis. There were 313 in opposition to buses and 150 in favor. The victory here for the Consolidated is regarded as important. Oxford is the key to the situation in the south end of the county, for, without permits in that town, buses cannot run to Worcester from Southbridge and Webster, large communities 15 miles away from Worcester. Oxford was quick to appreciate that economic conditions made it impossible for both the railway and the buses to continue and it chose the trolleys.

FITCHBURG BUSES RESTRAINED

The City Council of Fitchburg has granted licenses to Charles A. Benedict, Fitchburg, and the De Luxe Company, Worcester, to run buses between Worcester and Fitchburg. This action has closed a controversy extending over a month. The restrictions imposed make it necessary for the buses to operate on a non-stop basis between Fitchburg and Worcester. The fare, it is expected, will be slightly in excess of the trolley fare, which is 72 cents. The Worcester and Fitchburg has been one of the principal suburban lines of the Consolidated for years. Cars are operated on an hourly schedule. Fitchburg is 25 miles from Worcester.

After the Worcester to Fitchburg buses had operated for several days they were ordered to stop on the ground they had not been licensed by the City Council.

The operation of the Worcester & Fitchburg line will not affect Leominster, another city served by the same cars, because of the non-stop clause. Leominster offers local bus competition to the trolley only on a line within the city limits. This route, operated to the plant of the Viscoloid Company, carries its heaviest traffic in factory employees, but enjoys excellent patronage at all times of the day.

Conference on Traffic Problem Scheduled in Fort Wayne

The Indiana Service Corporation, Fort Wayne, Ind., will open a series of conferences in Fort Wayne in which the "Nickel Plate" railway and local city officials will be asked to take part in the hope that a solution may be found for the increasingly difficult traffic conditions in the heart of the business district. Plans are already under way whereby the "Nickel Plate" road will elevate many of its grade crossing tracks within the city limits.

Robert M. Feustel, president of the railway, has recommended that a land grant under the railway lines may be made at a point near the present interurban terminal in the downtown district and a special street railway subway built there for the passage of the interurban and city cars. This project will be brought before the conference.

Competition in St. Louis

United Railways Plans to Enter Bus Field at Once in Competition with People's Company

A threat of competitive bus service to be operated by interests affiliated with the United Railways unless the People's Motorbus Company, St. Louis, accepts a plan for interchange of transfers from bus to street cars was made by Col. Albert T. Perkins, general manager for Receiver Rolla Wells of the railway, on July 28, at a public hearing before the Board of Public Service of St. Louis. The occasion was the hearing on the application of the bus company for permits to operate seven additional lines in various sections of the city.

Colonel Perkins opposed granting permits for main line bus routes that would parallel lines of the railway. He suggested supplemental bus lines and indicated the intention to form a rival bus line unless the People's Motorbus Company saw fit to co-operate with the railway by accepting permits for only such bus lines as would be supplemental to the street cars and enter into a plan for exchange of transfers, the Board of Public Service to prorate the 10-cent fare to be charged between the bus and the railway. Mr. Perkins favored permits being granted to the People's Motorbus Company to allow it to put in a line that would operate in the Lindenwood and Gratiot districts from the end of the Tower Grove line of the United Railways at Woods and Arsenal Streets.

Officials of the bus company later rejected the railway proposal as "economically impracticable." John A. Ritchie, president of the Omnibus Company of America, which has a minority interest in the St. Louis system, said he would never consent to an arrangement such as Mr. Perkins suggested as it would take all of the profits out of bus operation.

OPPOSITION COMPANY FORMED

The threat of interests connected with the United Railways to start bus service to compete with the People's Motorbus Company took definite shape on Aug. 4, when Secretary of State Becker at Jefferson City, Mo., issued a charter to the Motor Coach Company of St. Louis. The incorporators are: A. L. Shapleigh, Lawson M. Watts, Sam W. Greenland, Thomas Stanton and Stanley Clarke. They constitute the board of directors. Mr. Shapleigh is president of the United Railways and a member of the reorganization committee. Mr. Watts is assistant vice-president of the First National Bank, St. Louis. Messrs. Greenland, Stanton and Clarke are connected with Newman, Saunders & Company, who are assisting in the reorganization.

It will be necessary for Receiver Rolla Wells to obtain permission from the United States District Court to enter into a contract with the new bus company for interchange of transfers. The plan must also be approved by the Missouri Public Service Commission before it can be put into effect.

Mr. Greenland, operating expert for the reorganization committee, said no decision had been reached as to routes, but that an application for permits would be filed with the Board of Public Service when a survey reveals where supplemental bus service is needed.

Richard W. Meade, president and general manager of the bus company, characterized the supplemental bus plan as "twenty years behind the times." He said:

> We intend to give the people of Lindenwood and the other outlying sections the kind of service they want, a direct route to the business district of St. Louis without transferring and for a fare of 10 cents that will insure a seat for every patron. The United Railways Company has not frightened us a bit. Its proposal is a thing of the past.

One-Man Cars Operate in Hartford Temporarily

The Connecticut Company continued to operate one-man cars in Hartford on July 15, although a resolution of the Common Council, passed on Jan. 14, revoking the permission previously given to operate this type of car was to take effect on that particular date. Summary action against the company was delayed and on July 21 a resolution was passed giving the company permission to continue with one-man cars until it received a month's notice to discontinue that type of service. The permission was granted pending a decision by the courts in reference to an action instituted by the city against the company for the payment to the city of 2 per cent of the gross fares collected from the local lines in the calendar year 1923. Prior to the end of the six months period of one-man operation the company petitioned the Public Utilities Commission for permission to operate one-man cars anywhere in the state. A decision has not yet been handed down. The position of the company is that a state law gives the Public Utility Commission power over these matters so that the Common Council of Hartford or any other city really has no right to decide whether the company shall operate one-man or two-man cars.

Interurban Starts Bus Service

Three Fageol six-cylinder, twenty-six passenger, parlor car type buses have been placed in service on the Kansas City-Excelsior Springs highway by the Kansas City, Clay County & St. Joseph Railway as a step toward supplementing its interurban railway with motor coach service. The three buses are being used between Excelsior Springs and Kansas City and will be followed by others as soon as operating requirements necessitate. Thus travel on a two-hour schedule, leaving the terminals at fifteen minutes after the even hours from 8:15 a.m., until 8:15 p.m. The railway plans to operate its buses from the start as methodically and safely as it does its interurban cars.

Miss Liberty, Miss Excelsior and Miss Clay are the names given to the three vehicles. Many new and unusual features are incorporated in their construction. The seats are of the individual air cushion type and are so arranged that the isle is in the center. Passengers enter at a single door in the front, controlled by the driver. The body of the bus is painted a light blue with black and white trimmings. The general appearance and attractiveness of the coaches created considerable comment among the people along the route when the first runs were made.

Many Hurt in Brooklyn Accident

One person was killed and about forty others were injured when a train composed of wooden cars crashed into a train made up of steel cars on the evening of Aug. 5 at the Ocean Parkway elevated station of the Brooklyn-Manhattan Transit Corporation. G. M. Dahl, chairman of the executive committee of the company, made a statement in which he said:

> The unfortunate accident was clearly caused by the motorman. He had been in the employ of the company for about thirteen years and for the last eight years has been a motorman. His record has been good. Apparently, he became so thoroughly confused at the imminence of an accident that he lost control of his faculties and failed to apply emergency measures.

George McAneny, chairman of the Transit Commission, said:

> The commission realizes how deplorable accidents such as these are and how the circumstances surrounding them are apt to become matters of political or personal controversy. Because it has a full appreciation of these facts, it is not inclined to render hasty opinions.
>
> Major Philip Mathews, chief executive officer of the commission, with an adequate force of inspectors, was promptly at the scene of the accident and secured all available data. His full report, will, in the usual course, be made public.

Railway Has Approximately 250 Out of 400 Newark Buses

The Public Service Corporation of New Jersey, through its subsidiaries, is now the largest single operator of buses in the Newark territory. There are more than 400 buses in use in Newark, but the Public Service has acquired title to all but approximately 150 of them. On most of the lines in and out of Newark it controls a majority of the buses. It stands ready to purchase the remaining buses on lines where it is already represented and to this end has announced that it will treat with the bus associations rather than individual owners, if desired.

The announced purpose is to continue the co-ordination of street car and bus service whether or not all of the buses on any line come under Public Service ownership. On lines where more buses than are now operated by the company are required to permit the kind of service the public has the right to demand, application will be made for sufficient permits to bring the service up to the required standard in the public interest. Matthew R. Boylan, vice-president and general manager of the Public Service Transportation Company, the operating subsidiary for the railway's bus lines, said:

> In the new buses now operated and in our orders for additional latest type vehicles, as well as as in the operation of such buses as we now control, we have given evidence of our intention to supply the people of this section a co-ordinated service of cars and buses that will be a distinct improvement over anything of the kind that has been before provided, and I am confident that we shall get the co-operation of the public to that end.

Unprofitable Lines in Missouri to Increase Fares

As the result of a group of citizens voluntarily offering to assume the burden of an increased fare, the Southwest Missouri Railroad, Webb City, Mo., may not abandon its railway service over its Alba and Duenweg lines. A recent conference, at which were present railroad officials and interested residents of towns, resulted in an agreement for a continuance of a hearing that was in progress on the company's application to the Public Service Commission to abandon the above-mentioned lines.

It was suggested that the rate on the Alba line be increased instead of suspending service. Under the plan the railroad agreed to maintain service between Joplin and Duenweg on the Duenweg line for sixty days, and to give service over the Alba line a sixty-day trial, the latter under a rate increase from 15 cents to 25 cents. This was decided with the understanding that no objections would be made to the abandonment of the line, at once, north of Duenweg to Prosperity Junction, a distance of 6 miles, or to the present rate of fare. At the end of the sixty-day period the company will check up and decide whether it can continue to operate the two lines without a loss.

The agreement of the railroad officials to the Alba line matter carried a provision that the co-operation of Webb City be sought in making the sixty-day experiment at the new rate. The fare from Webb City to Alba has been 15 cents with three fare zones. The new fare will be 25 cents with five fare zones. The railroad will reserve its right to resume its hearing to abandon service over the two lines at the end of the sixty-day period, if the line still shows a loss.

Loss of revenue was the reason for the desire of the company to suspend service. Citizens of the towns affected, however, made pleas for "some sort of service," even if it had to be reduced service. Their testimony was based upon the need of the lines by workmen, particularly men engaged in various mining operations, as well as by the school children who reside in the rural districts.

News Notes

Fare Protest Filed.—Mayor Kendrick on Aug. 5 signed and sent to the Public Service Commission the city of Philadelphia's formal protest against the fare increase sought by the Philadelphia Rapid Transit Company. The company is seeking a change from the present rate of 7 cents cash, 6¼-cent ticket rate to an 8-cent cash or two tickets for 15 cents. The city claims in its protest that the present rates are sufficient to provide revenue for all reasonable needs and enable the company successfully to issue the necessary securities. The proposed rate is said to be "excessive, unjust and unreasonable" and would result in an "unsuitable and unreasonable classification" of the company's service, patrons and rates. Meanwhile the Philadelphia general committee is investigating the transit situation in Philadelphia to determine whether the company is justified in seeking the advanced rate.

Employees Get Increase.—At a meeting of the directors of the Wheeling Traction Company, Wheeling, W. Va., held recently, a measure was adopted awarding employees an increase in wages of 2 cents an hour. The present scale of 55 cents will therefore be increased to 57 cents an hour. The increase will affect about 500 employees of the Wheeling Traction Company, the City Railway and the Wheeling Public Service Company. It has not been announced definitely just when the increase will become effective.

Railway Service to Be Resumed.—Railway service will be resumed in Iowa City, Iowa, according to President Schulze of the Mississippi Valley Electric Company. He declares that the track which had been torn up has been relaid and everything is in readiness. Bus service was substituted early in June in the northeast quarter of Iowa City. The matter caused one of the hottest municipal fights that local sections have seen in some years. The company started bus service when new paving was to be done, declaring that the assessments to be made against it for the new paving would be confiscatory. The officials maintained that under their contract they could give either gasoline or electric service. The citizens, however, objected to the buses as less accommodating than the cars and the Council objected to the damage to the pavement that the heavy buses would entail. A compromise was effected whereby the company agreed to resume the service and the Council decided to lower the taxes of the traction company.

Chicago's Growth and the Railway.—The close relations between land values and transportation is explained in an article in the Chicago *Realtor* for July, by Henry A. Blair, president of the Chicago Surface Lines. Mr. Blair's article is the second of a series on transportation and its relation to and effect upon real estate development and value that has appeared in that magazine, which is devoted to the building and real estate interests of Chicago especially and the State of Illinois generally. He states that the practice of receiving contributions of property owners toward the cost of street car extension had become more or less common since the day several years ago when property owners in a residence section of Cleveland, called State Road, agreed to pay $1.50 a front foot to finance the extension of railway service out to this section. The plan, in Mr. Blair's opinion, has proved profitable to the property owners. The article gives in detail the growth of Chicago in relation to the growth of its street car system, stating that the railway system always has been ahead of the city's expansion, as "growth in population follows the extension of transportation." Speaking of the adequate service which the surface lines were striving to provide, he said that the time had come when something had to be done toward a solution of the traffic problem if the city was to continue to expand and increase in population. The Chicago Surface Lines were ready, he said, at any time to participate in any movement which would result in improvement.

Bus Application Denied.—Public convenience and necessity, according to a decision handed down by the California Railroad Commission, do not require the operation by the Crown Stage Lines of auto service between Huntington Beach and Long Beach, nor the operation of through stages between Riverside and Long Beach via Huntington Beach and via Westminster. The commission, therefore, denied the application of the Crown Stage Lines for certificates under which to establish the services. The Pacific Electric Railway opposed the application of the Crown Lines. It is directed to establish through rail service between Huntington Beach and Long Beach via Seal Beach within sixty days.

Employees Must Be Taught.—As a result of a recent accident on the lines of the Union Traction Company of Indiana, Anderson, Ind., officials of the company have been ordered by the Public Service Commission to institute a school of instruction for all employees in train service. The classes must be continued regularly until all employees are properly instructed in the application of safety rules. In the report on which the order was based, the commission held the company entirely responsible for an accident which occurred at a siding, 7 miles east of Indianapolis, on June 12, when a passenger train slid down a grade and crashed into a freight car, causing the injury of three people.

Injunction Obtained Against Preventing Higher Fare.—Judge Wade has granted a temporary injunction sought by the Omaha & Council Bluffs Street Railway to restrain the city from preventing the company raising its fare to 7 cents in Council Bluffs, Ia. The company will be required to file a $100,000 bond pending hearing on a permanent injunction. Counsel for the city said the case would be appealed to the United States District Court of Appeals. The company is losing $1,000 a day on its Bluffs lines, Emmet Tinley, counsel for the company, declared in federal court when hearing was begun on the company's fight for higher fares. This loss, he asserted, was estimated on the company's claim to a 7 per cent return on property in Council Bluffs.

Opposes Bus Franchise Extension.—The Charleston Interurban Railroad, Charleston, W. Va., is understood to be opposed to letting the buses of the Midland Trail Motor Transit Company into Charleston as a parallel and competing transportation line. A hearing was held recently by F. O. Sanders, supervisor of motor bus traffic, on the Midland Trail Motor Transit Company's application, for an extension of its franchise. The company operates between Huntington and St. Albans to a connection with the interurban railroad cars between Charleston and St. Albans. If the bus line is given an extension its buses will come in over the South Charleston Bridge alongside of the interurban cars.

Foreign News

Paris Starts Its Second Electric Suburban Line

Another section of electrified suburban service has been opened in Paris on that part of the State Railway running from the Paris Saint Lazare station to Bois-Colombes and Becon-les-Bruyeres, a distance of 9 miles. There will be forty-nine trains a day in each direction, the service running over the regular rails of the main line steam railway.

It is expected that the line will be extended next year to Saint Germain and Saint Cloud and in 1926 the interurban exterior section will be opened between Saint Cloud and Versailles and Marly. In 1927 the Bois-Colombes electric trains will be prolonged to Argenteuil and a link which will connect with the present electrified line of the State Railway running from the Paris Gare des Invalides to Versailles. The whole electrification scheme is to be completed in four years.

Sydney Has Record Traffic

Sydney, New South Wales, has about 1,000,000 inhabitants, 251 miles of track and 1,417 cars in active service, and during the last Easter holidays broke all records for passengers carried. Factors which contributed greatly to the riding were the holding of races for four days, a large agricultural show, which was in session for nine days, and a visit from the British Royal Naval Squadron. The number of passengers carried for the two Easter weeks was 13,513,226. This period included two Sundays, Good Friday and Easter Monday, though the last was wet. The number of passengers carried was approximately 40,000 in excess of last year. The revenue obtained was £145,746, or about £4,000 in excess of the revenue for the corresponding period in 1923. There was no serious accident. The heaviest traffic on any one day during the period was approximately 1,500,000 passengers. The number of passengers carried to the Agricultural Show during its nine-day session was 633,628, and to the racecourse during the four days of racing, 244,687.

A description of the Sydney tramway system, with plan of the routes and views of the agricultural fairgrounds and racecourse, was published in the issue of this paper for Jan. 13, 1923.

Speeding Up in West London

The London United Tramways are carrying out extensive improvements to the tramcars operating in West London. Seventy cars have been equipped with new high-speed motors and magnetic brakes. A further forty cars are now being similarly reconditioned. The cars are now running upon the Shepherd's Bush, Hanwell and Hounslow routes and the new motors are daily effecting a very considerable reduction in the trip time. For example, the trip from Hanwell to Shepherd's Bush has been cut from thirty-five minutes to twenty-eight minutes and that from Hounslow to Shepherd's Bush has been cut from forty-seven minutes to forty-one minutes.

The London Underground Extensions

The placing of contracts for the construction and extension of the City & South London Railway from Clapham to Morden and for the extension of the Charing Cross & Hampstead Railway from Charing Cross, linking up with the City & South London line at Kennington, marks the commencement of two of the biggest schemes which appear on the London underground companies' list of new works. It is expected that trains will be running between Clapham Common and Morden in December, 1925.

Work on the Morden line is now in full swing day and night. Vertical service shafts 50 to 60 ft. deep have been sunk at all station sites and the rotary excavators will immediately be in position.

The extension of the Hampstead line beyond Hendon to Colindale, Burnt Oak and Edgware is now rapidly approaching completion and it is hoped to open this line in July.

The southern section of the City & South London Railway between Moorgate and Clapham Common will also reopen for traffic in October, 1924.

Glasgow Tramway Manager's Salary.—At a meeting of Glasgow Town Council, on June 16, the salary of James Dalrymple, the tramway manager, was increased from £1,500 to £1,750. The increase was opposed by the Socialists and some other councilors.

Trackless Trolleys in Wigan, England.—Wigan Town Council has approved the proposal of the tramway committee to install a trackless trolley system on a portion of the route where the tramway track is in need of reconstruction. This will mean a saving of approximately £15,317, the estimate for the trackless trolley construction being £10,805.

British Electric Traction Company Reports.—For last year the gross profits of the British Electric Traction Company, holding company for a number of properties in the British Isles, wer £278,666, as compared with £263,824, and the net profits £152,359, against £134,740. The dividend on the ordinary shares was raised to 6 per cent, as compared with 5 per cent last year, and the amount added to the undivided profits account is £30,019, making the total amount to the credit of undivided profits £245,381, while the reserve account stands at £520,000. The company's investments during the year were increased by £313,164, the yield from them representing 5.62 per cent.

Financial and Corporate

Employees Take 10,609 Shares

Short Campaign for Stock Ownership Among Brooklyn Employees Proves Very Successful

Employees of the Brooklyn-Manhattan Transit Corporation to the number of 10,609 subscribed for a total of 20,235 shares of B.-M.T. preferred stock under the employees' stock ownership offer. Announcement of the sale was made on July 16. Subscriptions closed July 26. This represents an oversubscription of approximately 35 per cent, as only 15,000 shares were offered to the employees. Of the 15,000 employees in the transit system, some 13,167 were eligible to purchase stock. Final figures in the stock sale were made public on Aug. 2.

Because of the large oversubscription of shares, it was impossible to allot more than three shares to any subscriber. Applications were received from approximately 350 employees for the maximum of ten shares, but most subscriptions were for one or two shares, some 9,000 applications for 11,500 shares in one or two share lots being received.

Subscriptions were received from 4,091 motormen, conductors and other employees of the surface lines and from 2,963 employees of the subway and "L" lines, for a total of 13,310 shares. This makes a total of 7,053 employees in contact with the public who are stockholders in the company.

The B-M.T. offered to sell to its employees 15,000 shares of its preferred stock carrying dividends at the rate of $6 per share per annum. The stock was offered on terms which make the final net cost approximately $60 per share to employees who retain ownership for two years after final payment. It should be mentioned that the stock that was offered was acquired by the company in the open market for the express purpose of tendering it to the employees.

The stock was offered on the partial payment plan and the employees have the right to cancel their subscriptions at any time before the final payment is made. In such cases the company will return all payments made by employees together with interest at the rate of 5 per cent per annum on such payments. The company reserves the right to cancel subscriptions of employees who leave the service before completing final payment for the stock. In view of the large oversubscription for the stock, any shares available because of cancellations by employees in the service or those leaving the service will be distributed among employee-subscribers who were not able to obtain the full number of shares they desired at the first allotment.

The B.-M.T. management in its notice of acceptance sent to employee-subscribers expresses its appreciation of the interest and co-operation shown by them and for the enthusiastic response which resulted in such a large oversubscription.

Public Service Railway Makes Good Showing

The June earnings report of the Public Service Railway, Newark, N. J., shows that the company, which has paid no dividend to the controlling company since 1917, has made a remarkable recovery since the 1923 strike. Gross earnings in June were $2,401,098. Moreover, monthly net earnings have shown substantial increases. Net income in June was $446,211, more than sufficient to cover all interest and amortization charges, which totaled $431,652. In February of this year the net income was only $309,717, while interest charges exceeded $457,000. In August, 1923, the net deficit approximated $227,400 and interest charges were $470,000. A commentator on the affairs of the company says it is expected that further co-ordination of bus and railway lines and extension of the 5-cent zone system will increase earnings for the last half of the year.

Service Suspended in Port Huron

The City Electric Railway, a subsidiary of the Detroit United Railway, has discontinued operation in Port Huron, Mich., and the city commission has advised the railway if service is not restored promptly the city would take steps to terminate the franchise. Service was suspended following disagreement between the railway and the city authorities on the question of the use of one-man cars, operation of which is prohibited on city streets. Meanwhile transportation is provided by buses.

Foreclosure Appears to Be Ahead Soon in Kansas City

Progress has been made recently toward the adjustment of the difficulties of the Kansas City Railways, which has been in the hands of a receiver during the past four years. In fact a statement issued by the protective committee representing the holders of the first mortgage bonds indicates that steps have been taken to advance foreclosure proceedings.

Numerous questions were raised this spring regarding the status of certain mortgage bonds. The issues were tried in April. Judge Stone has now returned a decision affirming the validity of the indenture under which the bonds are secured.

The statement of the committee included a financial report of the affairs of the road during the past several years. The achievements of the management were reviewed at length in an article in the issue of the ELECTRIC RAILWAY JOURNAL for May 24, page 807.

Indianapolis Case Reviewed

Fare Increase Appeal Allowed on Basis of Evidence Presented Showing Need for More Revenue

Some very interesting facts in regard to the operation of the Indianapolis Street Railway, Indianapolis, Ind., were presented at the recent hearings before the Public Service Commission on the plea of the company for an increase in fare. In this case the decision of the commission was unanimous. It will be recalled that the fare was raised as asked to 7 cents cash, four tickets for a quarter, with a 1-cent transfer charge. The basic owl car fare of 10 cents is to remain. Double transfers with a twenty-minute time limit for each are allowed, superseding the present single transfer rule. Moreover, the company is ordered to extend its service to Broad Ripple by Sept. 1, under penalty of going back to the former rates if the provision for the extension is not met. Revenues for each month in excess of those for the corresponding month of 1923, after the order becomes effective, are to be placed in a special fund, this fund to be used solely for depreciation, although the company is allowed to borrow from 75 per cent of it at 4 per cent interest for capital expenditures, by giving notes for the amounts. The company is also ordered to submit monthly financial statements to the commission. The city authorities had asked the company for bi-monthly financial reports.

There has been constant agitation for the Broad Ripple extension, particularly since the suburb was annexed to the city about a year ago. The Union Traction Company of Indiana has heretofore been supplying the service to Broad Ripple, operating city-type cars over the 9-mile run. The route from the downtown district of Indianapolis is over the tracks of the Indianapolis Street Railway to the present terminus of city service at Forty-sixth Street, thence over the Kokomo division of the Union Traction to Broad Ripple, where the suburban cars leave the main line and run for a short distance to the terminal at the Broad Ripple Amusement Park. The line is divided into two zones with a 5-cent charge for each zone. Ten two-zone tickets are sold for 75 cents. The Union Traction Company has recently filed a petition with the Public Service Commission asking to raise the fare inside the zone in which city cars operate to 7 cents. Robert I. Todd, president of the Indianapolis Street Railway, has announced that negotiations are in progress looking forward either to the lease or purchase of the Union Traction Company's tracks and equipment to Broad Ripple, or the consummation of some satisfactory operating agreement.

The necessity for rerouting has been one of the main issues of the fare question and a citizens' rerouting committee was appointed by city authorities. The Public Service Commission in its order also announced its intention of issuing a supplemental order covering rerouting later on. One change, the combination of two routes, has already been effected. The tendency now, on practically all sides, is to agree that the company operating officials are best informed on the details of the subject, and therefore best equipped to plan constructive rerouting changes. The commission and the city officials are now co-operating with the company to that end.

A number of interesting exhibits were introduced by the company showing the inadequacy of the present fare. Among them was the following table showing various revenue comparisons for the first three months of 1923 and 1924:

REVENUE PASSENGERS

	1924	1923	Increase or Decrease
January	7,891,388	8,039,414	148,026*
February	7,523,475	7,280,484	242,991
March	8,076,233	8,465,504	389,271*
Totals	23,491,096	23,785,402	294,306*

PASSENGER REVENUE

	1924	1923	Increase or Decrease
January	$396,168.80	$401,937.95	$5,769.15*
February	377,796.15	364,019.30	13,776.85
March	405,195.35	423,246.03	18,050.68*
Totals	$1,179,16[illegible].30	$1,189,203.28	$10,042.98*

TRANSFERS

	1924	1923	Increase or Decrease
January	1,570,817	1,652,562	81,745*
February	1,501,960	1,524,490	22,530*
March	1,611,284	1,748,439	137,155*
Totals	4,684,061	4,925.491	241,430*

TRANSFER REVENUE

	1924	1923	Increase or Decrease
January	$31,805.03	$33,538.54	$1,733.51*
February	30,396.72	30,959.84	563.12
March	32,225.68	35,541.71	3,316.03*
Totals	$94,427.43	$100,040.09	$5,612.66*

* Decrease of 1924 as against 1923.

Expenditures for maintenance and replacement of paving during 1922 and 1923 are shown in the following statement:

	1922	1923
January	$8,297.77	$9,777.40
February	5,839.64	5,520.07
March	6,447.52	7,853.68
April	7,569.17	8,601.32
May	10,798.52	12,775.84
June	8,615.22	14,531.53
July	13,432.64	17,559.68
August	14,339.79	24,914.27
September	8,862.65	15,799.00
October	12,220.00	20,546.05
November	9,134.28	11,278.28
December	7,743.04	11,645.10
Totals	$113,300.25	$160,802.22

The maintenance of paving increased $47,501.97 in the year 1923 over the year 1922.

An audit made by the commission of the company's financial operation covering 1922 and 1923 showed the following:

	1923	1922
Total operating revenues	$5,489,200	$5,517,457
Total operating expenses, including taxes, but no provision for depreciation	4,454,228	4,471,716
Net operating revenues	$1,034,972	$1,045,742

The audit also showed that although the company was previously authorized to set aside 21 per cent of gross revenues for maintenance and depreciation, it was compelled to use $98,285 in excess of this amount for necessary repairs during 1923.

The company introduced an exhibit to show the following summary of expenditures required for maintenance and equipment in the next five years:

1924	$515,000
1925	510,000
1926	390,000
1927	390,000
1928	371,150

It was brought out by the city during the hearing that of eighteen street railways in cities of more than 200,000 population in the United States, the average return per revenue passenger in Indianapolis is lower than that of any other city with the exception of the municipal system in San Francisco. It was pointed out, however, that San Francisco has the advantage of water power for the generation of electricity while Indianapolis has to depend on steam. The city's exhibit also showed that the maintenance and depreciation figure in Indianapolis of 1.26 cents per revenue passenger was lower than that of any of the other of the seventeen cities with the exception of Washington, D. C., where it is 1.22 cents.

Fewer Passengers in St. Louis

The United Railways, St. Louis, during the quarter year ended June 30 carried 3,856,112 fewer passengers than for the same period in 1923, according to the report filed with the city on July 16.

The figures submitted show that 67,912,316 passengers were carried during April, May and June this year, while 71,768,428 were hauled during the corresponding period last year and 69,066,402 in the first quarter of this year.

The average number of cars operated during the quarter was 1,395 on week days, 1,286 on Saturdays and 702 on Sundays. Last year the average number of cars operated was 1,407 on week days, 1,318 on Saturdays and 736 on Sundays.

The figures for the past quarter support the contention made before the Board of Public Service on July 15 by R. J. Lockwood, assistant manager for the United Railways, to the effect that travel fell off to a greater extent on railway lines that came in direct competition with the existing bus lines than it did on lines with which the buses do not compete.

Rate of Return in New Orleans Six per Cent

The second quarterly report of the New Orleans Public Service, Inc., New Orleans, La., embracing the months of April, May and June, shows a rate of return of only 6 per cent in all of its departments. The allowed rate of return is 7.5. The contributory cause of this slump was the increase in the rate base from $55,734,535 in April, when the rate of return was 7.06, to $56,841,707 in June, when the rate was 5.26. The general depression was another factor which contributed to the drop in the rate of return by reducing receipts.

The gross corporate income of the railway department shrunk from $147,501 in April to $116,595 in June.

The gross corporate income for all departments for the second period of the year decreased from $874,129 in 1923 to $847,253 in 1924, with a rate of return from 6.55 in 1923 to 6.0 in 1924. The gross corporate income for 1923 and 1924 is respectively $1,874,176 and $1,864,725, while the rate of return is respectively 6.81 and 6.99, showing that the change in the rate base is discernible in the decreased rate of return.

Peoria Railway Wants to Abandon Passenger Service

The passenger business of the Peoria Railway, Peoria, Ill., has been greatly affected by bus and private automobile competition, according to a petition for permission to discontinue the service, filed with the Illinois Commerce Commission. The road operates freight trains by steam and passenger cars by electricity. It asks to be permitted to discontinue the operation of the passenger cars, but wants to maintain the freight service.

The road was constructed about fifteen years ago, and about ten years ago the stock was purchased by the Chicago & Alton and the Chicago, Rock Island & Pacific, each road controlling 50 per cent. The line is operated alternately each year by one road and then the other.

During the past year the road has lost an average of $1,600 per month on its passenger service, its figures show. During the first five months of the present year 51,355 fewer passengers were carried than in the same period two years ago, and 74,509 fewer than in the first five months of 1921.

Seattle Considers Purchase of Rainier Valley Line

By a unanimous vote, the City Council of Seattle, Wash., has agreed to enter into negotiations with the Seattle & Rainier Valley Railway looking toward the purchase of the privately owned lines for operation in connection with the municipal system. Chairman E. L. Blaine of the finance committee and Philip Tindall of the utilities committee have been directed by the Council to start negotiations immediately.

Five years ago, shortly after the city purchased the railway lines from the Puget Sound Traction, Light & Power Company, the Council considered acquiring the Rainier Valley System, but the private company refused to consider any deal based on an appraisal made by the Council. Councilman William Hickman Moore, acting for the Council, appraised the valley lines at $765,000, and proposed allowing $70,000 additional for a fill which the railway company had made on Rainier Avenue. The company's liabilities at that time, Mr. Moore reported, were $1,600,000.

The Seattle & Rainier Valley Railway operates a twelve-mile line from Fourth Avenue and Stewart Street to Renton, along Fourth Avenue, Dearborn Street, Rainier Avenue and the shore of Lake Washington. The company also has a branch line from Rainier Avenue and Genesee Street to Fiftieth Avenue South and Hudson Street, on which a shuttle car is operated. The company serves a population estimated at 30,000 to 40,000. Rainier Valley residents at various times have urged the city to purchase the lines, and have also requested the city to compete with the Rainier line by running buses on Empire Way and other thoroughfares. Car riders can obtain transfers to and from the Rainier Valley lines upon payment of an 8⅓-cent token fare, but both the municipal and private systems have tokens which are not interchangeable.

Councilman John E. Carroll, who proposed the resolution providing for negotiations with the company, advised the Council that his investigations convinced him that the city could operate the lines profitably, and at the same time probably improve the service.

Walsh Holdings in Iowa Sold

Walsh Brothers, Davenport, Iowa, have negotiated the sale to George M. Bechtel & Company, representing the Southern Iowa Utilities Company, of electric light, power, gas and electric railway properties in Burlington, Morning Sun, Wapello and the Sigourney group, for a consideration reported to be more than $4,000,000.

The sale represented disposal of nearly half the Walsh Brothers' utility holdings and, with the exception of the Tri-City Railway transfer some years ago, is the largest transaction of that nature in the history of southeastern Iowa.

The Burlington electric railway system and the other light and power utilities there are the largest item of the group. The gas plants at Burlington and a number of small towns in that vicinity are counted in the transfer. The sale includes chiefly service lines, equipment and distribution systems as the major part of the current is now supplied from the Keokuk power plant. The Burlington Railway & Light Company, headed by E. C. Walsh, operates 23 miles of electric railway.

Income Decreases. — The city of Detroit, Department of Street Railways, Detroit, Mich., reports a total operating revenue of $1,704,780 in June, 1924, against $1,784,039 in June, 1923. These figures include revenue from transportation of $1,661,026 and $1,694,664 for the month of June, 1924 and 1923 respectively. Operating expenses decreased from $1,329,658 in June a year ago to $1,186,913 in June of the current year. The net income also showed a falling off from $62,139 in June of last year to $40,255 in June of the present year. Passengers carried totaled 41,730,246 in June, 1923, and 35,926,799 in June of this year.

Carhouse Property Sold.—The old carhouse block of the Broadway & Seventh Avenue Railroad, New York City, bounded by Fiftieth and Fifty-first Streets and Sixth and Seventh Avenues, has been bought by Realty Associates and Bing & Bing, Inc. The property has been held at $6,500,000, but the actual price paid for it was not made public. The sale is a part of the reorganization of the New York Railways. The proceeds will go in part to bondholders of the Broadway & Seventh Avenue road and in part to the general fund of the new system. A part of the area purchased will be offered immediately for resale. On the remainder an amphitheater will be erected to meet the need of the sporting interests of the city.

Purchase Report Delayed.—Fred S. Hunt, chairman of the street railway acquisition committee working on the proposed contract between the city of Milwaukee and the Milwaukee Electric Railway & Light Company, has stated that there will be no report to the Common Council until early in September. The sale terms which are being negotiated at Milwaukee were summarized in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 2, 1924.

Loss in Net Income.—For the six months period ended June 30, 1924, the International Railway, Buffalo, N. Y., reports an operating revenue of $5,134,538, against $5,366,746 for a similar period ended June 30, 1921. Operation and taxes decreased from $4,885,205 in 1921 to $4,729,757 in the period ended June 30 of the current year. The loss in the net income was further increased. For the months from January to June, 1921, it was $250,114 and for the six months period ended June 30, 1924, it was $357,703. Because of the strike in 1922 and its effect on the revenue and operating costs of the year 1923, the calendar year 1921 is used for comparative purposes.

Short Line to Discontinue. — The Missouri Public Service Commission has issued an order authorizing the Kansas City Power & Light Company to discontinue the operation of the railway system in Carrollton, Mo., and to remove the tracks. The City Council later passed a resolution approving the action of the commission. Private automobiles and buses have almost completely deprived the railway of patronage. The railway had been in existence for about twenty years. It consists of only a little more than 2 miles of track.

Transfer Completed.—The selectmen of Greenfield and Montague, Mass., met on July 31 with D. P. Abercrombie, receiver for the Connecticut Valley Street Railway, and completed the transfer of ownership of the Greenfield-Turners Falls branch to the two towns, under the state transportation area act. Of the $62,000 paid for the line, Greenfield pays $42,966 and Montague $19,034. The board of trustees that will operate the line include George W. Cary, chairman; Charles F. Mosher, secretary; J. B. Kennedy and Stuart Winch.

Seeks Partial Abandonment. — The Westchester Electric Railroad, connecting several cities and villages in Westchester County, N. Y., recently applied to the Public Service Commission for permission to abandon a portion of its Gramatan Avenue route and franchises in Midland Avenue, Bronxville. The petition says an agreement has been made with the New York, Westchester & Connecticut Traction Company, associated with the petitioner as part of the Third Avenue Railway system, whereby the other company will furnish service heretofore supplied by the Westchester line. The petition alleges that the Gramatan Avenue line has been operated at a loss ever since it started operation about Feb. 26, 1920. For ten years prior to that date this line had been operated by the Westchester Street Railroad as part of its through line between Mount Vernon and White Plains and was taken over by the Westchester Electric Railroad because of the default of the other company in the payment of track rentals and power due under agreement.

Seeks to Abandon in Riverside. — The Pacific Electric Railway applied to the California State Railroad Commission on July 23 for authority to abandon the larger portion of its local railway system in the city of Riverside and to substitute three motor bus routes over a portion of the area now served by the car lines. The application outlined that the railway would be obliged to make many repairs and improvements to maintain the local system in Riverside and that public patronage of the lines did not warrant such expenditures.

May Be Sold for Junk.—It is understood that the line of the Southeastern Ohio Railway operating between Crooksville and Zanesville, Ohio, will be torn up and sold for junk if the Public Utilities Commission grants permission to abandon the tracks. Officials of the company say that bus lines have depleted the income. No cars have been running since May, when the employees went out on strike. The work of dismantling part of the line has already been started.

Common Dividend Increased by Federal Company.—The Federal Light & Traction Company, New York, has declared an extra dividend of 75 cents on the common stock in 6 per cent cumulative preferred stock and the regular quarterly cash dividend of 1 per cent, both payable Oct. 1 to stock of record Sept. 15; also the regular quarterly dividend of 1½ per cent on the preferred, payable Aug. 30 to stock of record Aug. 16.

Acquires Columbia Railway.—W. S. Barstow & Company have announced the conclusion of negotiations for the acquisition by the General Gas & Electric Corporation of the Columbia Railway, Gas & Electric Company, Columbia, S. C. The purchase carries with it various subsidiaries. Plans of the purchasers include connection of the two sections, which lie about 100 miles apart, by transmission system.

Traffic Increases.—For the fiscal year ended June 30, 1924, the Municipal Railway of San Francisco, San Francisco, Cal., carried 4,000,000 more passengers than for a similar period a year ago. The receipts were increased by $185,000. During the 1922-23 fiscal year the railway carried 73,633,760 passengers, while 77,736,477 were transported during the 1923-24 year. Receipts for the year ended June 30 were $3,198,924 and those for the 1922-23 period were $3,013,552. Total accidents for the year ended June 30 were 807 or forty-six more than the previous twelve-month period. Car miles operated during the 1922-23 the aggregate was 8,676,611. These are the preliminary figures.

Deficit for Year.—J. H. McClure, receiver for the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, filed his report in the federal court at Toledo recently. It showed a deficit of $82,809 for the year ended June 30, last.

Power Purchase Completed. — Purchase of the capital stock of the Sierra & San Francisco Power Company of California from the California Railway & Power Company, a holding concern, was announced on Aug. 3 by H. M. Byllesby & Company. Ownership or control of the holding company, or of the Market Street Railway, of San Francisco, were not included in the transaction.

Cut in Service Necessary.—The York Utilities Company, Sanford, Me., has announced reductions in service and personnel because of exceedingly poor business. General Manager Dow says that due to the competition of the automobile and generally poor business conditions the financial standing of this property has reached a crisis. The income is no longer sufficient to meet operating expenses and reductions in the operating force and payroll have become necessary. Between Sanford and Biddeford cars will operate every two hours instead of hourly as heretofore. Temporarily twenty men were laid off and wages of the employees retained have been cut 10 per cent. Mr. Dow says that he trusts the condition is only temporary and that business will improve speedily.

Patronage Falls Off.—The report of the Calgary Municipal Railway, Calgary, Alberta, for the first six months of this year shows a falling off in patronage of 300,000, compared with the corresponding period last year.

Book Reviews

Electric Railway Practices in 1923

As Revealed in Presentations Made Aug. 15, 1923, to the Charles A. Coffin Foundation by Nearly a Score of Electric Railways. Edited by Henry H. Norris for the Foundation. Published by the American Electric Railway Association, New York, N. Y., 1924. $2.

This is a summary and review in book form of the presentations of the electric railway companies made last year in competition for the Charles A. Coffin prize. This award, which takes the form of a medal for the company and a gift of $1,000 to the "employees' benefit" or similar fund of its employees, is to be an annual award to the electric railway company which, during a given year, has made a distinguished contribution to the development of electric railway transportation. The award is one of several made by the Charles A. Coffin Foundation, which was formed in 1922 by the directors of the General Electric Company.

The administration of the contest was in the hands of the American Electric Railway Association, which appointed as a committee C. D. Emmons, Britton I. Budd and James H. McGraw. This committee laid out a plan for the competition embodying eight principal points upon which the award would be made. These included: Initiative, skill and enterprise in popularizing electric railway service; outstanding success in gaining public good will; economies introduced in operation resulting from original ideas; economies in operation by taking advantage of developments originating with others; improvements in construction practice; particular success in conducting a safety program and actually reducing accidents; outstanding accomplishments in development of good relations between the railway and its employees; special accomplishments, aside from good management, tending to reduce the cost of new capital.

In its arrangement in presenting to the readers the material contributed by the various competitors for the Coffin prize, the book is divided into two main parts, the first of which, "More Riders and More Revenue," deals with the publicity features, while the second part, "Operation with Proper Regard for Economy," deals with operating practices. This was done in preference to printing in full the individual briefs, as it was felt the method adopted would give a better presentation for the industry of the practices developed.

An idea of the contents may be obtained from a statement of the chapter headings: In Part I: Better Cars Bring in More Revenue; Insuring High Quality of Service; Explaining the Scope of the Service; Telling the Public About the Service; Electric Railway an Integral Part of the Community. In Part II: Operating Practices that Conduce to Economy; Economical Maintenance and Good Management; Electric Railway Savings in Construction; the Accident Menace Can Be Controlled; Satisfactory Relations with Employees; Securing Capital for Improvements.

In each chapter are excerpts from the presentations of the various companies that deal with that particular subject. Thus the book forms a handbook on the best practices to be found in the electric railway industry today and should be a good guide for the progressive managers. It is well illustrated, and its 220 pages contain a vast amount of valuable matter to the railway man.

A Symbol of Safety

By Harry Chase Brearly. 290 pp. Illustrated. Doubleday Page & Co., New York.

The electric railways have made great strides in the past thirty years, but though the changes have been revolutionary, they are no greater than those effected in increasing the means of safety, both of property and of life and limb. The history of safety precautions is one largely of the application of scientific principles to the means for removing the causes of disaster, and as one of the greatest destructive agents, particularly to property, is fire, it is not surprising that some of the most important early steps along these lines were taken to reduce the fire hazard. This was largely the inspiration for the establishment of the Underwriters' Laboratories, about thirty years ago, and the book under review tells what these laboratories have accomplished and how they do their work. While fire prevention is still an important feature at the Underwriters' Laboratories, the phases of the work there include also protection against burglary, accidents from automobiles, etc. Altogether the book, though telling facts, is an interesting as a romance.

Handbook of Direct Currents

By K. C. Graham. 164 pages, illustrated. Simmons-Boardman Publishing Company, New York. $2.

This volume, one of the Railwaymen's Handbook series, was written to impart a knowledge of the fundamental principles of direct current theory. The language is simple and can be understood by those having no previous knowledge of the subject. The book is not mathematical, all problems being included in one chapter on elementary electrical calculations.

The book should appeal to electric railway shop men desiring an elementary knowledge of direct-current circuits, motors and generators and measuring instruments.

Theory and Practice of Public Utility Valuation

By W. H. Maltbie, 201 pp. McGraw-Hill Book Company, New York, N. Y.

The science of valuation, like that of many departments of physics, is in the making. Its beginning, in the modern sense of the word, dates back only some decades to the first efforts toward commission rate regulation. In consequence, laws underlying the science of valuation to a large extent are undetermined, and, a book like that of Mr. Maltbie, which helps greatly to an understanding of the fundamentals, is greatly to be welcomed, particularly by the layman for whom the book primarily is written.

The general method followed is a discussion in one or more chapters of each of the various principal methods of determining valuation, namely, by original cost, by capitalization, by market value of securities outstanding, by cost to reproduce new, etc. Then follows a very clear statement on overhead charges and working capital, intangible values and deductions from gross value. The subject of depreciation is treated in six chapters in a very lucid way, the various classes of depreciation, such as obsolescence, inadequacy, deferred maintenance, accrued depreciation, etc., being explained. Outside of one chapter, where the position of the United States Supreme Court in connection with the subject of accrued depreciation is explained, there are practically no quotations from legal decisions. Instead the author develops the subject analytically in his own language, and the book is notable for the clearness with which the various points are brought out.

Personal Items

Charles T. Dehore's Experience Gained in Cincinnati

Charles T. Dehore, who has assumed active management of the Toledo & Indiana Railroad at Toledo, has been in the railroad business practically all his life in and around Cincinnati. Brief announcement of his appointment was made in the ELECTRIC RAILWAY JOURNAL for June 14.

His railroad experience began with his connection as chief clerk to the general yardmaster of the old Cincinnati, Hamilton & Dayton Railroad at Cincinnati, where he served for two years. Then he joined the Kentucky Traction & Terminal Company at Lexington as chief clerk to the general manager and purchasing agent, which position he occupied four years. For the last twelve years he has been railway specialist with the General Electric Company, serving the territory about Cincinnati.

During the war Mr. Dehore served in the cavalry, but was transferred to the air nitrate division at Muscle Shoals and served in Plant No. 1.

He is secretary of the Cincinnati, Georgetown & Portsmouth Street Railway, vice-president of the Toledo & Indiana Railroad and vice-president of the Lake Shore Power Company, the corporation which controls the Toledo & Indiana system. He was graduated from St. Xavier College, Cincinnati, in 1908.

Clark G. Anderson Leaves Moline Property

Clark G. Anderson has resigned as manager of the Clinton, Davenport & Muscatine Railway, Moline, Ill. Mr. Anderson will leave for Wichita Falls, Kan., shortly, where he will assume the duties of assistant to the president of the Arkansas Valley Interurban Railway. Mr. Anderson entered upon a public career in Moline as city engineer. In this capacity he served six years. His ability as engineer gained for him a place on the first city commission, when the form of government was changed. He served practically all of his term in the department of public works, resigning near the close to accept a position with the traction company. He has been in the employ of the interurban company at Moline since 1914.

Albert Swartz, general manager of the Toledo & Western Railroad Company, now under the joint control of the Willys-Overland Company and the Wabash Railway, Toledo, has resigned and will go to Chicago to enter business for himself. He will be in the railway supply business. Mr. Swartz has been with the Doherty interests at Toledo for twelve years and in the railroad business in Toledo for twenty-seven years. It was announced some months ago that the successor company of the Toledo & Western Railroad would retain the services of Albert Swartz, who would have complete charge of operations. When the Community Traction was first organized Mr. Swartz was vice-president, previous to which he was in the employ of the Toledo Railways & Light Company and the Toledo & Western Railroad. Following his graduation from Toledo schools Mr. Swartz served a short time in the New York offices of Henry L. Doherty & Company, New York.

H. L. Bollum with Twin City Company

Outstanding Figure in Minnesota Bus Circles Continues with Railway Following Bus Purchase

Great interest attaches to the announcement made elsewhere in this issue to the effect that the Twin City Rapid Transit Company, Minneapolis, Minn., has taken over the property of the Twin City Motor Bus Company. Along with this announcement the statement was made that H. L. Bollum, president of the motor bus company, will continue under the new arrangement as general manager of the bus lines.

H. L. Bollum

Quite naturally the question that will arise is: What manner of man is Mr. Bollum? Very briefly the latest accession from the bus field to that of the electric railways is one of the outstanding figures in bus circles in his home state. His record speaks for itself. In addition to running the bus line he has been president of the Minneapolis Bus Terminal Association and of the St. Paul Union Bus Terminal Association, both projects of considerable magnitude. Most important, however, are Mr. Bollum's ideas of the business. In his own work he has built in substantial fashion, and wherever it has been within his power to exercise his influence with others in the bus business he has insisted on the application of the same high ideals that have characterized his own personal commitments. His material success is an excellent criterion to the correctness of the public policies to which he has constantly adhered. In brief, the philosophy behind all his acts has been the public, first, last and all the time.

As for the other side of the picture, the so-called economic side, he has looked ahead with amazing clearness to the need for building along substantial lines. He was one of the moving spirits in the plan to make a real organization of the Minnesota Motor Bus Association. He advocated uniform legislation for bus control and license. He was also a strong advocate of the present automobile tax in Minnesota, passed in 1921 with the understanding that the state tax was in lieu of all other taxes on automobiles. As indicated before, it was he who, perhaps, did most among the local bus operators to bring about a better realization of the need for proper terminals in both Minneapolis and St. Paul. He also was quick to realize the need for the application of accurate methods to the keeping of bus operating accounts.

Mr. Bollum moved to St. Paul from Goodhue County, Minnesota, in 1911, but did not get into the transportation field until the organization of the Twin City Motor Bus Company, in May, 1915. He began as secretary, later added the title of manager, and succeeded John Wade as president in 1920, retaining the title of manager also. From a line with only two buses operating intermittently the system has grown to one of forty-four buses, with thoroughly dependable service and complete inspection and shop facilities of its own.

Obituary

John H. Dunlap

John H. Dunlap, secretary of the American Society of Civil Engineers, who was seriously injured in a train wreck near Buda, Ill., June 30, died July 29 at the Presbyterian Hospital, Chicago.

Mr. Dunlap had been secretary of the American Society of Civil Engineers for two years, having been elected during the annual meeting at Portsmouth, N. H., in the latter part of June, 1922. He succeeded to the office left vacant by Dr. Charles Warren Hunt in 1920 and filled since that time by Herbert S. Crocker and Elbert M. Chandler, with the title of acting secretary. Mr. Dunlap left the position of professor of hydraulics and sanitary engineering at the State University of Iowa, Iowa City, to accept the secretaryship of the American Society of Civil Engineers. In addition to his university work he had devoted part of his time to practice of civil and sanitary engineering.

Mr. Dunlap was born at Harrisville, N. H., Sept. 9, 1882. He was graduated from the Thayer School of civil engineering of Dartmouth College in 1908 after receiving his A.B. degree at that institution in 1905. After graduation he joined the faculty of the State University of Iowa as instructor in descriptive geometry and was promoted until he became professor of hydraulics and sanitary engineering in the college of applied science at that institution.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Some Manufacturers' Problems

Manufacturers have their problems no less pressing in their way than those of the consumers. Of this fact, however, sight is frequently lost. For instance, take the matter of prices. Thus in a recent case which involved a contract for equipment and supplies to the amount of about $100,000, the manufacturer had to convince the prospective purchaser that he had only one price, and that that price was based on the highest quality plus a fair profit on the actual cost of production. There was to be no trimming of either price or quality. He got the contract.

It should be self-evident that manufacturers are interested in producing as cheaply as possible. In no other way can they stimulate or extend the market for their goods. Sight is often lost of this fact. Also things that redound to the benefit of the industry redound to the benefit of the manufacturers serving that industry.

The question to be answered in making purchases is not how cheap one can buy, but how well. Railways have been at great pains to secure rates which bring them a fair return and they should not begrudge a similar return to the manufacturer. One manufacturer of specialties recently expressed the fear that the publication of the statement of earnings of his company by the JOURNAL might be interpreted by some railways to mean that a reduction in price of his products was in order. This manufacturer is hardly to be blamed for that view. It is the purchasers who are to blame. Frequently they do not realize that the manufacturer's profit is based on a multiplicity of sales at a small profit on each, on which there would be no profit at all except for the ingenuity displayed by the producer in both his manufacturing and marketing operations.

Norma Company Changes Name

In order to realize the fullest value from its nationally advertised trademarks—"Norma" and "Hoffmann"—as well as better to describe the nature of its business, the Norma Company of America, Long Island City, N. Y., has changed its corporate name to Norma-Hoffmann Bearings Corporation. The management, personnel and policies will be the same as heretofore.

Some twelve years ago the "Norma" ball bearing was first introduced in America. To the original "Norma" line of open or separable ball bearings was later added a line of "Norma" closed or non-separable bearings, to meet the requirements of service where the latter, and more common type, is preferred. The company, in developing the market for its ball bearings, felt the need for a precision roller bearing for heavy loads and hard service. In order to meet this need, the company acquired, two years ago, the American rights in the patents, trademarks and business of the Hoffmann Manufacturing Company, Ltd., Chelmsford, England, large and well-known manufacturers of precision roller bearings.

To provide for the constantly growing demand for "Norma" precision ball bearings and to permit the manufacture of "Hoffmann" precision roller bearings and "Hoffmann" steel rollers, the company has just completed a new and modern plant on its 17 acres of property at Stamford, Conn., on the main line of the N.Y., N.H. & H. R.R.

Railways Buying Mack Buses

The International Motor Company has recently announced the purchase of a number of Mack buses by various electric railway companies. Among these are the Public Service Railway, Newark, N. J.; Boston Elevated Railway, Boston, Mass.; Connecticut Company, New Haven, Conn.; Pennsylvania-Ohio Electric Company, Youngstown, Ohio; Northern Ohio Traction & Light Company, Akron, Ohio; Beaver Valley Traction Company, Pittsburgh, Pa.; Chicago, South Bend & North Indiana Railway, Chicago, Ill.; Illinois Power & Light Company, Decatur, Ill.

Standard Invoice Form Recommended

The use of a standard invoice form is being strongly advocated by the National Association of Purchasing Agents. It is said that this would result in material savings in the purchasing and accounting departments of large corporations. It is pointed out, moreover, that the adoption of a form of the kind suggested would do away with the use of what are generally known as buyers' invoice forms. These latter forms are used by certain corporations in connection with their purchases. This practice is very distasteful to selling organizations, as the customer's private invoice forms are inclosed with every purchase order, and the vendor must render his invoices on those private forms. The great difficulty in the use of those forms comes from the fact that the customer's name is printed on the forms and the name of the vendor rendering the invoice must be typewritten thereon. Consequently any carbon copy retained by the vendor shows his own name but not that of his customer, and the carbon copy is of little value to the vendor as being an exact reproduction of the invoice he has rendered. Further than that, the carbon copy, having no trace of the printed portions of the invoice forms, leaves a lot of figures such as order numbers, requisition numbers, etc., without anything to indicate what they represent, so that the vendor is not able to distinguish his own order number from that of his customer. Again, the carbon copy made in this way does not tie into the regular accounting system of the vendor, so he is obliged, for his own benefit, to bill everything on his own forms, thus duplicating the billing operations. After the billing operation is completed a careful check must be made to see that the billing retained in the vendor's files agrees exactly with that sent out on the customer's private invoice form. The advocates of the use of the new form contend that all of this economic loss would be obviated if all invoices were rendered on the National standard invoice form.

Equipment Company Files Petition in Bankruptcy

The National Safety Car & Equipment Company, St. Louis, Mo., has filed a voluntary petition in bankruptcy with the United States District Court in St. Louis, listing its liabilities at $124,072, with book assets of $142,438, of which more than half represents unsecured bills receivable. The company manufactures railroad safety devices.

The petition indicates that the company's troubles have been due largely to inability to collect claims from debtors. The largest single claim listed as an asset is one for $79,069.

Pole Plant Sold

The Massey Concrete Products Corporation, Chicago, has sold to the Westinghouse Electric & Manufacturing Company its entire interest in the manufacture and sale of "Hollowspun" concrete posts and poles, including its plant at Milwaukee. The sale in no way affects the activities of the Massey company in its twelve other plants, where reinforced concrete pipe, piles, cribbing, signal material and other similar products for railroads and industries are manufactured.

Still Coming

All records for the sale of exhibit space at the Atlantic City convention have already been broken and applications are still coming in. At present, two months prior to the convention, approximately 77,000 sq.ft. of space has been assigned, whereas the total for last year, which was the record, was only 75,681 sq.ft.

Metal, Coal and Material Prices

Metals—New York	Aug. 5, 1924
Copper, electrolytic, cents per lb.	13.375
Copper wire base, cents per lb.	15.00
Lead, cents per lb.	7.50
Zinc, cents per lb.	6.51
Tin, Straits, cents per lb.	52.00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	2.075
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.70
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons.	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N. Y., cents per lb.	17.75
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.05
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.625
Turpentine (bbl. lots), N. Y., per gal.	$0.84

Rolling Stock

York Railways, York, Pa., has announced specifications on the three interurban cars and the two city cars referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 2. The details of the three suburban cars are as follows:

Date order was placed	July 22, 1924
Date of delivery	Nov. 1, 1924
Builder of car body	J. G. Brill
Type of car	Passenger
Seating capacity	52
Weight:	
Car body	15,140 lb.
Trucks	10,760 lb.
Equipment	10,100 lb.
Total	36,000 lb.
Length over all	47 ft. 6 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 11⅝ in.
Height rail to trolley base	11 ft. 3⅜ in.
Interior trim	Mahogany
Headlining	White enamel
Roof	Arch
Air brakes	G.E.
Axles	A.S.T.M.—A-20-21
Bumpers	5-in. channel
Car signal system	Farraday
Car trimmings,	Aluminum and bronze nickle-plated
Center and side bearings	Brill
Conduits	Duraduct
Control	K-35
Couplers	Brill
Curtain material	Pantasote
Destination signs	Keystone illuminated
Door-operating mechanism,	National Pneumatic
Fenders	Providence
Gears and pinions	G.E. helical
Hand brakes	Peacock drum
Heater equipment	Consolidated
Headlights	Golden Glow
Journal bearings	M.C.B.
Journal boxes	Brill, semi-steel
Lightning arresters	G.E., Type MD
Motors	Four G.E. 247-A
Motors	Inside hung
Paint	York Railways standard green
Registers	International
Sanders	Ohio Brass, air-operated
Sash fixtures	Edwards aluminum
Seats	Brill reversible, rattan
Slack adjuster	Brill, air-operated
Springs	Brill graduated
Step treads	Alundum
Trolley catchers	Earle
Trolley base	U. S.
Trucks	Brill 77-E-1
Ventilators	Garland
Wheels	26-in., rolled steel
Power-saving device	Economy meters

The specifications for the two city cars are similar to those for the suburban cars, the differences being the dimensions, weights and type of motor, which are as follows:

Seating capacity	44
Weight:	
Car body	13,400 lb.
Trucks	9,760 lb.
Equipment	6,900 lb.
Total	30,060 lb.
Length over all	42 ft.
Motors	Four G.E. 264

An interesting feature is that one of the city cars will be equipped with Brill rubber cushion wheels.

Mexico Tramways, Mexico City, Mexico, decided some time ago to purchase a number of motors for the larger cars and to transfer the present ones from these to cars of the smaller type so that they could be equipped with four instead of two motors. All double-truck cars will be equipped with four motors and air brakes.

Syracuse Railways Co-Ordinated Bus Lines, Syracuse, N. Y., subsidiary of the New York State Railways, has placed an order with the Brockway Motor Truck Company of Cortland, N. Y., for six chasses for operation on its lines in Syracuse. The bodies will be of standard city bus pattern, with entrance and exit at the driver's right to facilitate collection of fares. Leather-faced seats will be used; the seating capacity of each bus to be twenty-five persons.

Track and Line

New Haven & Shore Line Railway, Guilford, Conn., has recently completed a 4,000-ft. extension to Hammonasset Beach at a cost of $7,500. This extension forms a spur reaching the public picnic park maintained there by the State of Connecticut on Long Island Sound.

Interstate Public Service Company, Indianapolis, Ind., has started work on building the double track on Washington Street, Columbus, Ind. The laying of the track will be completed within two months.

Helena Light & Railway Company, Helena, Mont., will complete shortly the installation of new rails and paving on Sixth Avenue between Park Avenue and Main Street.

Johnstown Traction Company, Johnstown, Pa., has started work changing the location of the tracks of the Windber line between Bens Creek and Kauffman's Run. The track removal preparatory to improving the highway will cost between $40,000 and $45,000. New tracks are to be constructed to the left of the highway for approximately a mile and one half. A new bridge over Bens Creek is also to be constructed.

Winnipeg Electric Company, Winnipeg, Man., is completing construction of a double track extension from Academy Road to the south gate of Assiniboine Park.

Philadelphia, Pa.—The Department of City Transit has awarded contracts to the Keystone State Construction Company, for almost one-third of the construction of the four-track subway on Broad Street. The award covers the portion of the subway running from Stiles to Clearfield Street, a distance of 10,130 ft., or close to 2 miles. Contract 105-A covers the portion between Stiles and Dauphin Streets, the aggregate of the bid amounting to $7,660,648. Contract 105-B covers the distance from Dauphin to Clearfield Street, aggregating a cost of $6,554,451.50.

Power Houses, Shops and Buildings

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has awarded the contract for a two-story, 20-ft. x 60-ft. brick and concrete addition to the steam turbine room on St. Francis Street to Meredith Brothers. The architect's estimate was $50,000.

Union Traction Company, Anderson, Ind., has recently completed and put in service a new freight house at Muncie, Ind. The offices are in the center of the big building and overlook all parts of the structure. The freight house is one of the best equipped in the state of Indiana.

Sacramento, Cal. — Contracts have been awarded for the construction of a union electric railway terminal for the joint use of the Sacramento Northern Railroad, the San Francisco-Sacramento Railroad and the Central California Traction Company. The building contains a waiting room, offices, baggage department, café, stores and other conveniences. The investment in land and terminal facilities approximates $350,000. Wollett & Lamb are the architects for the terminal and the adjoining store buildings. The general contract for the terminal building has been let to George D. Hudnutt, Inc., for the sum of $54,487. The electrical work will be installed by the Latourrette-Fical Company for $3,064. F. H. Betz has been awarded the general contract for the adjoining store buildings, which will cost approximately $27,000.

Trade Notes

Industrial Works, Bay City, Mich., announces the appointment of Ridenour, Seaver & Kendig, Buffalo, N. Y., L. N. Ridenour, resident manager, as its representative in the Buffalo district.

H. L. Woolfenden has joined the Scott Valve Manufacturing Company, Detroit, and will have charge of sales promotion. Mr. Woolfenden is a graduate mechanical and electrical engineer. After several years spent as a consulting engineer in Detroit, he went to Denver in 1901 and engaged in engineering and contracting, later becoming associated with the Allis-Chalmers Manufacturing Company. While district manager at Denver, Mr. Woolfenden had charge of all sales and engineering work in the Rocky Mountain district.

E. Jones, formerly of the Chicago sales office of the B. F. Sturtevant Company, Hyde Park, Mass., has been appointed district sales manager of Missouri, Kansas and Nebraska, with headquarters in Kansas City.

Advertising Literature

Union Iron Works, Erie, Pa., has recently issued a booklet describing in detail the design and construction of its new Union universal boiler of the self-contained return flue type. The booklet shows interior and exterior views, as well as sections through the boiler, and a table gives data on all dimensions of importance.

American Locomotive Company and General Electric Company have reprinted in folder form an "ad" from the ELECTRIC RAILWAY JOURNAL on the Paulista electrification results.

Mica Insulator Company, New York, N. Y., has issued "Commutator Insulation and Assembly." This twenty-four page illustrated booklet describes the various grades of mica used for insulating commutator segments and tells how commutators are built up and baked after assembly. Information is also given on remedies for such defects as high or low bars, high mica, sparking, pitting and grounds.

New York, Saturday, August 16, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 7

There Is Room for Improvement in Bearing Maintenance Practices

ON MANY electric railways the interval between the times that it is necessary to give attention to bearings determines the overhauling and inspection periods for the rolling stock. Long life of bearings is, therefore, most essential. This issue of ELECTRIC RAILWAY JOURNAL contains the first of two survey articles relating to bearing practice. Information has been collected first hand by personal inquiries of the editors as to the methods used in preparing bearings for use before they are machined and refitted to the rolling stock.

The use of bearings consisting of a shell of bronze, iron or steel with a wearing surface of a soft tin or lead base metal is nearly universal in this country. In order to obtain satisfactory service from such bearings, close attention to their preparation is necessary. The three most important essentials are a good grade of babbitt metal, absolute cleanliness and close attention to the temperature at which the metal is worked. A satisfactory bearing can be produced only by a skilled workman using proper methods and suitable equipment.

Regardless of its qualities, babbitt will give but indifferent results unless poured at close to the right temperature. When overheated, babbitt loses part of the constituents essential to long service, and if poured too cold, it cannot produce a bearing of satisfactory texture. The survey shows that not enough attention is being given to this important detail. Less than one-third of the railways visited had melting pots equipped with temperature control. The method most commonly used for determining temperature consists of inserting a pine stick in the hot babbitt. If the stick catches fire the metal is assumed to be hot enough for pouring. While this test is crude enough, there is no test for overheating. Even the "pine-stick" test is seldom made.

Particular attention has been given, in most cases, to the quality of new babbitt metal purchased, but frequently insufficient care is exercised to keep the metal pure. Impurities enter through lack of attention in cleaning out the old babbitt from shells, in keeping the new metal in the pots free from contamination, in using dirty ladles and babbitting jigs and in careless work while tinning the shells. Some master mechanics who have had analyses made of babbitt metal taken from bearings have been surprised to find traces of iron and other metals foreign to the original mixture. For armature bearings, it is folly to attempt to mix new metal with old. An unsatisfactory bearing is sure to result.

Failure of bearings in service should be followed by a careful investigation and analysis of the methods and equipment being used in the babbitting department. Closer attention to the essentials may prevent the trouble and produce substantial savings, to say nothing of greater regularity of service—for in the end that is what counts.

Good Work by All Will Help Pay High Wages

AN EDITORIAL in these columns recently called attention to increases which have taken place in electric railway wages during the past twelve months. If the present high wages are to continue, the only way in which they can be paid is for the men to give the companies the very best and most loyal service within their power. They can help in many ways.

This help need not go so far as to advance the interest due on the bonded indebtedness of the company when its treasury is low, or of purchasing a large block of stock so as to vote into office a popular group of directors, though both of these things have been done by electric railway employees within the last few years. There are less spectacular but equally effective ways of helping the company's finances.

One way is to operate as economically as possible so as to keep down operating expenses. This means care in using power and supplies; care in operating without accidents to persons and property; notifying some responsible officer of the company of leaks which may be noticed in the expenditure and of defects which may be discovered in the equipment, so that they can be corrected promptly; of speeding up the service so that a greater number of car-miles can be operated in the same number of car-hours, etc.

It also means assistance to the company in increasing its gross receipts, as by courteous and attentive treatment of passengers on the car, of being on the lookout for waiting passengers, of standing up for the company and its policies in public and private meetings and at the polls if necessary, in helping to impress the public with the idea that an efficient and enterprising electric railway is an asset to every community and that the only way in which such an asset can be had is by fair treatment of it by the public.

The suggestions just made apply primarily to the platform man, but it is obvious that good work from the men in the shops, power station, construction force and offices is equally necessary. It should be a case of all pull together.

This applies also to the executive force, for it should be recognized that nothing is so effective in good team

This is the issue in August that is devoted essentially to maintenance subjects

work as the cordial co-operation and interest of the management. On a certain property, a platform man on one of the outlying divisions recently remarked that he had been with the company eight years, and during that time he had not seen any of the officials of the company at his division headquarters, with the exception of the master mechanic and the division superintendent. On another property, not far away, the general manager knew by sight practically every one of the 1,800 employees on the property and could call most of them by name. Although a good memory for faces and names is largely a gift, there is no reason why all the men should not at least know the manager by sight and feel that they can talk things over with him when they wish to do so. It is part of his job to have them know him, and his work will be accomplished far better if they are working with him.

Getting the Best Results from Reclaimed Oil

THE familiar quotation from Benjamin Franklin, "He has paid dear, very dear, for his whistle," shows that there has always been a tendency to misapply certain products or practices to uses for which they are not economical. The use of old material or reclaimed material for purposes to which it is not suitable in electric railway maintenance, may cost more in the long run than new material particularly adapted to the use desired.

The work of reclamation is to be commended and should be encouraged, but care should be used in applying the material not to put it to an inferior use or one for which it was not originally intended. In a recent survey article published in ELECTRIC RAILWAY JOURNAL mention was made of the fact that several railways were using reclaimed oil for various purposes. In a communication published in this issue of the JOURNAL it is pointed out that for many of the uses to which reclaimed oil was said to be put the particular type of lubricant was not suitable. Reclaimed oils of straight mineral character can be used for the same purposes as those for which the new oil was initially used, and with equal or even better results, but the benefits of reclamation may be lost through misapplication.

This illustration serves to bring out the point that master mechanics should consider the suitability of any material to be used as well as its initial cost as compared with that of new material. The manufacturers' engineers often spend considerable time and thought determining the particular product that will meet the railways' conditions most satisfactorily. If something unsuitable is substituted troubles and delays may occur that will prove far more expensive than the initial cost of the right material.

Systematic Inspection Pays Handsome Dividends

NO MATTER how good the component parts of electric railway equipment may be when purchased, they cannot continue to function indefinitely without proper inspection and repair. Both of these are important. Continuity of service, the aim of any management, depends on finding the possible failures before they occur and so repairing the parts that the cause leading to a failure is either removed or its effects counteracted so that the part can function successfully.

The efficiency of the car inspection department can be judged directly by the public in the number of failures or delays which occur in service. These are the result of the defects missed due to lack of inspection or improper repair of the parts inspected and found unfit. As a rule failures of this sort, if more or less regular in their occurrence, indicate that the inspection has been slighted, either through inefficiency of the force or through a short-sighted policy of the management in saving money for the moment.

A few illustrations will show that trivial causes may result in serious disruption of the service. In going over the records of one railway, several items appeared as causes of delays that would not have been possible with proper inspection. One of these was the wedging of doors due to worn races. Delays occurred at nearly every stop, so that the car ran considerably behind its schedule. Another delay was caused by a burnt-out lamp in the headlight circuit. This minor failure was allowed to go unnoticed until it was time to turn on the headlight. The result was considerable delay due to replacing the lamp. The two delays in question spoiled a monthly record that otherwise was excellent. They serve as a good example of the value of making sure that the inspection is carried through at the time designated, and that the repairs are carried out immediately when they are found to be necessary.

Clean Cars Increase Riding and Deteriorate Less Rapidly

THE many railways which are now making a special feature of keeping their cars clean and advertising this fact to their patrons report good results from such campaigns. Certainly the cleaner and better-looking cars are kept, the greater will be the attractiveness to car riders.

There still is room for improvement in methods of car cleaning on a large number of railways. If cars are to be kept clean, they should be washed frequently outside. To do this without considerable cost proper washing equipment is needed. One of the most efficient methods that has been used in a large number of shops and is being installed in many of the shops which are giving special attention to car cleaning consists of a washing section with perforated pipes connected to the city water system. Tracks set aside particularly for car cleaning are provided with proper drainage so that the car can be run through the spray from the pipes as many times as needed, while men with brushes clean the windows and woodwork.

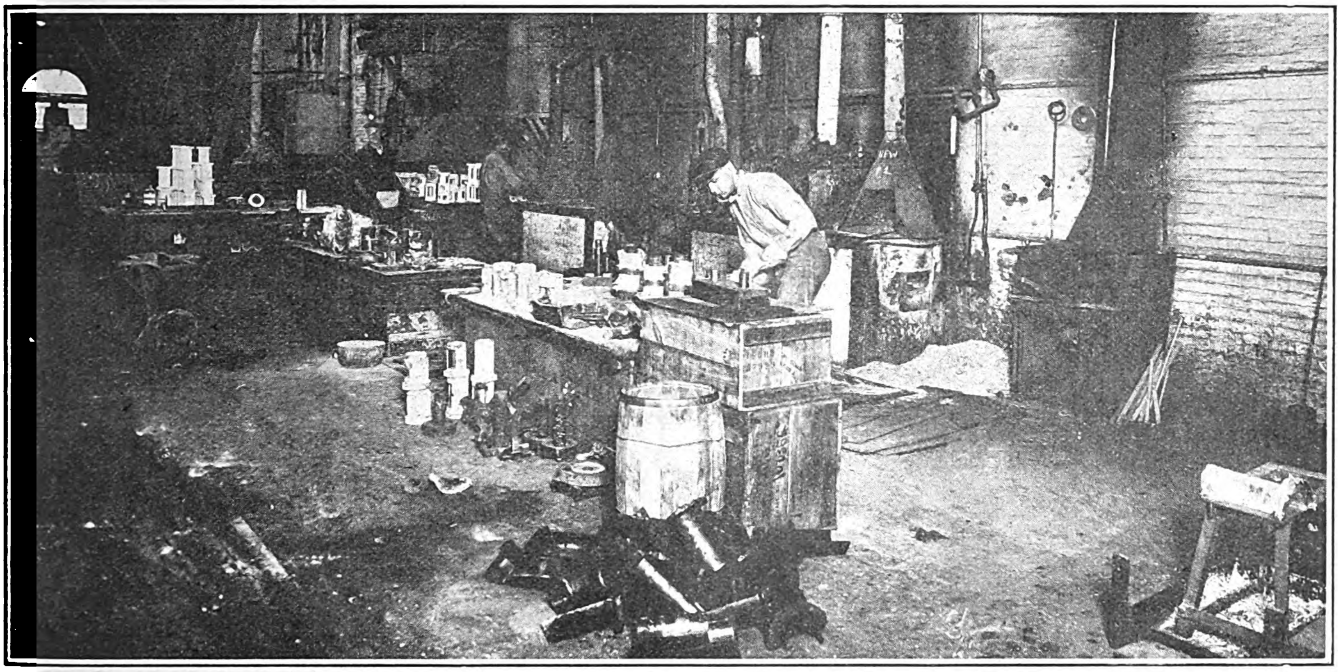
Another chance for improvement in cleaning practices is in the interior of the cars. Vacuum cleaning equipment has been used by several electric railways. The principal trouble experienced is that railways have attempted to use for this purpose equipment not particularly well adapted to the needs. There are several vacuum cleaners on the market, however, which have been worked out particularly for installation in shops where such work is done.

Aside from the increased riding and the merchandising value of clean, attractive cars, deterioration usually takes place more slowly. The dirt in corners collects moisture and leads to decay of posts and window framing on wooden cars and to rusting of various parts on steel bodies. By keeping cars clean such parts need less attention to keep them in repair and repainting can be done at less expense. Modernization in this respect will give results well worth the outlay.

Survey of Armature, Axle and Journal Bearing Practice

First Article

An Analysis of Types of Bearings Favored, Methods of Determining Wear and Removal of Bearings, Removing Old Babbitt, Cleaning and Tinning Shells, Babbitt Composition, Mandrels, Pouring the Babbitt—Practices of 20 Electric Railways Disclosed by Personal Visits of Editors Are Summarized



Babbitting Department of the Third Avenue Railway, New York City

REALIZING that the time between overhaulings of electric cars is governed principally by the life of the various bearings, a special study has been made of the bearing practice on twenty representative electric railways by personal visits of the editors of ELECTRIC RAILWAY JOURNAL. The practices found are in general quite uniform, but of course vary with the different types of equipment used and also with the types of bearings which are operated.

Most of the electric railway properties were found to have three types of bearings in service. These were (1) babbitted cast-iron or malleable-iron shells, (2) babbitted bronze or brass shells, and (3) solid bronze bearings. There is a general tendency away from the use of the babbitt-lined iron bearings, and either babbitt-lined bronze or solid bronze bearings are being substituted for those with iron shells. Of the 20 electric railways from which information was obtained, 12 were using all three types of bearings. Eight companies were using babbitt-lined bronze or solid bronze bearings exclusively. These are the Long Island Railroad; New York Central Railroad; Toronto Transportation Commission; Niagara, St. Catharines & Toronto Railway; Youngstown Municipal Railway, Illinois Traction, Inc., New York, Westchester & Boston Railroad, and the New York, New Haven & Hartford Railroad.

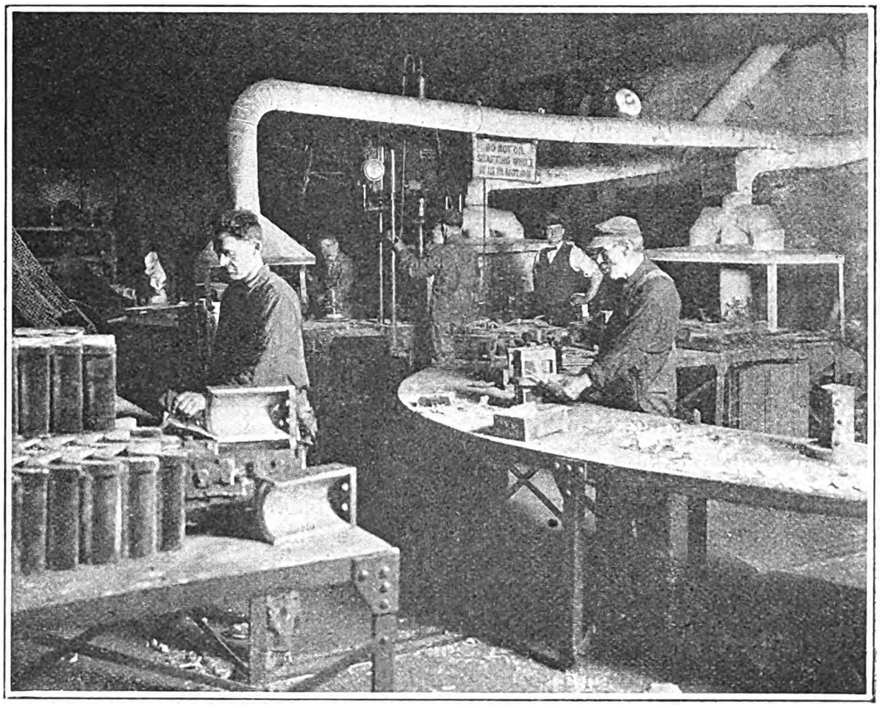
The bearing practice of electric railways is readily divided into five distinct operations: (1) Removal of the bearings from the cars, their gaging for wear and to determine their suitability for rebabbitting in order to return them to service; (2) removal of the old babbitt and preparation of the shells for rebabbitting; (3) where a babbitt lining is used, relining the shells with babbitt; (4) machining the bearings, cutting oil grooves and other work necessary to produce a finished bearing and (5) reinstalling the bearings in cars and making sure that proper fits are obtained. The first three of these operations will be analyzed in this article, and a subsequent article will deal with the machining and fitting of bearings after they have been babbitted.

TESTING MOTORS FOR ARMATURE CLEARANCE

As bearings do not wear uniformly, most electric railways find it necessary to check up the clearance between the armatures and the motor pole faces as a matter of regular inspection. The most common method of determining the clearance is to insert feeler gages of various thickness. Whenever a motor has so small a clearance that the thinnest of the feeler gages is the only one that can be inserted, the car is ordered in and the bearings are replaced. The thickness used for the thinnest gage was found to vary on the railway properties visited from a minimum of 0.02

in., used by the Omaha & Council Bluffs Street Railway, to 0.09375 in. on the Brooklyn-Manhattan Transit Corporation. On the majority of the roads the thinnest gage was approximately 1/32 in. Nearly all of the railways test for both top and bottom clearance, but the bottom clearance is the only one considered when replacing bearings. In addition to replacement for wear, bearings, of course, are removed when the equipment is overhauled, and in most cases the practice is to replace them with newly fitted ones.

After the bearings have been removed, the wear both inside and outside the shell must be determined and those bearings which are excessively worn and which cannot be rebabbitted with safety must be discarded or scrapped. The Third Avenue Railway and the Brooklyn-Manhattan Transit Corporation use snap gages for determining the wear on the outside of the various types of bearings. As soon as the bearings are removed, they are gaged, and if the snap gage for that particular type passes over the bearing, it is rejected. On some of the smaller railway properties, the suitability of a bearing shell for rebabbitting is judged entirely by looking at the shell and determining its thickness. Of course the inside lining of the shell can be rebabbitted so as to provide a proper fit for the axle, but the outside wear can only be taken up by using shims between the bearing and housing or by building up and remachining the parts which fit together. The various methods used and results obtained will be considered in the second article.



Circular Benches Around the Babbitting Pot Make a Convenient Arrangement in the Eastern Division Repair Shop of the Brooklyn-Manhattan Transit Corporation

The next operation is that of removing the old babbitt and preparing the shell for rebabbitting. In most railway shops there is a pot with old babbitt and the bearings are dipped in this until the temperature is high enough to melt out the lining. In Toronto the lining is melted out in a special gas furnace so that the metal is run off into molds as soon as it melts, preventing overheating and burning. The removal of babbitt metal by the use of a hammer and chisel has been quite generally discarded, as this not only entails considerable labor, but there is danger of damaging the shell. It is also a difficult matter to chip babbitt from anchor holes and grooves.

CLEANING THE SHELLS AN IMPORTANT ELEMENT

After the old babbitt has been removed, the next step is to clean the shells of all dirt, sand, scale, rust, oil and grease. Oil and grease are quite generally removed by burning or by dipping in the babbitt pot. Sand, scale and rust are most frequently removed with a wire brush or a stiff bristle brush. On the Third Avenue Railroad and the Georgia Railway & Power Company the bearings are sand blasted. Oil and grease are sometimes removed by dipping the bearings in saturated caustic soda solution. In Omaha the bearings are boiled in Wyandotte alkaline solution manufactured by the J. B. Ford Company, Wyandotte, Mich., after they are brushed off. The pickling of bearings by immersing them in dilute sulphuric acid is not generally practiced except where they are in bad condition. Where acid dips are used, they should be followed immediately by a thorough washing of the bearings in clean water.

For the information of those who find it desirable to clean their shells in some sort of solution, a sulphuric acid solution which produces satisfactory results can be made by taking 10 gal. of 66 deg. B. commercial sulphuric acid to 100 gal. of water. The specific gravity of this solution is 1.072 at 86 deg. F. and 1.08 at 154 deg. F. Best results are obtained by maintaining this solution at a temperature of from 140 to 176 deg. F. when in use.

A satisfactory hydrofluoric acid solution can be made in the proportion of 11 gal. of 16 deg. B. commercial hydrofluoric acid to 100 gal. of water. The specific gravity of this is 1.015 at 61 deg. F. and 1.005 at 124 deg. F. This solution should be maintained at a temperature of 104 to 140 deg. F. while in use, and should be replaced when it takes on a brownish color.

TINNING BRONZE SHELLS

Where bronze or brass shells are used for bearings, it is the universal practice to tin the surface to be babbitted to hold the lining firmly in place. Cast-iron and malleable-iron shells are not tinned, but dovetail grooves or anchor holes are used for retaining the babbitt. The tinning practice includes three principal methods. The larger electric railways, such as the Chicago Surface Lines, the Milwaukee Electric Railway & Light Company and the Third Avenue Railway, which have many shells to be tinned at one time, invariably dip them into a pot of hot solder, which is maintained at a temperature of from 792 to 824 deg. F. The smaller electric railways such as the Eighth Avenue Railway and the New York & Queens County Railway, usually apply the solder by taking a bar and melting it with a hot soldering iron or else by heating the shells and applying the solder to the parts which are to be tinned, which is standard practice in Memphis and Atlanta. The hot shell then melts the solder. Of course it is necessary to use a flux on the parts to be tinned. This usually is a saturated solution of zinc in hydrochloric acid. The most common method of applying the flux is to swab it on.

Where shells are dipped in the soldering pot, it is necessary to coat the parts which are not to be tinned with some mixture which will prevent the tin from sticking where it is not desired. The most common material used is whiting or chalk. In Milwaukee a mixture of fireclay and water is used. Some railways use a thin mixture of graphite and water. After the parts have been coated and the flux applied, they can be dipped in either the soldering pot or in the babbitt pot and they should be left in until they are just hot enough for the molten metal to run off. After they are removed, it is the general practice to rub with the zinc chloride solution so as to make sure that there are no untinned spots left on the surface to be babbitted. In Brooklyn it is the practice to dip new shells twice in the solder where they have not been tinned previously.

After the tin has been properly applied, the surface should not be touched, but should be babbitted immediately. Possibly the most common mixture used for tinning is plumber's solder, half tin and half lead, although some roads vary these proportions. One manufacturer recommends using 35 per cent tin and 65 per cent lead. The Milwaukee Electric Railway & Light Company uses 90 per cent tin and 10 per cent lead. It is stated that the small quantity of lead is used in order to prevent contamination of the babbitt with the lead from the tinning.

Babbitting the Bearing

It is the usual practice to follow with the babbitting while the shells are still hot from the tinning operation, the babbitting jigs and mandrels having been previously prepared to receive the shells. Of the 20 railways from which information was obtained, 14 followed this method. In Memphis, Omaha and Milwaukee, the bearings are placed on a shelf around the babbitting furnace. The New York Central Railroad and the New York & Queens County Railway preheat by means of a torch. In Toronto shells are preheated in the furnace used for melting out old babbitt. The mandrels are preheated to prevent chilling of the babbitt when it is poured. The usual method of doing this consists of standing the babbitting jig on a shelf adjacent to the babbitting pot. Some railways have babbitting furnaces with ovens and the jigs and mandrels are placed in these for preheating. Mandrels for solid bronze shells should be heated to approximately 212 to 257 deg. F. and split bronze shells are usually heated to a somewhat higher temperature. Mandrels for use with malleable iron shells are sometimes heated to as high as 572 to 662 deg. F. Where bearings are tinned and then set away before the babbitting operation, it is of course necessary to preheat them specially before the babbitt is applied.

The mandrels are made with an allowance for boring the rebabbitted bearing. The information obtained shows that this allowance varies from 1/16 in., which is used in Omaha, to 3/8 in., which is allowed by the New York & Harlem Railroad. The majority, however, make an allowance of 1/8 in. under that of a new shaft. Most electric railways are using undersized shafts for some motors. Where bearings are fitted to these, of course, a smaller amount of the babbitt is bored out.

TABLE I—BABBITT COMPOSITION AS USED ON 20 ELECTRIC RAILWAYS

Company	Composition in Per Cent Tin	Lead	Antimony	Copper	Remarks
Brooklyn-Manhattan Transit Corporation	83⅓	....	8⅓	8⅓	....
Chicago Rapid Transit Co.	89	....	7	4	....
Chicago Surface Lines	83⅓	....	8⅓	8⅓	....
Denver Tramway					
Armatures	...	....	...	..	More-Jones metal
Axles, old standard	86¾	3	7	3¼	....
Axles, new standard	22	64½	13	½	....
Eighth Avenue Railway					
Armatures	...	....	...	..	More-Jones metal
Journals	...	....	...	..	Brill and More-Jones
Georgia Railway & Pwr. Co.					
Armatures	...	....	...	..	Westinghouse metal
Axles and journals	...	....	...	..	More-Jones metal "Regent"
Illinois Traction, Inc.	86	....	9	5	....
Long Island Railroad					
Armatures and axles	85	....	...	..	Antimony and copper to make 100 per cent
Journals	...	....	...	..	Zero metal
Memphis Street Railway	...	....	...	..	More-Jones metal
Milwaukee Electric Railway & Light Company, The	83⅓	....	8⅓	8⅓	....
New York Central Railroad					
Armatures and axles	...	....	...	..	Tin base
Journals	...	....	...	..	G. E. lead base
New York & Harlem R. R.	...	....	...	..	Tin base
New York, New Haven & Hartford Railroad	...	....	...	..	Tin base
New York & Queens County Railway	...	....	...	..	Tin base
New York, Westchester & Boston Railroad	83⅓	....	8⅓	8⅓	....
Niagara, St. Catharines & Toronto Railway	...	....	...	..	Hoyt's formula
Omaha & Council Bluffs Street Railway					
Armatures	84	....	10	6	....
Axles	5	80	15	..	....
Third Avenue Railway	...	....	...	..	Tin base
Toronto Transportation Commission	83⅓	....	8⅓	8⅓	....
Youngstown Municipal Ry.	...	....	...	..	Special nickel-bronze

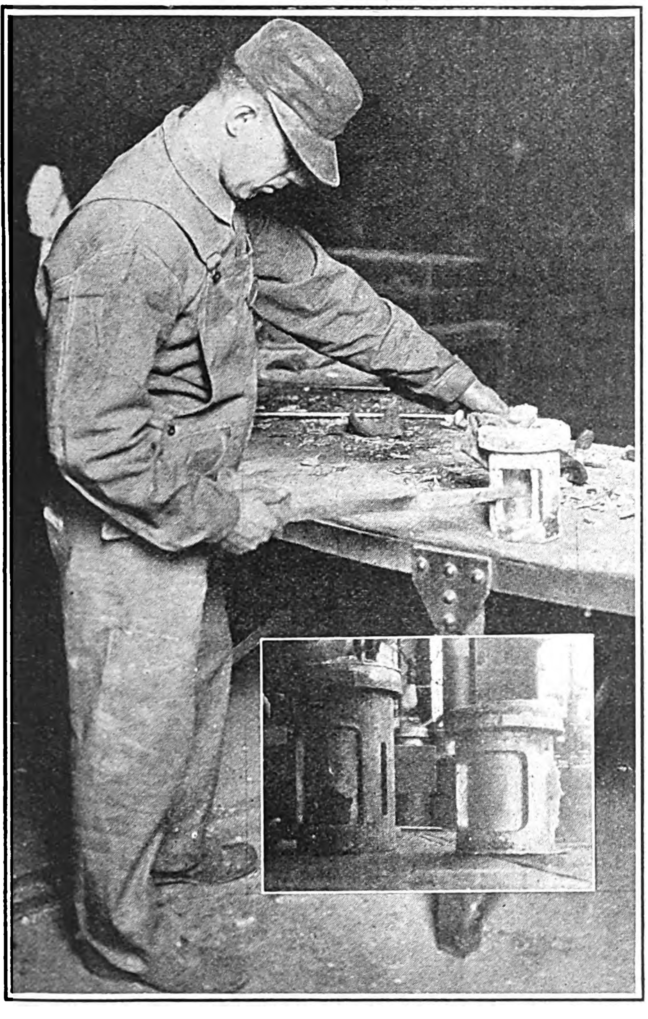
Some railways take special precautions to prevent the sticking of the babbitt to the mandrel and also to prevent blowholes in the babbitted portions. It seems to be quite general practice to provide the mandrels with a slight taper to assist in their removal, and to keep them highly polished and oiled frequently. Some reported that they paint the mandrels with graphite and oil every morning before starting to pour the babbitt. The Brooklyn-Manhattan Transit Corporation uses a solution of fireclay and dips the mandrels in this solution about every fourth pouring. This railway also states that the use of fireclay materially assists in preventing blowholes, as it gives a very smooth finish to the babbitted portion. The majority of railways, however, report that no special precautions are taken with the mandrels to prevent blowholes, but they make certain that the babbitt is thoroughly mixed by agitating the molten metal just previous to filling the ladle. Blowholes are frequently caused by damp or wet mandrels or dampness in the bearings themselves. If the mandrels and bearings are carefully preheated they naturally will be dry.

Formulas Used for Babbitt

A large variation was found to exist in the formulas used for babbitt by the different railways. The majority of those visited, however, preferred a tin base babbitt metal. Of the railways using the tin base metal, the percentage of tin varies from 83⅓ per cent to 86 per cent, with antimony varying from 8⅓ per cent to 10 per cent, and copper varying from 4 to 8⅓ per cent. The formula frequently referred to as genuine babbitt is quite commonly used. This consists of 83⅓ per cent tin, 8⅓ per cent antimony and 8⅓ per cent copper. The composition used by each of the companies included in the survey is given in Table I.

Several of the railways using a tin base babbitt metal exclusively for their armature bearings include a small amount of lead for their axle and journal bearings and obtain good results. The small railways are nearly all buying standard babbitt metal as furnished by the various manufacturers. These include a great many varieties with special trade names and distinctive qualities. They usually contain from 80 per cent to 90 per cent of tin or lead as their principal element. The larger railways, however, make their own babbitt metal according to the proportions which they find most satisfactory.

Of the railways from which information was obtained, fifteen reported that they used old babbitt, while five, including the Chicago Surface Lines, the New York Central Railroad and the Long Island Railroad, make no use of second-hand babbitt. Of those using old babbitt, six use this for all bearings, four use it only for axle bearings, four use it for both journal and axle bearings, and one railway employs the babbitt for miscellaneous uses such as sash weights and other parts of similar nature required about the shop. The Chicago Surface Lines returns the old metal to the manufacturer for reconditioning.



After Pouring the Babbitt, Various Fins and Excess Babbitt Around Windows and at Edges as Shown in the Insert Must Be Removed. This Can Be Done Most Conveniently by Use of a Hot Iron as Shown

The temperature at which babbitt metal is poured into the bearing is vitally important. Manufacturers recommend that the babbitt metal be not allowed to become hotter than 914 deg. F. Information obtained in this survey indicates that temperatures ranging from 700 deg. to 900 deg. F. are used, but as more than half of the properties were using babbitting pots not equipped with pyrometers, accurate information was not available. Railways which do not have pyrometer equipment in connection with their babbitting furnaces quite commonly use a pine stick for determining the temperature of the babbitt. If the stick starts to blaze when it is inserted in the babbitt pot the metal is considered to be at a sufficiently high temperature to pour. Of the railways visited, only six had babbitting departments equipped with pyrometers. All, however, realize the advantages of temperature control and several expect to install it soon.

The babbitt metal should be agitated at frequent intervals and always just before using, particularly if it has been standing in a molten condition for a considerable length of time. Where the babbitt pot is used infrequently, a covering of charcoal is frequently used to prevent the formation of dross. A common method of supplying this is to add a few handfuls of sawdust or oak shavings. The hot metal, setting fire to this, produces a covering of charcoal. The New York Central Railroad prevents oxidation by throwing a handful of sal-ammoniac onto the molten babbitt and stirring it in.

In order to insure that none of the dross enters the bearing while it is being poured, six of the 20 railways use self-skimming ladles. These ladles have a bridge extending down inside from the lip, so that the babbitt metal is taken from near the bottom instead of from the top of the ladle. In pouring, the babbitt should run from the ladle in a steady stream directly down along the mandrel to avoid splashing or pocketing of air. If the metal is splashed against the mandrel, it will cause blowholes and give a mushy bearing. Ladles should be kept in proper repair, and the lips free from burrs or other irregularities in order that the babbitt metal may be poured in a smooth round stream.

It is almost universal practice to pour all bearings in a vertical position unless the shape of the bearings makes this position inadvisable, in which case the bearing is inclined at an angle most suitable and convenient for pouring. Split bearings are commonly poured by placing the two halves together in a babbitting jig and pouring the two halves at one operation. A few railways, among them the Chicago Rapid Transit Company, pour each half of the axle bearing separately, and in this case the parting face is usually placed down. Several railways have special jigs for their axle and journal bearings, so that the metal is poured into these with the bearings in a horizontal position. In babbitting armature bearings, the practice of the various railways visited appears to be about equally between pouring with the flanged end up and down.

More than half of the railways visited babbitt the ends of the flanges on armature bearings in order to provide for wear at this point. Where the end flanges are babbitted, it is quite convenient to pour these with the flanged ends up, since the thickness of the metal applied to compensate for end wear will vary considerably. Of the railways which do not babbitt the end flanges of axle bearings, four build these up by welding on additional bronze and remachining. The New York Central Railroad turns off the flange and then sweats on a new collar.

In babbitting journal bearings, it is universal practice to allow a small clearance at the edges so as to provide for the entrance of oil as the axle rotates. This clearance is commonly taken care of by the mandrels, although in a couple of instances the railways scrape out a small quantity of the babbitt and round the edge.

In order to prevent babbitt metal from flowing out at the windows and at the edges, fireclay is frequently applied to the parts where there is excessive clearance with the babbitting jigs. After the bearings have been babbitted, the fins, burrs and excess babbitt are most commonly removed by using a hot iron. One railway reported that it filed and chipped off any excess babbitt, and another has a pneumatic tool for removing excess metal.

Some of the special practices used by various railways are of particular interest. Following are some points in babbitting practice followed on several of the railways. These illustrate how varying conditions influence the best methods to be used.

MILWAUKEE BABBITTING PRACTICE

From the pouring of the shell to the time the bearing goes into service on the motor, the details of its construction are under engineering supervision in the Milwaukee shops. Samples of the brass and babbitt compositions are subjected to chemical analysis in order to see that the standard is being maintained.

The bronze used for shells and linings consists of 85 per cent copper, 5 per cent tin, 5 per cent lead, and 5 per cent zinc. Fully six tons of this composition is poured a month for bearing purposes, of which approximately 50 per cent has been salvaged from wornout shells.

All babbitting of old and new brasses is done in a small room adjacent to the foundry. It contains the tinning pot, the babbitt pot and also the bench with three air-operated mandrel extractors. The new bearing shell is placed on the brickwork near the tinning pot to pre-heat it somewhat prior to tinning. As it has been previously rough turned both outside and inside, the proportions of the bearing not to receive tinning are coated with a solution of fireclay, applied by means of a brush. The bearing is then dipped into a tinning solution of 90 per cent tin and 10 per cent lead. This low quantity of lead has been used to prevent contamination of the babbitt with lead. If complete tinning has not been effected it is replaced in the tinning metal and the process repeated.

In addition to the anchorage offered by tinning, anchor grooves are cored into the shell to prevent the rotation of the babbitt lining. On a solid armature shell these grooves are made up in two parts, extending around the interior bore approximately ¾ in. from each end. Four longitudinal grooves connect with those which follow the contour of the shell, thus preventing the babbitt from turning or from sliding out of the end of the shell. While it is almost impossible to tin these grooves, the babbitt keys in to form an anchor. For split armature bearings the same style of grooving is used, but for journal bearings only longitudinal grooves are provided. These are somewhat heavier than those employed in armatures.

The mandrel used in Milwaukee, which is hollow, screws onto a piece of pipe fastened to the cylinder of the air-operated extracting device. A steel cover is held in place over the bearing window by means of a C clamp. With the mandrel and bearing in this position the babbitt is poured. Its temperature is held at 750 deg. F. as indicated by a pyrometer in the babbitt pot.

After the babbitt has set the mandrel is removed by means of an air-operated extractor. An adjustable hand clamp is placed over the top of the hollow mandrel and the C clamp is removed. When air is admitted to the cylinder, the piston is forced upward, causing a rod first to strike a plug which knocks out the window cover, and then to hit the cross-bar of the hand clamp, raising the finished bearing off the mandrel by means of the two tongs which engage the collar. Having a foot control this operation is accomplished very quickly. It is similar to that used in Cleveland, except that there the mandrels are pulled out instead of being pushed out, as in Milwaukee.

TABLE II—BOARD SHOWING PARTS USED FOR BABBITTING BEARINGS IN EAST NEW YORK SHOP OF BROOKLYN-MANHATTAN TRANSIT CORPORATION

	BGS.		Babbitting Tool	Numbers	
Type Motor	End	Mtl.	Broach	Mandrel	Base
West. 81	C E	BZ	6	19	30
	P E	BZ	7	20	55
West. 93	C E	BZ	7	20	31
	P E	BZ	1	14	32
	C E	..	7	47	33
	P E	..	1	48	34
West. 101	C E	BZ	8	21	35
	P E	BZ	8	21	35
	C E	CI	8	49	36
	P E	CI	8	49	36
West. 49	P C	..	4	17	59
West. 68	C E	Mall. I	4	17	29
	P E	Mall. I	5	18	54
G. E. 57	C E	BZ	1	44	45
	P E	BZ	8	50	46
G. E. 64	C E	BZ	5	18	39
	P E	BZ	7	20	59
G. E. 80	C E	BZ	4	17	40
	P E	BZ	8	21	56
G. E. 234 A	C E	BZ	12	58	52
	P E	BZ	8	21	57
G. E. 800	C E	BZ	13	26	43
	P E	BZ	13	26	43
West. 50B	C E	CI	1	14	27
	P E	CI	2	15	28
West. 50E	C E	CI	1	14	27
	P E	CI	3	16	53
West. 50L	C E	CI	1	14	27
	P E	CI	3	16	53
West. 300	C E	BZ	9	22	37
	P E	BZ	10	23	38
Walker L 15	C E	BZ	12	25	41
	P E	BZ	8	21	42
G. E. 212 and 248	C E	BZ	1	14	60
	P E	BZ	2	15	61

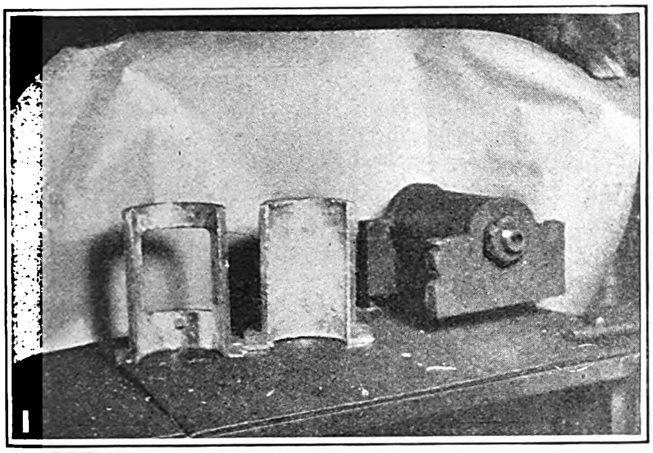
BABBITTING DEPARTMENT OF THE BROOKLYN-MANHATTAN TRANSIT CORPORATION

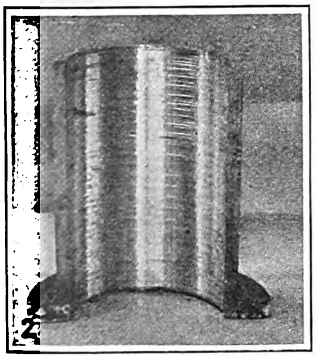
The Eastern Division repair shop of the Brooklyn-Manhattan Transit Corporation contains one of the most complete babbitting departments of any visited in this survey. Bearings are babbitted in this shop for all subway, elevated and surface cars of the system. The equipment consists of two babbitting furnaces and a tinning furnace, with semicircular benches for the workmen immediately in front. The semicircular bench is of particular benefit, since a man can reach all parts of it with very few steps from the furnace. Each babbitting furnace has two pots, one for armature bearings and the other containing a mixture with second-hand babbitt for axle bearings. As more armature bearings are turned out than axle bearings, workmen at both furnaces work on armature bearings regularly, and on journal bearings whenever opportunity presents.

All babbitting pots are provided with recording pyrometers. Smoke charts are used. They are taken off at the end of each working day, 4:30 p.m., and then dipped in a thin solution of shellac to make the record permanent. New charts are put on the pyrometers each morning at 7 o'clock. When removed the charts are dated, signed with the initials of the foreman, and the number of the furnace and a record number also added. Genuine tin base babbitt is used in Brooklyn.

Each bench is provided with a box of snap gages. When bearings are received in the babbitting department they are gaged, and any over which the snap gages will pass are thrown aside for scrapping.

A carefully worked-out system for keeping track of babbitting jigs and mandrels is used in the babbitting department. Each part is numbered and is placed in a definite location on storage shelves. A large board occupies one side of the babbitting department. On this is a tabulation in large numbers showing the various mandrels, bases and bands which should be used for each particular type of bearing, as shown herewith in Table II. The columns give the type of motor; the particular type of bearing which is to be babbitted, such as commutator end or pinion end, the material which is used for the bearing shell; the numbers of the various broaches used; the numbers for mandrels, and the numbers of bases. Thus, if a commutator end bearing for a Westinghouse No. 81 motor is to be babbitted, the workman uses mandrel No. 19 and base No. 30. This method reduces the number of the various parts and makes it easy for the workman.





Babbitt Bearings in Chicago Rapid Transit Company Shop

No. 1. Axle bearing shells are babbitted in especially constructed horizontal mandrels producing a surface which requires no finishing.

No. 2. The anchorage used in the bearings extends within ¼ in. of each end.

No. 3. A preheated mandrel is used for babbitting armature bearings.

Bearings are poured with the babbitting metal at a temperature of 860 deg. F. The pyrometer records which were in place showed a variation of from 800 to 900 deg. Whenever new babbitt is added to the pot, the temperature drops but it is quickly brought up to the required temperature of 860 deg.

All armature bearings are poured in a vertical position with the small end down. In pouring split bearings, the flange or collar end of the bearing is down. The end flanges of armature and axle bearings are babbitted to provide for wear. After pouring a bearing, the burrs at the edges of the mold and at the bearing windows are removed by hot irons. A large forcing press is located between the two babbitting furnaces which is used for the removal of mandrels after the bearings have cooled. Equipment for grinding out excess babbitt by means of wire brushes is also included as a part of the babbitting department's machine tools.

OMAHA USES CAST-STEEL HOUSINGS

Babbitt-lined cast-steel shells are used entirely for axle bearings in Omaha, except where the diameter of the axle is so close to that of the bearing housing that there is not room for the babbitt-lined shell, in which cases ordinary bronze axle bearings are used. The minimum difference in diameter between the interior of the bearing housing and the axle which is considered sufficient to permit the use of babbitt-lined steel bearings is 1 in. Since the practice is to use from 3/16 to ¼ in. of babbitt in such bearings, the minimum amount of babbitt allows 5/16 in. thickness for the cast-steel shell. If the clearance between the axle diameter and the bearing housing bore is less than this, the solid bronze type of bearing is used without babbitt. This is true of some types of motors in service, where it has been necessary to increase the axle diameter, so that there is insufficient room for the standard babbitt-lined steel bearings. Similar babbitt-lined steel bearings are used for armatures, except where the bronze bearing supplied with new motors are still in use. All journal bearings are babbitt-lined bronze.

Anchor holes are cast directly in the steel shells of axle bearings and a special groove is cut with a shaper longitudinally on the inside face. This also acts as an anchor to hold the babbitt in place. This groove is kept close to the edges on each half of the axle bearings. A special type of internal clamp is used to hold the two halves of the bearing together while they are being machined. Anchor holes are drilled in bronze bearings, consisting of 10 to 12 holes of about ½ in. diameter in each half, made as deep as practicable without allowing them to go through the shell.

ILLINOIS TRACTION PRACTICE

The practices in the manufacture and installation of bearings by the Illinois Traction, Inc., established some years ago, have resulted in an enviable record of no service failures from burned-out bearings due to the armature dropping upon the pole pieces. The finished bearing gives a life, with proper lubrication, of approximately 120,000 miles of service.

Following the customary method of tinning, the bearing is allowed to stand until the tin begins to solidify. This cooling of the bearing is considered an important factor in the successful pouring of babbitt and insures uniform cooling of the poured babbitt producing a homogeneous solid. If the babbitt cooled too slowly, the heavier ingredients would settle to the bottom of the lining.

A cast-iron mandrel is preheated to a temperature of approximately 300 deg. F., the temperature to which the bronze shell has been previously cooled, and then is placed in the center of the bronze shell. The mandrel is coated with a thin graphite solution to prevent blowholes in the babbitt.

As there is a foundry in the shop, it is possible to utilize scrap bronze shells in the manufacture of new ones. As high as 50 per cent of the composition is scrapped shells, while the remainder is of the following composition: copper 84 per cent, tin 12 per cent, zinc

3.5 per cent and lead 0.5 per cent. Most of the copper used in this composition is reclaimed from armature and field coils. This makes it necessary to deoxidize the composition and also eliminate to some extent the phosphorus present in the copper. A solution of muriatic acid and zinc chloride is used for this purpose, three ounces to 100 lb. of metal being the proper amount. Borings from the machine shop are also used. These are passed through a magnetic separator in order to eliminate the iron and steel, and then are placed directly into the furnaces. Often as much as 25 per cent of the composition is made up of borings.

The foundry has two coke furnaces with a capacity of 175 lb. each. The total amount of bronze poured per day amounts to 800 lb. This output includes bronze bearing shells, trolley wheels, and other small car parts.

Motor axle bearings are not babbitt lined, but are of the same composition as the armature bearing shell. These are cast in the foundry and are machined to the proper size. The company does not make its own journal bearings, purchasing standard M.C.B. brasses ready to insert in the box.

CHICAGO RAPID TRANSIT COMPANY EXPECTS BEARING LIFE TO EXCEED OVERHAUL PERIOD

On some divisions of the Chicago Rapid Transit Company's lines, the babbitt-lined armature and axle bearings of the motors have a life in excess of the mileage run between motor car overhaulings. While this practice was formerly the standard on the entire system, the company is now experimenting with a solid bronze bearing sleeve which has proved very successful on one division.

At the Metropolitan Division shops, the babbitting and rebabbitting processes are carried on in the conventional manner. In the case of armature bearings, the babbitt is poured around a steel mandrel, while the window in the shell is closed by means of a wood block. Axle bearings are originally of solid bronze and are babbitted only after the wear is in excess of $\frac{1}{8}$ in. A special mandrel of the exact size of the axle is used which holds the lining in a horizontal position while the babbitt is poured, and gives a $\frac{3}{32}$ in. thickness of babbitt around the inside bore and on the end-thrust collar. These bearings are rebabbitted until they fail mechanically. Some axle bearings used by this company do not lend themselves readily to rebabbitting and are therefore scrapped after they have received the initial wear.

In preparing either armature or axle bearing shells for babbitting a similar procedure is followed. With new armature bearings from manufacturers specializing in this work, the inside bore is given a rough cut to within $\frac{1}{4}$ in. of each end to provide an anchorage for the babbitt lining. The cut is made on a lathe with the feed set to give approximately four cuts to the inch. With the shoulders left at the ends and this rough spiral cut, the babbitt is held securely in place and no trouble has been had with loose babbitt. As a final test, before the bearing is placed in service, it is suspended and struck a light blow with a hammer. If it produces a clear ring like a bell the babbitt has a complete amalgamation with the shell; otherwise it is an indication that there is an air pocket or loose spot between the babbitt and the shell.

After the shell has been prepared by the anchorage cut, it is not necessary to recut the grooves throughout the useful life of the bearing.

With this type of bearing, records indicate that with proper oiling, a life of over 100,000 miles is obtained consistently. As this is the mileage which is used as a basis for overhauling motor car equipment, there is little necessity for having a bearing with greater life. At the overhauling period, it is the practice to replace all bearings on the car and to fit each individual armature bearing to its shaft.

DENVER BEARING PRACTICE

The present practice of the Denver Tramway is to machine all bearing shells both inside and out, although formerly the castings were used in the rough state. Some babbitt lined cast iron shells are used for axle bearings on the older types of motors. For armatures babbitt lined bronze, solid bronze and babbit lined cast iron bearings are used. The cast iron shells are used only on some of the older types of motors, chiefly the GE 58. Journal bearings are all babbitt faced bronze.

The amount of babbitt used varies with the size of the shell as only one standard arbor is used for casting the babbitt of each type of bearing. While a recording pyrometer is not used in the babbitt pot, one will be installed when contemplated improvements in existing practices are carried out.

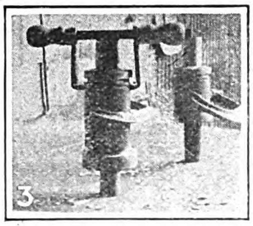
Babbitt is used on the end flanges of all babbitted armature and axle bearings. When solid bronze bearings are worn through, they are babbitted and used over again. Because of the 42-in. track gage in Denver, no axle collars are used as the motors occupy all the available space between the wheels.

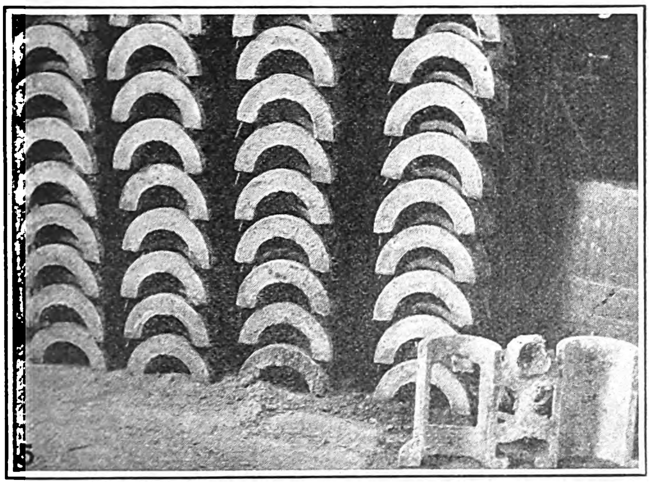
Cast-iron bearing shells are cored out with six lugs, which are $\frac{1}{16}$ in. over the armature shaft diameter. Thus the babbitt thickness over the lugs is small enough so that there is no danger of the armature getting down on the pole pieces in the event of failure of the babbitt.

NICKEL-BRONZE BEARINGS USED IN YOUNGSTOWN

After exhaustive tests which extended over a two-year period, during which different formulas of babbitt metal and different methods of handling the rebabbitted shells were tried, the Youngstown Municipal Railway, Youngstown, Ohio, decided to equip all of its rolling stock with a good grade of solid nickel-bronze armature bearing without a babbitt lining. The treatment of the bearing shells previously used by this property is very interesting inasmuch as the company tried various means of procuring a satisfactory bearing before adopting the present standard. During the experiments iron, brass, and bronze shells were used with about equal success. When the shell was new, there was little difficulty in obtaining satisfactory bearings. However, the rebabbitting of shells presented the most serious problem, both from a physical and economical standpoint.

In preparing these shells for rebabbitting several methods were used. The shells were pickled in pickling vats for 48 hours to remove all grease and dirt; they were burned and baked in gas ovens, and some even were copper plated after they had undergone these preliminary treatments. Various types of anchorage were used to hold the babbitt in the shells. These included dovetailed grooves from end to end of the shell, holes drilled through the shells and countersunk on both sides and tinning of the inside of the shell with a formula of 75 per cent tin and 25 per cent lead. This later was reduced to 50 per cent tin and 50 per cent lead.





Equipment and Methods Used for Babbitting Bearings in the Shops of the Milwaukee Electric Railway & Light Company

No. 1. Armature brasses are coated with fire clay on portions which are not to be tinned. Grooves in the casting serve as an anchorage for the babbitt.

No. 2. Journal brasses have babbitt held in place by two longitudinal grooves.

No. 3. The babbitted bearing is removed by means of an air-operated mechanism. The tongs engage the flange of the bearings while the rod on the air cylinder provides the lifting power.

No. 4. Pouring brass in the foundry of the Milwaukee Electric Railway & Light Company.

No. 5. Axle bearing castings which represent a portion of six tons of the bearings poured per month in the shops of the Milwaukee Electric Railway & Light Company.

After being tinned the bearings were placed in various positions for pouring the babbitt. Mandrels were used, the bearings were poured solid, and some were even poured while the shell was being turned in a lathe at 3,600 r.p.m. In this latter process a special jig was set up in order to get a uniform thickness of babbitt without air holes. Various thicknesses of babbitt were tried inside the shells of the finished bearing, the thickness on the side wall at first having been ⅛ in. which was later increased to ½ in.

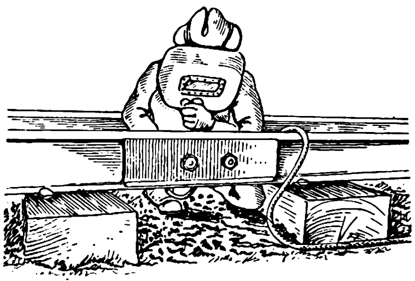
Precautions were taken to see that the motor housing was in the proper shape to receive the bearing. As another precaution, armature shafts were renewed or re-machined preparatory to running in the new bearings. Motors were run on a test rack at maximum speed for 10 minutes after which it was specified that the armature must be free to turn by hand. Even with these precautions, and under favorable conditions, a fair average for this type of bearing was found to be 48,000 miles although some ran 80,000 miles. This mileage is much less than that obtained from the babbitt-lined bearings received from the manufacturer on new motors.

However, the company was able almost to equal the mileage of new bearings by making new brass shells, lining them with new babbitt and placing them in a rebored motor housing with a new armature shaft. The cost of this procedure was prohibitive, and other means were sought to obtain bearings that would give long life. While these tests were going on, it was found that no matter what precautions were taken to remove oil and grease from the shells, still it would show up when the shells were preheated preparatory to rebabbitting. This grease would prevent the babbitt from adhering to all the surface of the shell, and an air space or bad contact between the shell and babbitt was formed. Such a space kept the heat generated in the bearing from passing off through the shell. At such spots the bearings showed heat and the babbitt started to melt.

Following these tests, it was decided gradually to equip all of the motors with bearings of the best grade of nickel-bronze obtainable. The rough bearings are purchased from a manufacturer in Pittsburgh. They are obtained with an excess amount of stock to be bored out of the inside. It is the practice to machine at least ¾ in. from the inside of all bearings and 3/16 in. from the outside, allowing 0.015 in. clearance for a shaft of approximately 3 in. diameter and 0.022 to 0.025 in. clearance for an armature shaft of approximately 4 in. diameter. As a part of this installation, the armature shafts are turned or renewed in order to provide a perfect bearing. An end slug allowance of 1/32 in. is given all motors. The motor housings are rebored and the bearing is made 0.001 in. larger than the hole in the motor housing per inch of diameter, to provide a pressing fit.

These nickel-bronze bearings have run as high as 175,000 miles, while a good average for those in service is around 157,000 miles. Due to its longer life, the bearing does not require as close inspection as one lined with babbitt, does not need as much lubrication after it has been in service for a short while, and has been found particularly valuable for reboring purposes after it has been used. When a bearing is worn too large for a particular shaft it may be rebored to fit one a little larger. This rebored bearing has the advantage over a new bearing that it is soaked with oil and does not require the careful attention that a new bearing does.

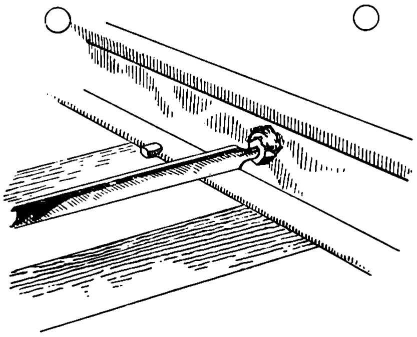
Of the motor equipment, 75 per cent is now provided with this type of nickel-bronze bearing. It is hoped that all of the company's motors will be changed over by the end of this year. The company has been several years in making this change, but it is felt that the results obtained from the new nickel-bronze bearings more than repay for the trouble and inconvenience that have been incurred. In all that time it has operated some 17,000,000 miles on this type without a hot armature bearing. The same type of bearing is also used for axles.



WELDING JOINTS IN SPECIAL WORK AND STRAIGHT TRACK

Material	acct 5 acct 507
Labor and Hauling	acct 8 acct 510

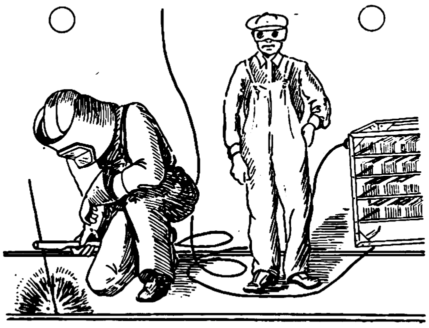
1



WELDING THE RODS

Material	a/c 5 a/c 507
Labor and Hauling	a/c 8 a/c 510

2



WELDING - Filling in Cups in Rails

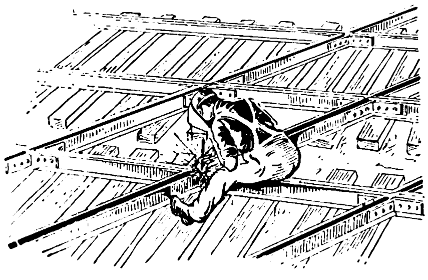
Straight Track

This is for repair to Rails — not joints.

For Joints see Picture 1.

Material	acct 4
Labor and Hauling	acct 8

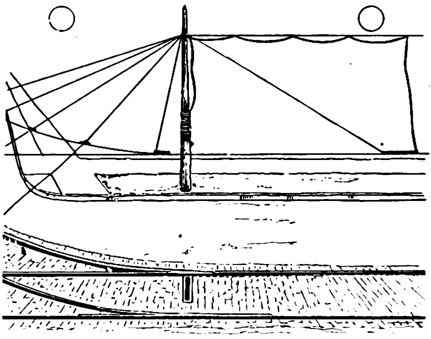
3



WELDING - Filling in cups in Rails
Special Work
This is for repairs to rails in Special Work - not Joints.
For Joints in Special Work see Picture 1.

Material	Acct.6
Labor and Hauling	Acct.8

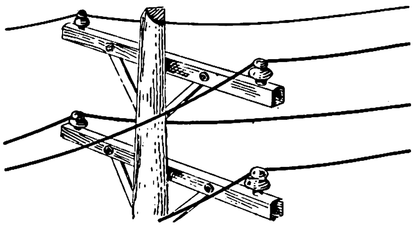
4



ELECTRIC TRACK SWITCHES
and
WIRING FOR SAME

Material	acct 6 acct 508
Labor & Hauling	acct 8 acct 510

105

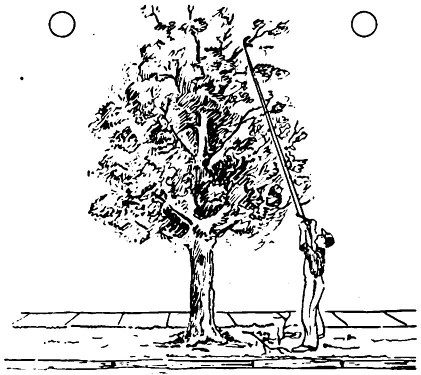


HIGH TENSION POLE LINE.

Everything included - poles - anchors High Tension Wires.
Includes High Tension Pole Line from Trombly Substation to Mt. Elliott and Trombly.
Does not include pole line from Mt. Elliott and Trombly to Leesville Substation. For this see Picture 111.

Material & Labor	Acct 49 Acct 544

110



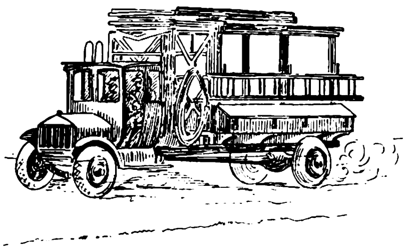
TRIMMING TREES
To clear railway cars or feeders

Tools and Material	acct 9 acct 512
Labor and Hauling	acct 8 acct 510

To clear high tension lines

Tools and Material Labor and Hauling	acct 49 acct 544

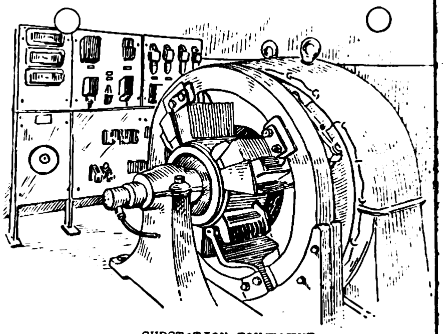
123



EFFICIENCY WORK BY LINEMEN

Broken and leaning poles and fixtures	Acct 20
Feeders, pos. & neg. o.h.	Acct 22A
Feeders, pos. & neg. undergrd	Acct 22B
Trolley and span wires	Acct 22D
Fires-derailed cars, vehicles on tracks	Acct 78

124



SUBSTATION EQUIPMENT

M.G. Sets - High Tension Apparatus - Switch Boards, Wiring

(except lights)

For Light Wires See Pictures 402 & 403

Material and Labor	Acct 48 Acct 543

302

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Typical Sheets from Pocket Guide for the Classification of Electric Railway Accounts Used by Detroit Department of Street Railways

Correct Account Numbers Put on Jobs

By Means of Pictorial Instructions Foremen in Detroit Are Told How to Enter Correct Account Numbers on Their Work Sheets

THE adoption of the Interstate Commerce Commission's "Classification of Accounts for the Use of Electric Railways" was a great step forward, but its value necessarily depends on the care with which charges arising in practice are allocated to the proper account numbers. This in turn is affected by the knowledge of the accounts by the person or persons making the charges against the various accounts. In some of the major operations the correct account number is obvious, while in others, more especially in many of the minor operations, the reverse is true. If the account numbers assigned by the person with whom the charges originate are incorrect, the error will probably be carried right through the entire bookkeeping transaction.

Some people may say errors of this type are immaterial as long as the totals are correct and a reasonable allocation of charges by accounts is available for comparison purposes. This may be true, depending upon the mental attitude of the person by whom or for whom the accounting is being done. On the other hand, there is another factor in the situation, viz., the nuisance value because of differences of opinion over the proper accounts to which to assign charges for certain work. These differences may arise between foremen and timekeepers, timekeepers and superintendents, clerks and superintendents, etc., and generally relate to the most trivial subjects. It is obvious that any scheme which will reduce or, better still, entirely eliminate such differences is greatly to be desired.

It must be remembered that much of the work of allocation of charges for maintenance and construction work (except where timekeepers are employed for that particular purpose, which is not generally the case unless a large construction job is involved) is done by the men in the field who have personally done the work or else by their immediate superiors. It must also be remembered that the standard classification of accounts has five sub-classifications, each containing many divisions, the operating expenses alone comprising one hundred accounts. Some of the definitions of these accounts are quite extended. There are also printed in the last edition of the classification 440 questions and answers further defining and modifying the various charges to be entered under the account numbers.

To the accountant and to the engineer this volume of 250 pages is a problem in itself. What must it be to the foreman or timekeeper not specifically trained in its use? The accountant uses it from cover to cover, the engineer portions of it and the foreman and timekeeper limited portions. The foreman and timekeeper are in intimate contact with the field work, the engineer is in partial contact and the accountant only to a limited extent. In other words, those in closest contact with the work (where the major share of the charges originate) know the least about accounting. The field man is not apt to be equally proficient in the work to be done and in the method of accounting for it. His natural tendency is to memorize only a few account numbers and use these account numbers on his time sheet and material requisitions, rather than to consult the classification for the exact account number especially for minor items. At least, this is found to be the experience of the Department of Street Railways in Detroit.

To overcome this difficulty, H. M. Gould, electrical engineer (now acting assistant manager of the department), has prepared for the use of the electrical department's foremen a pictorial pocket guide (compiled after a thorough canvas had been made of all the possible types of work to be done, due regard being given to the various accounts and the 440 questions and answers) showing the correct account number to use in making charges. The sheets are divided into groups as follows:

Pages 1 to 100—Welding and Bonding.
Pages 101 to 200—Overhead and Underground Construction.
Pages 201 to 300—Power Stations.
Pages 301 to 400—Substations.
Pages 401 to 500—Light, Wiring and Telephone.
Pages 501 to 600—Laboratory.
Pages 601 to 700—General.

It has not been found necessary yet to provide this total number of sheets. At present the book altogether contains about 135 sheets, and gaps are left in the serial numbers for additional sheets as they may be found desirable. Reproductions of a few typical sheets, considerably reduced in size, accompany this article. The size of the pages in the book itself are 4 in. x 7 in.

To use the book it is only necessary for the man making the allocation to glance through the illustrations in the department to which the work belongs, it being well known that the people who will make use of a pictorial representation of facts have an inherent aversion to wading through a mass of text portraying the same facts. He will then quickly find the correct account numbers. Where there are two account numbers on a sheet, divided by a line, as with a fraction, as shown on several of the sheets, the user of the book is instructed to employ the upper number if the job is one of maintenance and the lower number if it is one of construction.

Provision is also made for the use of a manufacturing account (No. 411 in the classification) to cover such work as is done on supplies before they are charged out of stores.

Copies of this book, in blueprint form, are supplied to the superintendents of power stations, substations, lines and welding and bonding, also to the chief chemist, and electrical engineer. In addition to these copies the sheets showing the more common charges in each department are posted on the wall in a number of buildings where those most interested will be likely to see them. Later it is the intention to supply each field foreman with as many copies as he requires.

One-Man Operation in Arnhem

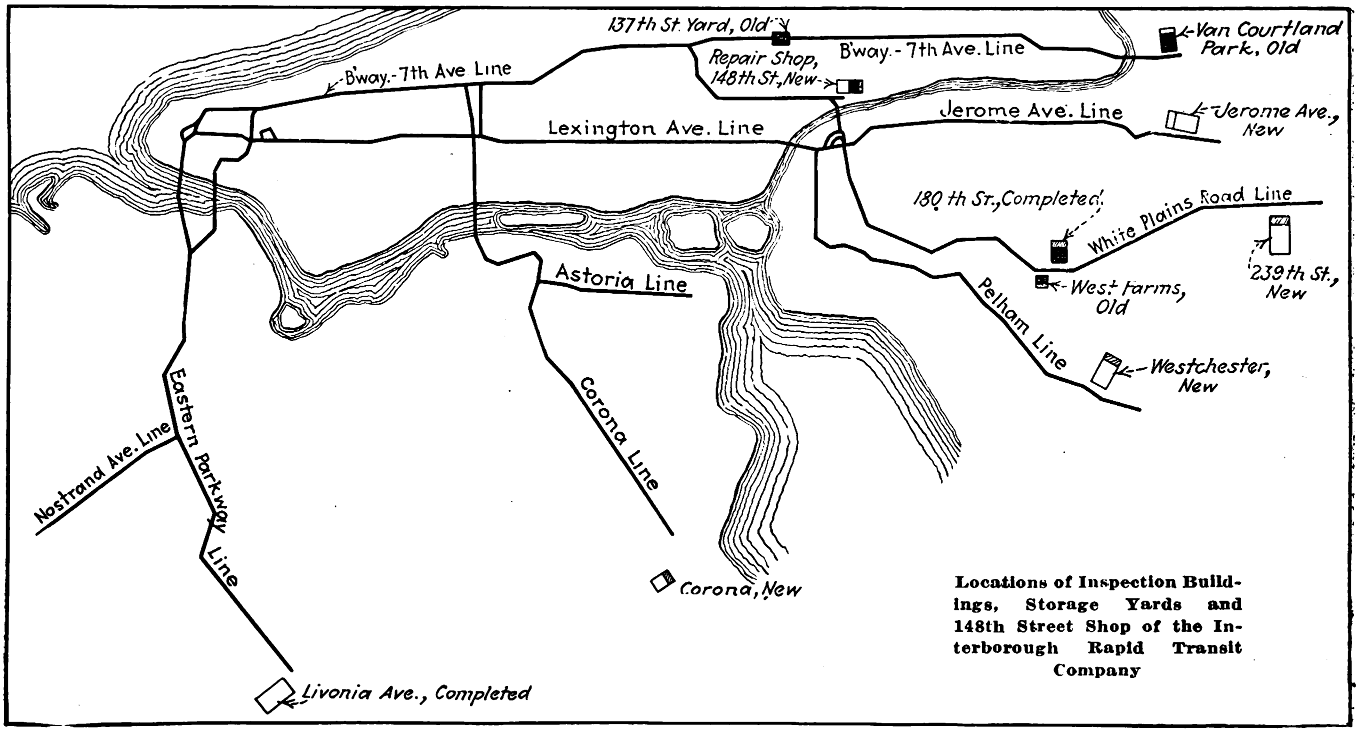
ONE of the leaders in one-man-car operation in Europe is the Arnhem Municipal Tramway System in Holland, on which several one-man cars were put in operation about 2½ years ago, after the manager of the system, P. M. Nieuwenhuis, had personally studied one-man operation in the United States. An account of the installation by Mr. Nieuwenhuis was published in the ELECTRIC RAILWAY JOURNAL for Dec. 2, 1922, page 881. The success of these cars has been so great that the entire system in Arnhem has been converted to one-man operation.

Interborough Inspection Shop Methods

Inspection of Elevated and Subway Cars on the Interborough Rapid Transit Railway Is on the Basis of 1,000 Miles for Motor Cars and 1,200 Miles for Trail Cars—The Work Is Thoroughly Planned — A Bonus Is Paid to Finders of Trouble of Vital Importance

WORK has recently been completed on a new inspection shed of the Interborough Rapid Transit Company at 180th Street. This is part of an extended plan for expanding the inspection and repair facilities of the company. There are now six inspection sheds of the company at which the work of making running repairs on the cars of the company is being conducted as follows: Bronx, 180th Street (completed); Bronx, Van Cortlandt Park (old shop); Bronx, West Farms (old shop); Bronx, Jerome Avenue (temporary); Brooklyn, Livonia Avenue (completed); Queens, Corona (temporary).

In additional, two other inspection sheds will be built as follows: Bronx, 239th Street; Bronx, Westchester.



Locations of Inspection Buildings, Storage Yards and 148th Street Shop of the Interborough Rapid Transit Company

This article will give an account of the methods followed in these inspection sheds. A later article will describe the shed recently completed at 180th Street.

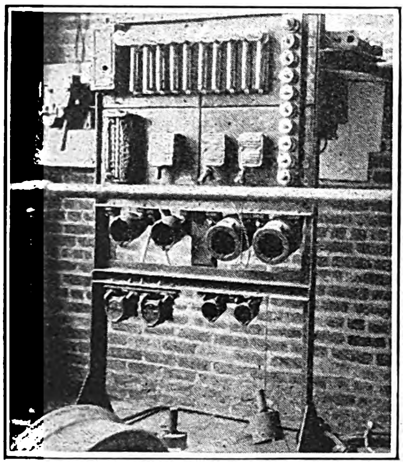
Each day the mileage clerk makes out a list, giving the numbers of the cars that are due for inspection, with the number of trips or mileage that each of the individual cars on the list has made since the date of its last inspection. A careful record is kept of the mileage made each day by each car, and motor cars are inspected every 1,000 miles and trail cars every 1,200 miles. After the mileage clerk makes out his list of cars to be inspected, one copy is sent to the shop department and another copy to the train dispatcher.

As soon as a car is put in the inspection shed for inspection and repairs, the car checker compares the car numbers with his inspection list and puts a white inspection or work card on each car that is due for regular inspection. The front of the card so used is reproduced on page 240. The back of the card contains space for record of the inspection of the storage batteries, as each car on the system carries a battery for emergency lighting. There are 26 cells, and the gravity, height of electrolyte, volts per cell, and total volts are recorded. The fact that the inspection card carries a list of the jobs to be done relieves the individual workman from a great deal of bookkeeping, because he has simply to make his entries on this card. On roads of the size of the Interborough where several hundred men are employed on inspection and repair, it is considered very essential that each individual should be held directly responsible for the work he performs. This the work card illustrated allows, because it has listed all of the various parts of the equipment with space for the signature of the man who does the work.

No car is allowed to leave the pit until all items have been signed up. There are two other cards somewhat similar to the inspection card, as will be described later. One is blue and the other is red. This distinguishes them from the general inspection card reproduced in the first illustration because it is white.

BLUE AND RED INSPECTION CARDS

The blue inspection card is attached to those cars in a train in the inspection shed which are not due



Rack for Testing Control and Bus Line Jumpers at 180th Street Inspection Shed

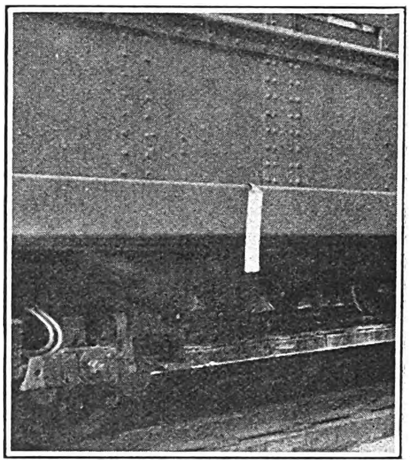
for inspection, not having completed the mileage of 1,000 for motor cars and 1,200 for trail cars between inspections. Nevertheless, while these cars are in the shops, the company does give the more important parts, such as running gears, air brakes, draft rigging, and contact shoe devices a thorough inspection, and the parts of lesser importance a superficial inspection. The men sign up this card for work done in the same manner as with the white inspection card.

The other inspection card used is printed on red stock. It is used for regular inspection in the same way as the white card illustrated, but its color indicates that axle boxes, journals, etc., on the car are due for general oiling in addition to the inspection required on the rest of the car. The general oiling period is 10,000 miles. The entries on this card are printed somewhat closer together to allow for blanks covering the lubrication attention required. A separate entry on this card is made for motorman valves, feed valves, armature bearings, air compressors, center plates, triple valves, journal bearings, axle bearings and gears, and draft brake rigging and side bearings.

When all of the various classes of workmen have completed their work on a train and have properly signed the inspection cards, the train is pumped up, air brakes are tested, and brake rigging is adjusted, etc. The control and the motor circuits are then thoroughly tested. The train is then ready to return to service.

OTHER BLANKS AND FORMS USED

Space will not permit a reproduction of all the various blanks used, but one other is shown on page 240 and a brief reference will be made to the other more important forms. The one reproduced is that used for lamp and fuse renewals, cars cleaned, etc. Some of the other blanks used during this inspection work include the following:



As the Train Enters the Building a Clerk Places a Colored Tag on Each Car Indicating Kind of Inspection Needed

Report of broken glass replaced on cars.

Report of repairs made and defects found on the cars while in for inspection.

Report of journal brasses removed.

Report showing length of time the train was in the inspection shed.

Report of the cars inspected and mileage made since the last inspection.

After these reports are filled out in the inspection shed, they are sent to the assistant to the general manager weekly. They are then tabulated and graphs are plotted showing the recurrences of different troubles, life of parts, etc.

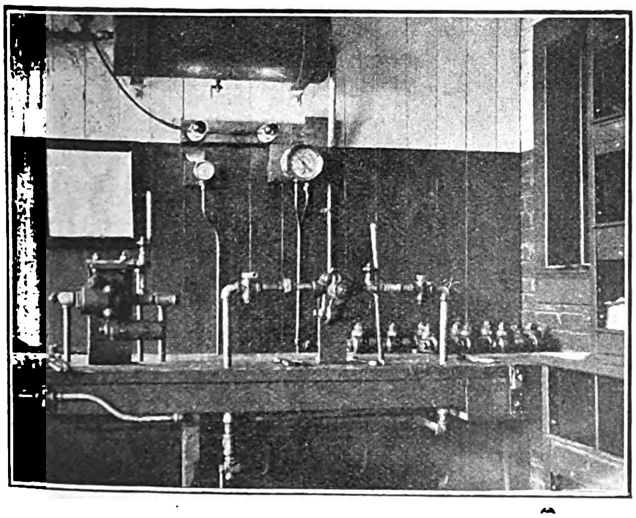
DIVISION OF INSPECTION FORCE AND LAYOUT OF GANGS

Outlines of the duties of the inspection force and of the work performed are given in the two lists, printed on pages 241 and 242.

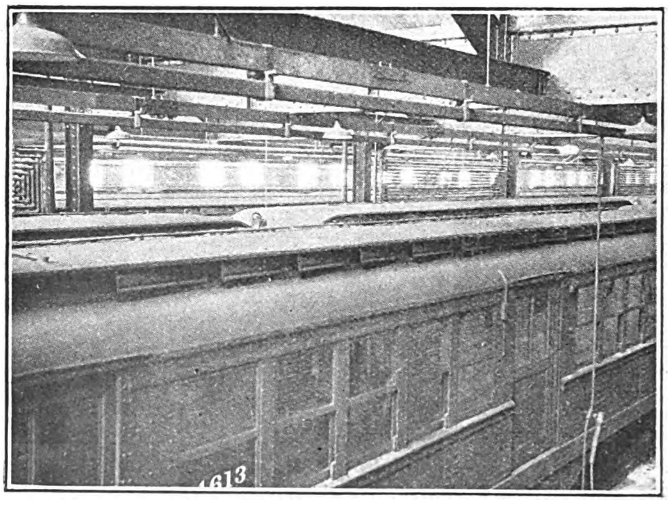
At the 180th Street inspection shed as many as 144 cars per day are inspected and for this work nearly 250 men are employed. These men work one shift of nine hours, some coming on duty at six in the morning and others at seven. A cleaning force and two emergency men are on duty during the night.

Although the work of changing wheels is usually done only at the main repair shops at 148th Street, some of this work is done at the inspection sheds when it seems desirable.

The storeroom at the inspection sheds carries a very complete supply of replacement parts, but only a week's supply normally is kept on hand as the supply car makes a trip to the various locations every day. The oil sup-



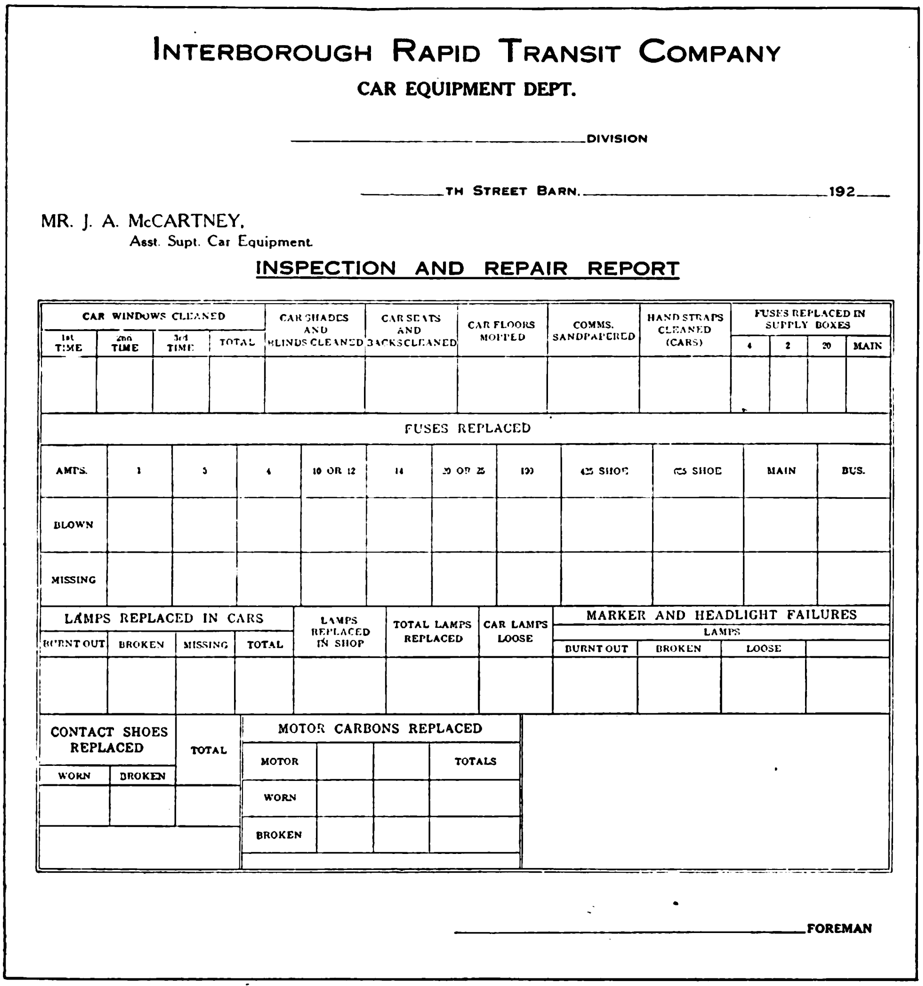
Rack for Testing Various Brake Valves, Feed Valves and Other Pneumatic Equipment



Power for Moving Trains Is Taken from an Overhead Conductor Through Flexible Leads ply is cared for in a little different manner. The company has an arrangement with the oil companies whereby an oil tank truck delivers the supply direct to the inspection buildings. Storage tanks capable of holding two weeks' supply of the various oils used are to be found in the oil room.

FOLLOWING UP THE WORK

The work performed at the inspection shed is constantly being followed by a corps of special inspectors. These men drop into the various inspection sheds at unexpected times and check up the work and methods being employed. They report their findings directly to the assistant to the general manager.



INTERBOROUGH RAPID TRANSIT COMPANY
CAR EQUIPMENT DEPT.

____________DIVISION

________TH STREET BARN.____________192___

MR. J. A. McCARTNEY,
Asst. Supt. Car Equipment

INSPECTION AND REPAIR REPORT

CAR WINDOWS CLEANED				CAR SHADES AND BLINDS CLEANED	CAR SEATS AND BACKS CLEANED	CAR FLOORS MOPPED	COMMS. SANDPAPERED	HAND STRAPS CLEANED (CARS)	FUSES REPLACED IN SUPPLY BOXES			
1st TIME	2nd TIME	3rd TIME	TOTAL						4	2	20	MAIN

FUSES REPLACED

AMPS.	1	3	4	10 OR 12	14	20 OR 25	100	425 SHOE	625 SHOE	MAIN	BUS.
BLOWN											
MISSING											

LAMPS REPLACED IN CARS				LAMPS REPLACED IN SHOP	TOTAL LAMPS REPLACED	CAR LAMPS LOOSE	MARKER AND HEADLIGHT FAILURES LAMPS			
BURNT OUT	BROKEN	MISSING	TOTAL				BURNT OUT	BROKEN	LOOSE	

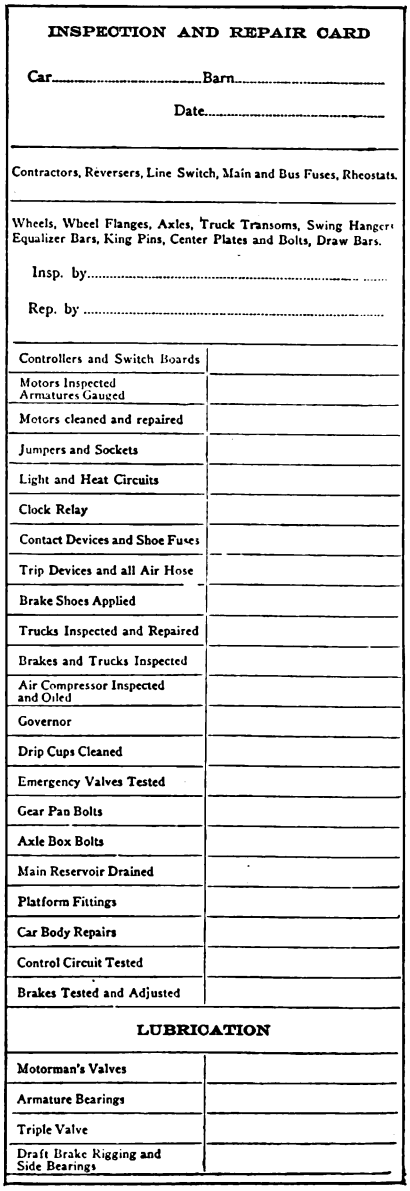
CONTACT SHOES REPLACED		TOTAL
WORN	BROKEN	

MOTOR CARBONS REPLACED			
MOTOR			TOTALS
WORN			
BROKEN			

____________FOREMAN

The work of inspection is also greatly helped by information received from the transportation department. This comes principally from the motorman's report book. The entries in this book are filled out by the motorman and conductor for every car that has trouble on the road. This report gives the number of the car, minutes delayed, time taken out of service, nature of trouble, names of conductor and motorman, etc. Two books of this kind are kept at each of the terminals, these books being used on alternate days. This permits one book to be sent each day to the shop foreman. The clerk makes a copy of the book each day and returns it to the terminal so that it will be available for the following day. In addition to the entries made by the trainmen, this book contains a space in which the shopman making the repairs enters the nature of the trouble actually found and the repairs made. Space is also provided for his signature.

In addition to the methods described for detecting trouble, the company follows the unusual plan of paying bonuses to employees for discovering vital defects. This bonus is paid to any employee, regardless of his classification or his rate of pay, who discovers and reports cracked or broken parts of the running gear of any car. This system of stimulating the detection of defects to the vital parts of the equipment keeps the men keyed up and is considered by the company the best possible insurance against serious road trouble happening.



INSPECTION AND REPAIR CARD

Car............................Barn............................
Date............................

Contractors, Reversers, Line Switch, Main and Bus Fuses, Rheostats.

Wheels, Wheel Flanges, Axles, Truck Transoms, Swing Hangers Equalizer Bars, King Pins, Center Plates and Bolts, Draw Bars.

Insp. by............................

Rep. by............................

Controllers and Switch Boards	
Motors Inspected Armatures Gauged	
Motors cleaned and repaired	
Jumpers and Sockets	
Light and Heat Circuits	
Clock Relay	
Contact Devices and Shoe Fuses	
Trip Devices and all Air Hose	
Brake Shoes Applied	
Trucks Inspected and Repaired	
Brakes and Trucks Inspected	
Air Compressor Inspected and Oiled	
Governor	
Drip Cups Cleaned	
Emergency Valves Tested	
Gear Pan Bolts	
Axle Box Bolts	
Main Reservoir Drained	
Platform Fittings	
Car Body Repairs	
Control Circuit Tested	
Brakes Tested and Adjusted	

LUBRICATION

Motorman's Valves	
Armature Bearings	
Triple Valve	
Draft Brake Rigging and Side Bearings	

Above, One of the Blanks Used by the Inspection Force. At Right, Inspection Card Which Must Be Signed by the Man Doing the Work.

When this system of discovering defects is combined with the system described by which every man working on a car personally signs the inspection card for each part of the equipment he inspects and passes, assurance is made doubly sure that all defects are discovered and the necessary repairs are made.

HEAVY REPAIR WORK

Heavy repair work is performed at the 148th Street shop for the subway division and the shop at 98th Street and Third Avenue for the Manhattan division. The former is shown in the map on page 238.

Inspection Routine on the Interborough

(These regulations are referred to on page 239)

Contactors. Inspect and change when necessary, all arc chutes, contactor bases, auxiliary fingers, finger blocks and auxiliary contact plates. These parts are to be kept cleaned and properly adjusted. The contactor base bolts and shunts are to be kept tight. Inspect all motor and bus rheostat leads and jumpers on rheostats. Clean the insulating collars on the circuit breaker and reverser. Remove the covers of the control rheostat coils and inspect and clean them. Inspect the main bus and power fuse and wiring. Arcing plates are to be removed when loose, cracked or broken, and are to be cleaned on all inspections. The clock circuit fuse and fuse block are to be cleaned on all inspections. All relays are to be cleaned and the leads must be examined for loose connections. P. K. commutating drums are to be cleaned off with a damp kerosene cloth, and the fingers are to be adjusted and lubricated on every inspection. The bus and control connection boxes are to be cleaned and inspected on a 10,000-mile basis. The circuit breaker arc chutes are to be cleaned and the inspectors should see that the tips make proper contact, that all parts work freely, that the head is on tight and that the line breaker trips properly.

Motor Inspection. Inspect armatures, commutator, brush-holder, brushes, etc.

Batteries. Remove all storage batteries (Edison type). Test each cell for voltage and specific gravity. Measure the height of the solution. Clean all cells and keep the top oiled. Use only distilled water when the solution is renewed. Clean the top of the cells with steam on a 60-day basis. Inspect the leads and see that they are properly insulated and that the connections are tight.

Jumpers. Change all train-line jumpers on a four-month schedule. Remove all jumpers that are in bad order or over the age limit. Clean out the coupler sockets and clean and spread and tighten all terminals in sockets and jumpers. Inspect the springs and covers on all sockets. See that all jumpers are properly inserted before the train leaves the barn.

Contact Shoe Device. Inspect and gage all contact shoes and beams. Remove the covers and examine the shoe fuses and leads on a 10,000-mile basis. Test out all shoe fuses on every inspection. See that all bolts in the contact devices are tight. Remove all shunts and jumpers where they are worn or broken. Remove all shoes when worn.

Compressors. Fill the crankcase with oil at the filling elbow. Fill the commutator oil well at the oil plug on the commutator side of the motor bearing. Do not oil on the crankcase side. Inspect and clean the inside of motor shell, fields, commutator and brush-holder and replace worn brushes, etc.

Governors and Relays. Inspect and adjust the magnet and air governor fingers and the battery charging switch.

Controllers. Remove the cover from the controller to inspect it. Remove the arc deflector. Inspect the main blow-out coil. Inspect and clean the fingerboard and flash shields. Remove the auxiliary fingers and block to inspect and clean contacts. See that all fingers are properly adjusted. Change all worn or burnt fingers. Clean the segments on the cylinders. Oil all bearing points on the cylinder and gear wheel. See that the screws in the controller top and water cap, controller handle and reverser cup are tight. Replace all weak or broken dog springs in the handle. Clean and adjust the fingers in the master electric-brake valve and engineer's valve. Inspect and repair all MS-41 and 10 switches. Install fuses where they are missing. See that all ⅜-in. pilot valve cut out cocks are sealed. Replace all worn parts.

Switchboards. Inspect and clean the switchboards and examine fuse clips, fuses, switches, etc., on each inspection, including the main switches. See that the proper rated fuses are in the circuits.

Light Circuits. Cut in the light switches on all cars and test all circuits and markers. Replace all missing and burnt-out lamps and broken sockets. Test out the emergency light circuit on all cars. Replace all missing and blown fuses on the switchboards.

Indication. Clean the indication boxes and disk on the pole contacts. Make necessary repairs on each inspection.

Clocks. Open the cabinets in all clocks (coasting recorders) and see that they are wound and supplied with tape. Test all clocks and circuit with a 4-volt battery. The clocks are to be changed once a year for general cleaning and repairs. Clean the clock relays on inspection.

Testing Indication. Test the motorman's indication circuit on all cars and in train formation. See that all trains are equipped with lamps, jumpers and plugs before they leave the barn. Replace any missing covers on the motorman's lamp boxes. Replace broken seals and rings in the signal box covers where they are missing or broken.

Air Brakes. Test the electric brake and control circuits from each controller and the brake valve in the train, using the electric brake key to determine whether the electric brake master switch is operating correctly and the electric brake fuse is in place. When the controller is in "on" position, let go of the button and make a test of the pilot and "E" valves. Pull all conductor's valve cords and test them for operation. Make a test of the compressors by cutting in all compressor switches. Test the balance circuit by cutting in one balance switch and noting if all the compressors are working. Note that the governors cut in at 85 lb. and out at 100 lb. pressure. Note that no leaks exist in the pipe system. Test the motor circuit on all cars by using a 5-lamp bank across main switch. See that all MS switches have fuses in and are left cut out. Examine the inspection tags and see that all work has been covered and signed for. No trains must be sent out until all work is completed, inspection tags signed, and car in good operating condition. Go around train and see that no men are at work on cars before the train is trolleyed out of the barn. Report all defects noted to the assistant general foreman.

Air - Brake Valve Changes. Change for cleaning at the repair shop, all UE-5 triple-vent A & T valves, governors, etc., on a one-year basis. Change for cleaning the compressors head on a 90-day basis. Make pipe repairs. Tighten pipe leaks, etc.

Car-Body Inspection. Inspect and repair all manually and air-operated doors, draft rigging, car body, interiors, platforms, fitting, etc. Replace all missing and empty Pyrene fire extinguishers. Repair the markers and headlights. Replace any broken glass and missing shades. Inspect the sanitary hand holds. Test all emergency cords, bell cords and bells. Inspect all destination signs and see that each car is fully equipped with these signs. Remove and replace all signs that are disfigured. The foreman of car-body inspectors will make a personal inspection of all cars passing through the barn.

Safety Gates. Inspect, clean and lubricate all gates and slides. Unhook and inspect all locks and springs. Open the gate and inspect for broken rivets in it. Inspect hand holds on all cars passing through barn.

Trip-Device and Air-Hose Inspection. Inspect, gage and adjust all trip devices. Inspect all hose on the car for chafing, being loose at the nipple, or over the age limit. See that all pipe clamps are in place and tight and that all bolts in the air-hose clamps are tight. Mark the height of the tripper on the inspection tag when it is signed.

Axle Box Inspection. Inspect and tighten all axle box and gear pan bolts. Remove and replace all broken axle brasses.

Oil Armatures. Inspect the waste and bearings on all motors passing through the barn for inspection. Remove all waste above the bearing and see that it is well lubricated. Remove all short and hard waste. Gage the oil on every inspection.

Journal Inspection. Inspect the waste and brasses on all cars passing through the barn. Remove the waste and brasses on the general oiling. Test the waste on all inspections.

Drip Cups. Remove all oil from all drip cups on all motors. Lubricate all brake rigging and drawbar slides.

UE-5 Valve. Clean the high-pressure portion of the UE-5 valve and clean the brake cylinder pressure limiting valve on a 30-day basis. Clean the 1-in. dirt collector on inspection. Fill the oil well. Examine No. 3 vent valve and the motorman's emergency cocks on inspection.

Reservoirs. Reservoir tanks are to be drained on every car going through the barn.

Air Doors. Test all air doors. Clean and lubricate all hand bases, sides, rods and gears. Remove all dirt from the door track. See that the door works at proper speed. Make all repairs, including any required on the locking device.

Feed Valves. Change the cab and control feed valves every 30 days. Oil the motorman's brake valve on inspection. Clean the ½-in. cab dirt collector on inspection.

Detailed Duties of Inspection Force on Interborough

The General Foreman is in full charge of the inspection barn and of all men assigned to the barn. He is responsible for the proper maintenance of the car equipment under his supervision. He also sees that full service at all times is available for the transportation department.

The Assistant General Foreman assists the general foreman and takes over his work when he is absent. The duties of the assistant general foreman are to run the floor, to check up on work of men, to see that trains are pulled out of the barn when turned over to transportation department, to inspect personally all cars that are cut out for the shop and all trains reported for trouble, and to see that all cars are properly tagged for the shop and are recorded in the log book. He also is responsible to see that the motorman's report book is checked, that the repairs called for in this book are made and that the book is signed to indicate that the repairs have been made.

The Assistant Carhouse Foreman's duty is to check up all cars reported by the transportation department as in bad order, also to check up the men working on the control circuits and to assist in making repairs.

The Clerks and Assistant Clerks keep the general records. They take care of all correspondence and see that the time cards are properly registered and the time recorded. On these and all other matters in which he is in doubt the chief clerk is to consult with the general foreman and assistant general foreman.

The Car Checker checks and tags all inspection and non-inspection cars. He also checks the bad-order list for bad-order cars and reports on the trouble to the assistant general barn foreman.

The Storeroom Tender receives and cares for all material and sees that there is an adequate supply of material on hand at all times.

The Motor Cleaners clean the retaining rings, brush-holder insulators, and the inside of the motor shell, fields and connections.

The Car-Body Foremen are in charge of the car-body and air-door device inspectors. They also keep a record of all repairs made by them on car bodies.

The Car-Cleaner Foreman supervises all car-cleaning work.

The Air-Brake Foreman is in charge of all air-brake and mechanical work, car body, brake and draft rigging, trucks, wheels, axle box, journal lubrication and packing.

The Air-Brake Inspectors inspect all work done by the brakemen and helpers on the inspection of cars. These inspectors also have charge of the general inspection of the "non-inspection" cars and give special attention to the toggle bar, brake pin, special lock washers and cotter keys.

The Electrical Inspector and Trouble Repairmen make the repairs to the electrical equipment and check the inspection of electrical apparatus.

The Motor Lead Inspector inspects the motor leads, ground leads, cleats, clamps, etc.

The Truck Inspector inspects all trucks for cracks on the side frame and in the transoms, equalizer bars, wheels, swing hangers, etc., for all cars going through barn.

The Wheel Inspector inspects all wheels, trucks, car body bolsters, king pins, drawbars and carriers, center casting and bolts, outside and inside equalizer bars.

The Wheel Inspector (Night) inspects all wheels, trucks, drawbars, shoe beams and general equipment. Every car in for the night must be so inspected. He also reports all defects which he discovers to the night barn foreman and leaves a written report for the general foreman.

The Valve-Room Men clean and test all feed valves, clean and grind the compressor heads, clean the compressor strainers and make minor air-valve repairs.

The Brakemen and Helpers inspect and renew brakeshoes, brake rigging, side bearings and truck chafing plates, pedestal and equalizer bars, etc., inside and out. New cotter keys must be used for all replacements. The key must fit tight in the brake pin.

The Car Inspectors will keep in touch with dispatchers and will report promptly when called by the train crews. They should keep a close check on the motorman's book and sign up when the repairs are made. They should immediately notify the general foreman when ordering a train out of service. In case of any train trouble or delay on the division to which the inspector is assigned he will give a detailed report of such trouble in the car inspector's book, which is provided for such reports. The car inspectors should see that all trains have markers when they leave the terminals. They should also make any necessary minor repairs to doors, signal circuits, markers and light circuits and control circuits.

The Lamp Trimmers equip all trains daily with refilled and clean tail lights. They should inspect the tail lamps on all trains each trip and should see that all lay-up trains are equipped with freshly trimmed lamps at both ends.

Trolleymen and foremen are the only ones allowed to apply the trolley to a train or to trolley a train out of the barn. The trolley is not to be applied to any car or train while men are working on it. Trolleyman will test brakes (electric and pneumatic) on all cars, but the brake adjustment is done by the air-brake inspector, as already described.

The Night Car Cleaners sweep and dust all cars and remove all newspapers from under seats.

The Day Car Cleaners carry out the following program: (1) Clean windows; (2) sponge seats and seat backs; (3) mop car floors; (4) clean and wash lamp shades; (5) wash sanitary hand holds; (6) wash white ceilings; (7) wash or wipe fan blades; (8) renovate the interior; (9) dry clean the interior; (10) clean the markers; (11) clean and dust under the seats, etc.

Peter Witt Car Rebuilt for One-Man Operation

Youngstown Company Has Converted Four of Thirteen Such Cars for One-Man Operation—Provision Has Been Made for Opening Side Door by Street Men at Heavy Loading Points

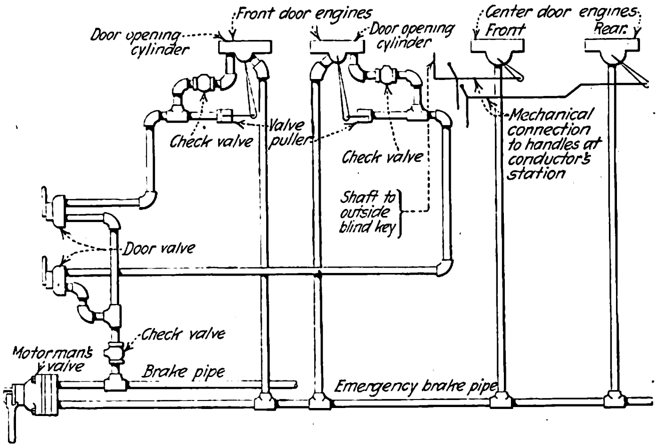
By A. B. Creelman
Master Mechanic, Youngstown Municipal Railway

IN ORDER that all of the rolling stock of the Youngstown Municipal Railway that is suitable might be operated by one man, 13 double-truck Peter-Witt type cars are being converted for this purpose. In making the changes necessary for safe one-man operation the company has not lost sight of the fact that the car may be needed for two-man operation during the rush hours and at some future time during the non-rush hours. Furthermore, it must be possible for these cars to be operated in trains with other cars equipped with GE emergency straight air brakes.

The fact that the converted cars are designed for single-end operation simplified the work of rebuilding. At the forward end the operating mechanism of the double folding doors was changed so that they could be operated independently as two single folding doors. These doors are air operated and controlled. They are interlocked with the air brake apparatus, and the H-L control is also interlocked with the doors so that power cannot be applied to the motors while any door is open.

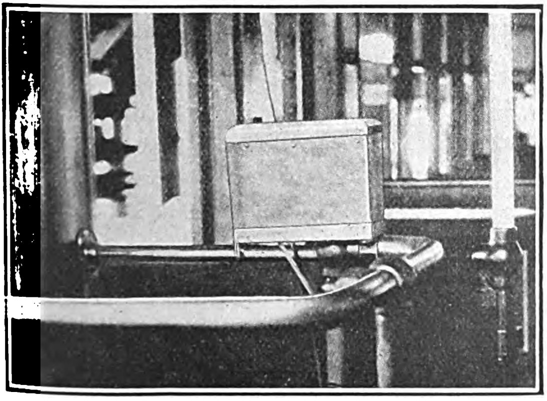
Modifications of the company's standard practice were made necessary because it was not considered desirable to replace all of the air control and brake piping which was originally on the Peter Witt cars, as this piping was necessary when these cars were operated either to pull trailers or in multiple-unit trains. The modified layout of the door-operating mechanism is shown in the accompanying drawing. The GE emergency straight air brake equipment has the full pressure emergency air pipe, the door control being taken from the brake pipe line. A check valve was placed in the door control pipe just ahead of the control levers. A small bleeder pipe connects the door engine cylinder with the control pipe line at a point between the control lever and the puller valve on the engine. By introducing this by-pass and check valve in the control pipe the operator is forced to close the doors by means of his door valves, as the by-pass maintains the pressure within the control pipe, while the check valve in the control pipe prevents the escape of air to the air brake pipe. Without the check valve the door operating valve would be connected to the brake-pipe line, which is opened to atmosphere after the brakes are released. This would cause the doors to close automatically. However, at the next application of air the doors would be opened, if the door valves had not been closed. It is to eliminate this condition that the check has been introduced, while the bleeder pipe furnishes air to replace that lost through leaky control and check valves.

Another change from the standard layout of this company has been to take the door interlock contact off the door engine piston rod and place it directly on the door. Placing the interlock contacts directly on each of the four doors makes it impossible to start the car until the doors are actually closed. The necessary valves and reservoir were also installed to provide automatic sanding of the track when an emergency application of the brakes is made.

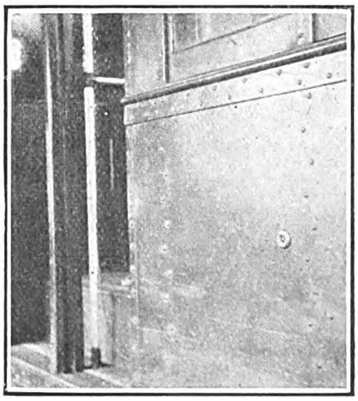


Modifications in Air Piping Give the Youngstown Car Full Safety Features, and at the Same Time Allow It to Be Operated in Multiple-Unit Trains Having G E Emergency Straight Air Brakes

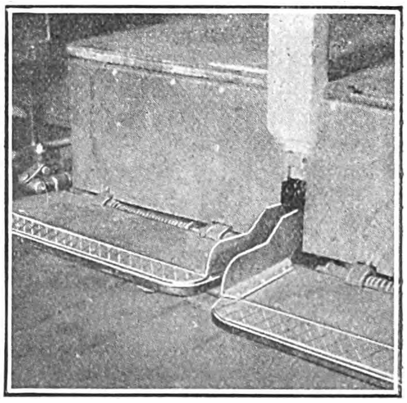
The control of the two center door engines, which is mechanical, has not been changed, the two operating handles being mounted in the usual position near the side doors. When the car is operated by one man these handles are covered by a steel case which is locked in position, so as to prevent passengers opening the doors. During the two-man operation the box is removed. Air for the operation of the center doors formerly was taken



When Used as a One-Man Car the Center Side Door Control Handles Are Inclosed in a Locked Box to Prevent Passengers Opening the Door. When Operated by Two Men the Box Is Removed



The Side Doors of the Modified Youngstown Cars May Be Opened by a Street Supervisor by a Key Which Fits the Socket on the Side Exterior of the Car



Step Guards Have Been Provided at Adjacent Ends of Both Folding Steps at the Forward End of the Car to Prevent a Passenger Having His Foot Caught Between Them directly from the main reservoir pipe. In order that the doors would be unlocked and could be opened by hand in case of an emergency application of the brakes, this arrangement was changed so that air is now taken from the emergency pipe.

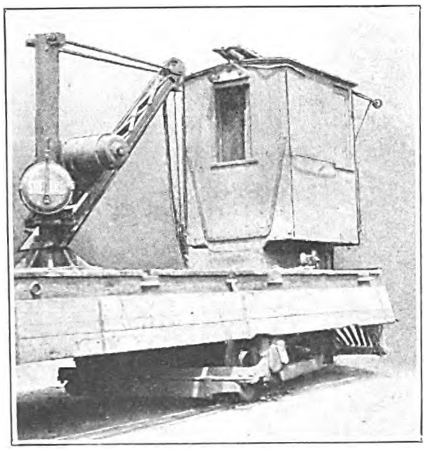
DOORS CAN BE OPENED FROM THE OUTSIDE

Means have been provided for opening the doors from the outside in order that the side doors may be used while loading in the downtown district during the evening rush hour. For this purpose a small ¼-in. square plug extends outside of the car. It is protected by a steel rim fastened to the side of the car. The plug forms the end of a rod which connects, by means of levers, with the control valve of the door-operating engines for the side doors. By means of a socket key, the street supervisor may control the door mechanism so that at the more congested loading points in the downtown district the supervisor can open or close these two doors from the outside. It is felt that this procedure will result in a considerable increase in the schedule speed.

As the car is operated by one man the double folding front doors are arranged to be opened individually. The forward one is for exit and the rear one for entrance, the passenger paying his fare as he leaves. A separate folding step is provided for each door. To prevent the departing passenger from getting his foot caught between the two steps a step guard has been fastened to the adjacent ends of both steps. These guards are of 1/16-in. steel approximately 10 in. long and 4 in. high, and are cut to such shape that they will slide back under the platform when the steps are folded up.

As a part of the rebuilding program the hot-air heating system has been replaced by thermostatically controlled electric heat. The cars have been repainted inside and outside and the four which have been rebuilt present a very neat appearance. The company has nine more of these cars which are to be rebuilt.

Cheaply-Built Crane Car for Doing Light Work



Home-Made Crane, Mounted on a Flat Car of the Massachusetts Northeastern Street Railway

A HANDY crane car for doing the light work of the track department of the Massachusetts Northeastern Street Railway was recently built at the company's shops, Salem Depot, N. H., under the supervision of Harry Osgood, master mechanic. The underframe of an old flat car was reinforced by the addition of two extra 7-in. x 8-in. stringers. On the floor of the car was placed a base casting secured from a local foundry. The mast of the crane is a revolving 8-in. pipe passing through this casting and resting on an old truck center plate below the car floor. To this center plate has been riveted a larger plate which is suspended by four bolts from the base casting.

The interior diameter of the base casting is 1¼ in. larger than that of the pipe, and ⅝-in. rollers have been inserted. This permits free rotation of the crane. The jib is built of 4-in. channel irons braced as shown in the accompanying illustration. At the top of the mast a casting has been shrunk in and cap screwed. Iron rods connect this casting and the end of the jib.

A Shepard 3,000-lb. electric hoist is used. In order to test the capacity of this crane car experiments were made which showed a maximum lifting capacity of more than 4 tons. When not in use the hook is fastened to the floor of the flat car to prevent rotation of the crane. Electrical connection for the hoist motor has been arranged by means of a controller finger.

The Readers' Forum

Careful Storage and Handling of Lubricants Are Important

THE TEXAS COMPANY

NEW YORK, N. Y., Aug. 5, 1924.

To the Editors:

I have read with considerable interest your articles in the July 19, 1924, issue of ELECTRIC RAILWAY JOURNAL under the headings "Putting Car Oil Lubrication on a Higher Level" and "Oil Storage and Handling Practice." I was particularly interested in the parts referring to improved conditions for storage and handling of lubricants.

When The Texas Company actively entered the field of selling petroleum products to the electric railways, one of the most flagrant and neglected important factors, as affecting efficient lubrication and the care of lubricants, was found to exist on the majority of properties in connection with the storage and distribution of lubricants. In line with our general policy, our engineers set about correcting such conditions on the properties where we secured the business, by furnishing up-to-date storage tanks with measuring pumps, locked faucets, modern electrically heated waste saturating outfits and other equipment necessary to place this important matter on a desired system, which resulted in vast economies, the elimination of fire hazards and greatly improved conditions as pertaining to lubrication as a whole. The use of sand, sawdust and other materials to soak up waste oils is not only wasteful but often these foreign matters get into the lubricant itself, which results in an inestimable amount of damage to bearings and shafts, which in turn causes greatly increased cost of maintenance.

After giving due consideration to furnishing nothing but high-grade, suitable lubricants, and to see that the same are properly stored and a record kept of each amount used daily, a fundamental factor necessary for the efficient lubrication of trolley cars, in which the major part of lubricants are used, is the proper saturation of waste. Practical experience has proved that each pound of waste should not contain more than 2½ pints of oil. When a greater amount is allowed to remain in the waste, it is impossible to keep the waste properly against the bearings. A short time after bearings have been packed, where the feed of oil is by capillary attraction, the waste sags away from the bearings and trouble results.

In the article, you mention in particular: "That the quantities of various lubricants used are followed up very closely by representatives of the oil companies who visit the railway properties. . . ." This is quite true in so far as The Texas Company is concerned, and this detail is considered to the extent of seeing that no extravagance in the use of lubricants occurs, but not with a view of cutting the allowance of lubricants to a point where there is probability of trouble developing.

I also note that 23 railways which you have investigated are reclaiming lubricating oils, which are put to various purposes. Of this number only one road uses reclaimed oil in the same manner as new oil. This is the proper procedure, provided the reclaimed oil is thoroughly cleaned and of straight mineral character. All reclaimed oils can and should be used for the purpose for which the new oil was initially recommended. For other purposes proper lubricants should be furnished. This is the practical and profitable method to be employed and to compensate for the installation of reclaiming outfits.

It is a fact that oils which are properly filtered, having all foreign matter removed, have even greater lubricating values than unused oils. However, this is a matter to which those interested should give serious consideration and confer with those experienced in the physical characteristics, manufacture and application of lubricants. The general effect which lubricating oils undergo through use is principally to increase the viscosity.

Until such time as used oils have emulsified or become rancid, the lubricating value has a tendency to increase through passing off of volatile matter. It will be found that through long-continued use the viscosity may become too high for efficient results. Samples should be taken by the oil companies furnishing lubricants and advice given as to the proper blending with lighter oil, for the purpose of bringing the viscosity to normal again.

On the other hand, seven of the companies mentioned in the survey are using the reclaimed oils for various purposes in connection with truck parts. It is the writer's opinion that this is not at all economical, and as a whole the oils reclaimed are unsuitable for the purposes mentioned, and less expensive and more suitable lubricants could be used. Six of the companies use reclaimed oil for journal bearings. If the oil is properly reclaimed it should also be used for axle and armature bearing lubrication. Three of the companies use reclaimed oil in air compressors. If the oil used for the latter purpose is oil taken from the compressors and reclaimed, it is a practical move but not otherwise. Two companies use the reclaimed oil for lubricating shop tools.

It is a question of the suitability of the oil which has been reclaimed for this purpose, and in the previously mentioned uses of reclaimed oils the latter two companies should also see that the oil is properly cleaned and then used for the same purpose for which it was initially recommended. One railway uses reclaimed oil for freight cars, trolley bases, door engines, automobiles, for track and general oiling. In this instance the use of the reclaimed oils in freight cars is practicable, but for the other purposes mentioned it is quite out of line, and for several of the purposes entirely unsuitable.

Another important matter which must be considered is the use of seasonal grades of oils. These consist of heavy-bodied oils for summer use, in which the pour test is comparatively high, whereas the lighter bodied winter grades of car oils have a pour test at the zero point. The regulation of the use of reclaimed oils as affected by initial physical characteristics can readily be handled so that uniform products can always be at hand for use.

GEORGE R. ROWLAND,
Superintendent Electric Street Railway Sales.

Testing Hangers to Make Sure That Studs Do Not Pull Out

BROOKLYN, N. Y., July 7, 1924.

To the Editors:

The description of the testing laboratory conducted by the Department of Street Railways of Detroit, as published in the ELECTRIC RAILWAY JOURNAL of June 28, gives a method of testing trolley hangers to insure that the studs will not pull out of the insulation when the hanger is heated. A similar test has been used by the Brooklyn-Manhattan Transit Corporation and its predecessors, the Brooklyn Rapid Transit Company and the Transit Development Company, for at least ten years.

There is one marked difference in the requirements of the Detroit and Brooklyn specifications. The temperature required is really the same, 65 deg. C. in Detroit and 150 deg. F. in Brooklyn. The length of time at which the hanger is to remain at this temperature differs, however, in the two companies. In Detroit one hour is specified, while in Brooklyn it is but thirty minutes. A half hour should be long enough to allow the insulating composition to become thoroughly heated and softened and will lessen the time required for testing.

The great difference in the tests is in the pull applied to the stud. While the Detroit specification requires only 100 lb., in Brooklyn the hanger must withstand a stress of 2,000 lb. While 100 lb. is more than the weight of the wire and overhead fittings that the hanger will probably ever have to support, yet the greatest strain on the stud will come, not under normal conditions, but when the trolley pole of a car gets hooked into the wire. To withstand the pull which it then will receive, and yet have some factor of safety, the test of 2,000 lb. does not seem to the writer to be too much.

G. H. MCKELWAY,
Engineer of Distribution
Brooklyn-Manhattan Transit Corporation.

Diameter of Detroit Trolley Wheel

DEPARTMENT OF STREET RAILWAYS
DETROIT, MICH., Aug. 11, 1924.

To the Editors:

It has been called to our attention that in the article regarding trolley breaks in your issue of July 19, the outside diameter of our wheel was shown as $8\frac{5}{8}$ in. This is incorrect, as the outside diameter as shown on the blueprint is $5\frac{5}{8}$ in.

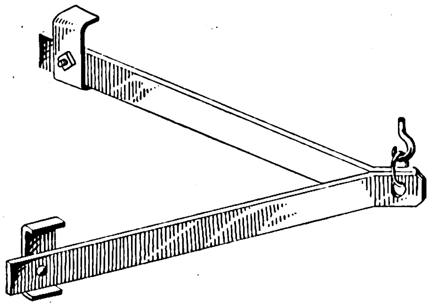
I would appreciate your calling attention to this error.

H. S. WILLIAMS,
Assistant Superintendent of Equipment.

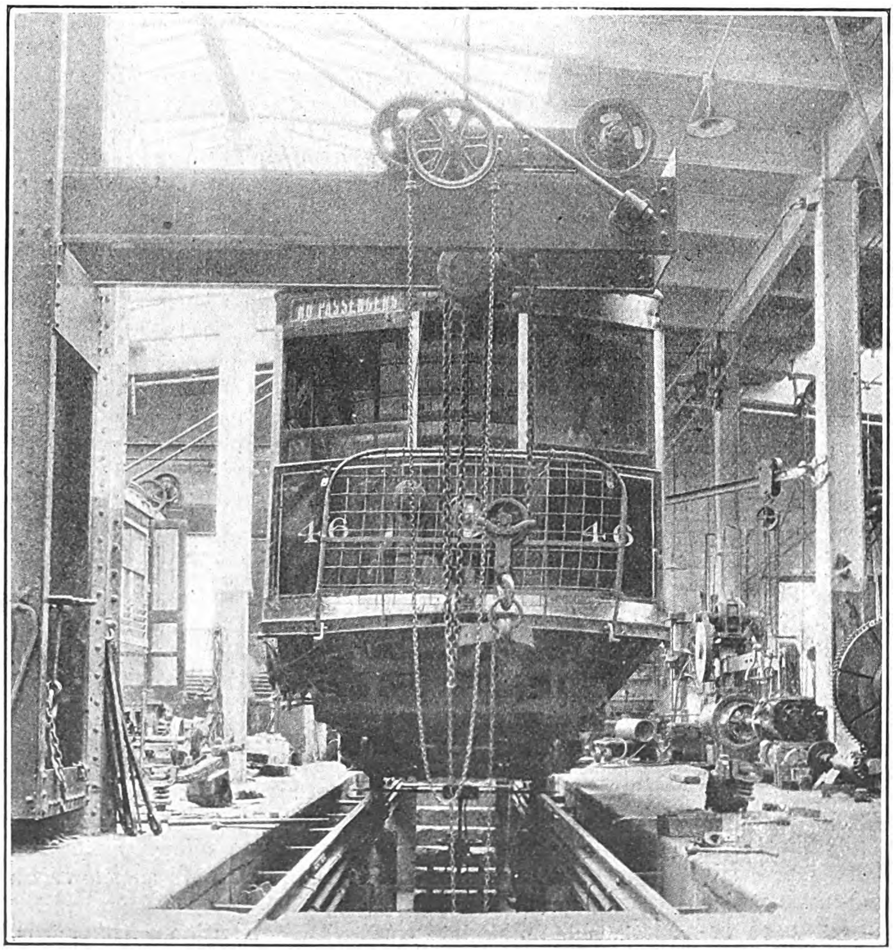
Equipment Maintenance Notes

Steel Frame Relieves Strain on Car Body in Hoisting

AN INGENIOUS arrangement has been devised by H. B. Baldwin, master mechanic Bangor Railway & Electric Company, Bangor, Me., for use in hoisting car bodies in the shop. Almost the entire equipment of this railway consists of lightweight safety cars, and the usual method of raising car bodies in the shop is by means of a QMS crane and a Yale triplex block, as shown in the accompanying illustration. In order to relieve the strain on the car underframe, which would result from attaching the block directly to the bumper, a V-shaped steel framework is used. The two arms extend under the car platform and U-shaped pieces hook over the channels of the car underframe. At the point is a large iron ring to which the hook of the hoist is attached.



Frame Used to Take Strain from Car Body



Raising Cars by Means of a Triplex Block and Special Frame in the Shops of the Bangor Railway & Electric Company

Mounting Grid Resistors to Keep Them Cool

EXPERIENCE has shown that the location and mounting of grid resistors has considerable effect upon the temperature they attain while in service. Since the circulation of air through the grids provides ventilation, it is quite essential in keeping the resistors cool that the individual grids themselves be arranged lengthwise of the car, as the movement of the car then will cause a current of air to pass between the grids. Where it is necessary to mount these near to the wheels or truck it is common practice to install splash guards to keep out wheel wash.

These splash guards shield the grids from air circulation as well as protect them from water, and precautions should be taken to make certain that they are not installed too close to the grids themselves and that as much space as posible is allowed for air circulation.

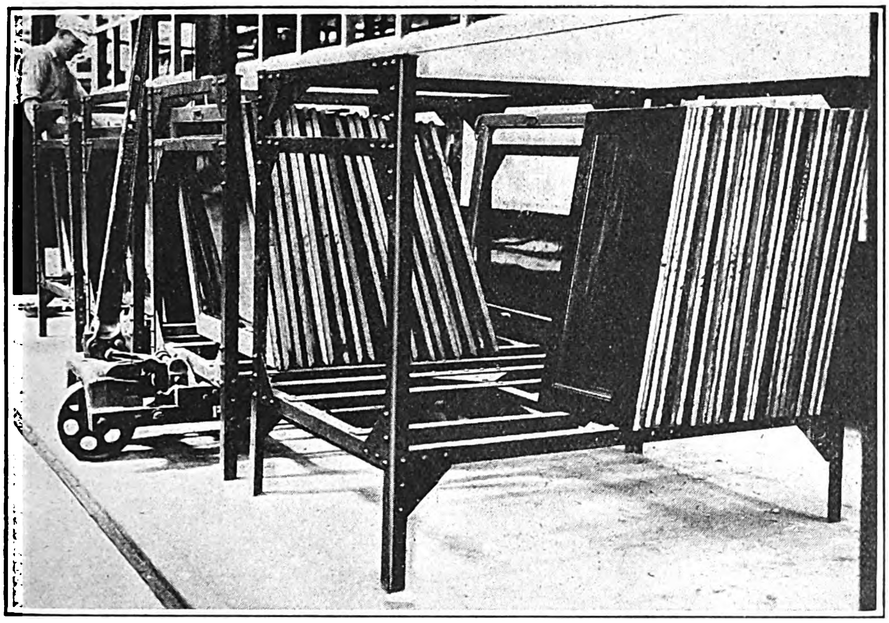
Another point that will assist in keeping the grid resistors cool is to drop them as low as possible underneath the car. This location is not only of advantage for ventilation but also gives more freedom for making the cable connections. In lowering resistors care should be taken not to mount them too close to the rail since there is danger of some high parts striking and breaking the grids. A clearance of at least 10 in. is desirable between the top of the rail and the bottom of the grid resistors.

Convenient Racks for Handling Car Sash

RACKS for storing and transporting car sash have been found particularly useful for overhaul work in the shops of the Department of Street Railways, city of Detroit, as mentioned briefly in the issue of this paper for July 5.

These racks are made up of 1¼-in. x ⅛-in. angle framing, riveted together and braced at the corners by small gussets. The vertical members are carried down to form short legs and, as shown in the accompanying illustration, the horizontal top angle is omitted from one side to facilitate stacking and removing the sash. In the bottom framing two horizontal flat steel strips are placed to form a support for small upper sash as well as for the larger size lower sash. The racks are of sufficient size to take a full set of sash for a car.

Cowan lift trucks are used to



These Racks Are Used in the Detroit Shops to Carry Complete Sets of Car Sash

transport the racks about the shops. They are run under the racks, as shown in the accompanying illustration.

When a car is stripped for overhauling all of the sash are stacked in one rack. They are then transported in complete car sets to the cabinet shop, where any necessary repairs are made. After this work is completed, the rack with its complete set of sash is transported to the paint shop. By using small wooden wedges between the upper edges of the sash they can be readily stacked directly in the racks after being refinished and are then transported back to the car from which they were taken. The use of racks of this type reduces the amount of handling to a minimum and avoids broken glass and other damage.

Simplifying Air Hose Assembly

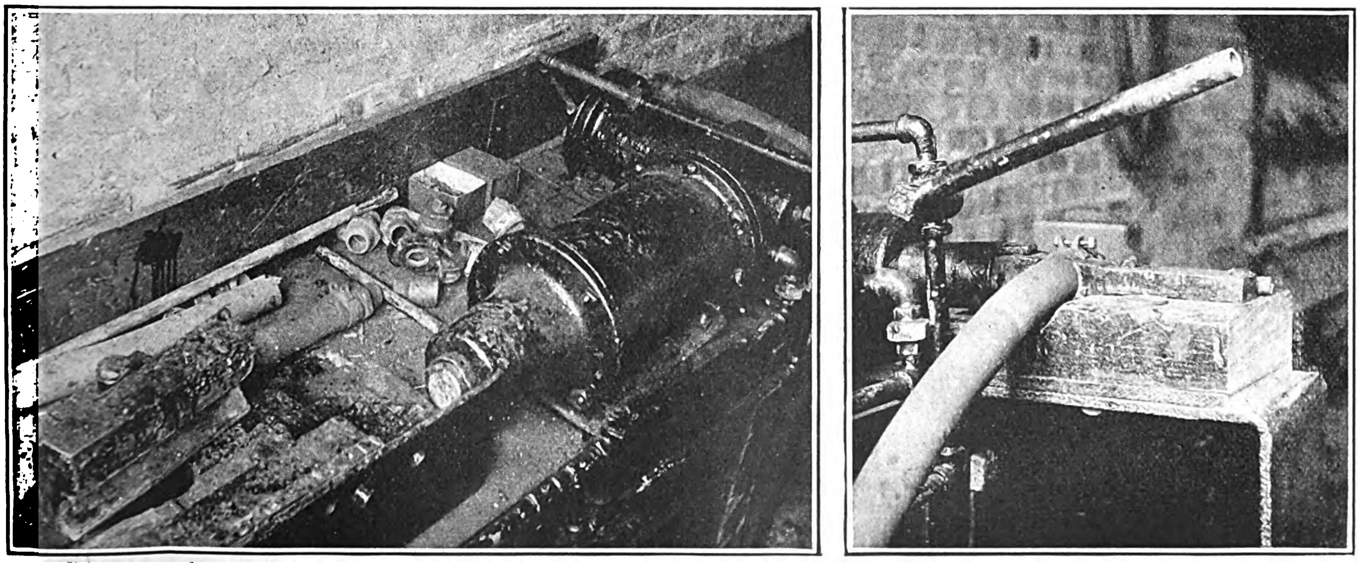
THE task of assembling air hose has been simplified in the shops of the Illinois Traction System at Decatur by applying fittings to each end of the hose and placing a band around to reinforce the connection. These operations are performed by pneumatic machines. One forces the fitting into the end of the hose, and another shrinks the clamp in position while the clamp bolt and nut are inserted.

The first apparatus consists of two parts. A holding device has a movable jaw 10 in. long grooved out to fit the hose, which is brought up against a similar stationary jaw. The movable jaw is actuated by air admitted to an 8-in. x 12-in. brake cylinder, the piston rod of which is connected to a toggle link mechanism. The movement of the piston closes the jaw while a spring returns the mechanism to its original position. Directly in line with the longitudinal hole formed by the closed jaws is another 8-in. x 12-in. brake cylinder with a blunt ram on the end of the piston rod. This is used for forcing the fitting into the hose while it is held in position by the jaws.

This apparatus is also used for removing fittings from old air hose. After the fitting clamp has been removed, the hose is clamped in position, a piece of small diameter pipe placed through the hose, and pressure applied to the end of the pipe by the cylinder used to press in fittings. The coupling fitting is removed first, then the hose is reversed, and, after a pipe cap has been screwed onto the threaded fitting, this fitting is removed.

After the fitting has been inserted, the hose is placed in the second apparatus. This consists of another 8-in. x 12-in. brake cylinder having a curved die, mounted on the end of the piston rod. When extended, this die meets a similarly-shaped concave anvil, curved to receive the hose. The binding clamp is placed in the proper position around the hose and the hose inserted between the jaws of the apparatus. Pressure is applied by admitting air to the cylinder, and with the clamp squeezed as tightly as possible the retaining bolt is inserted and the nut made tight.

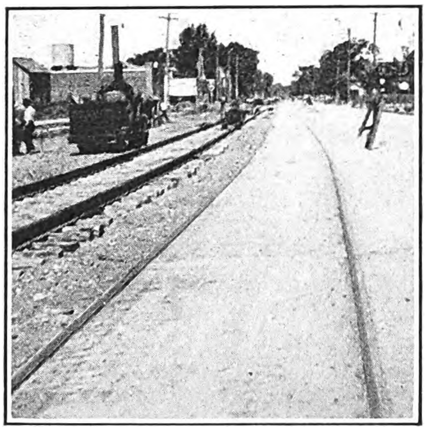
With these two pieces of apparatus the shops are able to turn out 1,000 1⅜-in. standard A.R.A. complete air hose in three days. This work is



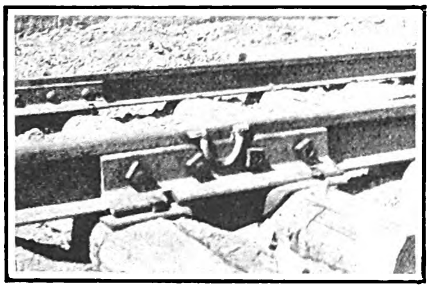
At Left, Brake Cylinder Used to Force Fittings into Air Hose. At Right, Jaws Hold Retaining Clamp Shut Until Nut Is Tightened Up on Fastening Bolt done for the stores department, the complete hose being requisitioned when needed in the shops.

Dirt Track Foundation in Portland

ON SEVERAL recent track rebuilding jobs the Cumberland County Power & Light Company, Portland, Me., has successfully used the old dirt foundation underneath its ties. A usual type of construction of this railway embodies 6-in. 100-lb. T-rails, wood ties, and granite block paving. Where the track has been in service many years and the ground is firmly packed under the ties no ballast is used in reconstruction work. The old ties are allowed to remain in place and new rails laid directly on them. Elsewhere, when needed, rock ballast is used for the track foundation.



Track in Portland Paved with Granite Block Inserted Under Rail Head

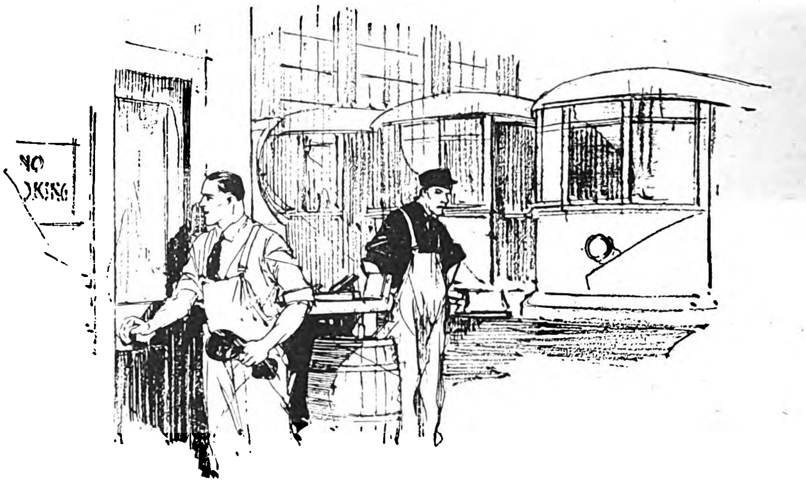


No Ballast Is Used Under These Ties, Which Rest on a Dirt Foundation

Concrete is poured between the ties up to the approximate level of their tops. Granite blocks are inserted under the head of the rail. By carefully selecting the blocks to get the larger sizes in the center of the track, the pavement is given the necessary crown. This type of rail and pavement is extensively used in Portland and has proved entirely satisfactory not only to the railway, but also to other users of the street.

A Summons for Dick Prescott

And He Answers With Some Misgivings



FOR several days following Mr. Milburn's visit, there was a feeling in the shops of the Consolidated Railway & Light Company that important changes were imminent. Nobody, however, knew what to expect.

In the brief period since coming with the company as its general manager, Mr. Milburn had shown a firm hand in instituting various changes in the practices of several of the departments. His courteous manner, coupled with obviously wide experience and mature judgment, had made a very favorable impression on the various department heads, and he was well along toward receiving full co-operation from them.

Thomas Mullaney alone had held aloof. While called general foreman of the shop, he actually was the superintendent of equipment. Previous changes in management had had little effect on his department. Usually the general manager had been too busy with other things to pay much attention to the shop, and Mullaney had visited the head office only on rare occasions.

Mr. Milburn's unannounced visit was a wide departure from precedent. His manifest interest in the shop equipment and methods gave each foreman an unusual thrill of pleasure and importance. His declared intention to follow the department's activities closely caused general comment and speculation.

During the several days since this visit, Mullaney himself seemed changed. A long conference in his office had followed the trip through the plant, and since then Mullaney had put in much of his time in the shop. He had suddenly become critical of existing practices and seemed unusually interested in suggestions for improvements. His stock reply of "We tried that 15 years ago," or "This has been good enough for 20 years, why change it now?" was strangely absent when the various foremen mentioned possible improvements.

Steve White, carpenter foreman, was delighted with the new trend of events, but still he felt uneasy about his spirited conversation with Mullaney, part of which at least he felt had been overheard the day Mr. Milburn had appeared unexpectedly in the shop. But Mullaney said nothing further on the matter.

Meantime, Dick Prescott, in his capacity as carpenter's helper, was outside the circle of active discussion of impending events, except as the men in the ranks noted and commented on obviously changed conditions. Dick had rapidly made friends among the men with whom he came in contact, even including some of the foremen. He had taken his place as a carpenter's helper with a willingness and cheerfulness that impressed those about him. No task seemed too small to be done well, and no man seemed too lowly to receive a cheerful lift if Dick was near by. During the lunch hour he joined the various groups, and was soon sought after to join in sports of his associates or to give an opinion.

Steve White had taken a particular liking to Dick. So when, several mornings after Mr. Milburn's visit, a telephone call came to have Dick report at once to Mullaney, he conveyed the message with some misgiving. Such a summons to Mullaney's office in the morning had never, to Steve's knowledge, been the occasion for rejoicing.

Dick was helping old Bill Newman, the carpenter, lift a heavy corner post into place when Steve called him aside.

"The old man wants you in the office," said Steve.

"Wants me?"

"Yes, said he wanted you there right away."

"All right. Thanks, Mr. White," said Dick. "Then I guess I'd better start right over. Somebody will have to give Bill a hand," and he nodded in the direction of the old carpenter, who stood waiting. "Those posts are pretty heavy."

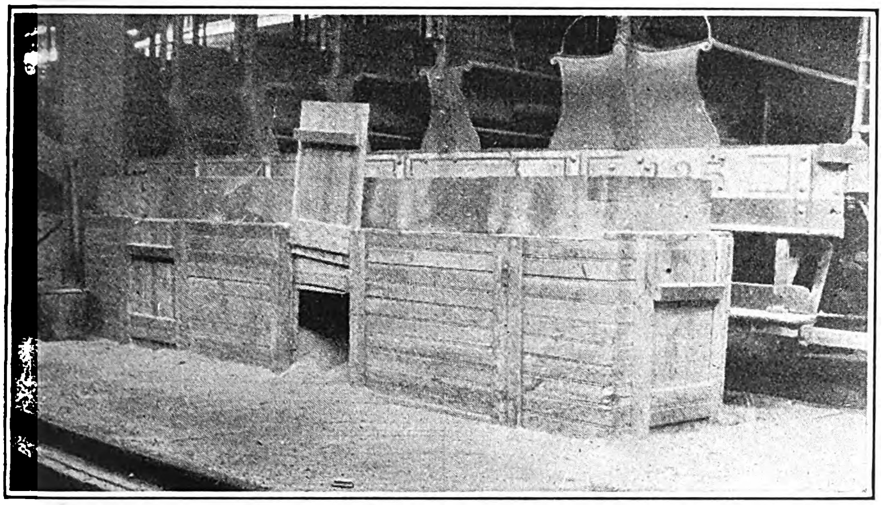
"Go ahead," replied Steve, "I'll take care of that."

Dick swung briskly off, anxious to make a good impression by being prompt. As he entered the outer office, the sullen-faced clerk at the timekeeper's window stared at him curiously.

"Mr. Mullaney sent for me," said Dick. "Is he busy now?"

"Knock on the door and you'll soon find out," was the ungracious reply.

Dick approached the heavy door to Mullaney's office and rapped firmly on the panel.



Electric Sand-Drying Apparatus Used by the Massachusetts Northeastern Street Railway

Electric Sand Dryer

A SIMPLE and convenient apparatus for drying out sand used on the cars of the Massachusetts Northeastern Street Railway has been designed by Harry Osgood, master mechanic, and installed at the company's shops, Salem Depot, N. H. A rectangular wood bin, about 2 ft. high, was built parallel to and between a pair of tracks in the carhouse. Near the top of this bin six old-fashioned electric car heaters were placed crosswise. Above them is a wide-mesh screen surrounded by 8-in. boards placed on edge. Wet sand is heaped on top of the screen, the heaters are turned on and as the sand dries it drops down into the bin. Trainmen desiring to secure sand for their cars obtain it through one of three sliding doors to the bin by means of a bucket and shovel.

Some Precautions in Rewinding Armatures

GREAT care should be used in rewinding armatures to guard against failure in service. Sharp corners and rough nicks in the slots which might damage the coils should be filed down. All chips and filings should be removed carefully before attempting to apply the insulating material to the coil. The coil itself should be a tight fit in the slot and should be wound so that its top is $\frac{1}{32}$ in. above the band grooves. Fillers should be used between the top and bottom coils if necessary to get the correct position. By having the coils extend above the band grooves they will be pulled down tight when the bands are applied. The bands, however, should rest on the iron in order to prevent movement in service. If the coils are wound too high the bands will not rest on the iron, and when the insulation dries out in service the bands will become loose.

While placing the coils in the slot they should not be twisted or abused any more than is absolutely necessary. Care should also be taken to avoid crossing of the leads in such a manner that when pressure is applied there will be danger of a short circuit. The ends of coils should be forced down against the coil supports so as to make a solid foundation for the bands, but pounding should not be carried to the extent that the coils or leads are damaged. The tool used in driving the leads into place should be free from sharp corners that might nick the leads and result later in broken wires and open circuits.

Insulated protecting sleeves should be placed at all points where the coils cross and where there is danger of short circuits. The cotton sleeving used on the leads should not be allowed to get into the commutator slot, as it may prevent soldering.

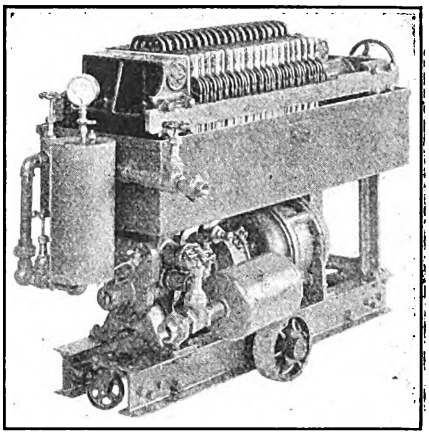
New Equipment Available

Improvement in Oil Filter Presses

AN IMPROVEMENT in the oil filter press manufactured by the General Electric Company is the addition of an air bell for testing suction piping so as to avoid freely mixing air with the oil as it is being purified. This is undesirable in most modern types of power transformers which are equipped with special tanks to keep the air out of solution in the oil, thereby greatly prolonging its life and assuring its efficient operation.

Leaky suction pipes and joints in pipe lines to the purifier have heretofore been one of the most difficult conditions to guard against. To facilitate precautions against such leaks all G-E oil filter presses are equipped with air bells which provide a simple and convenient means for testing the tightness of the suction piping, pump stuffing boxes, etc., before filtration is begun.

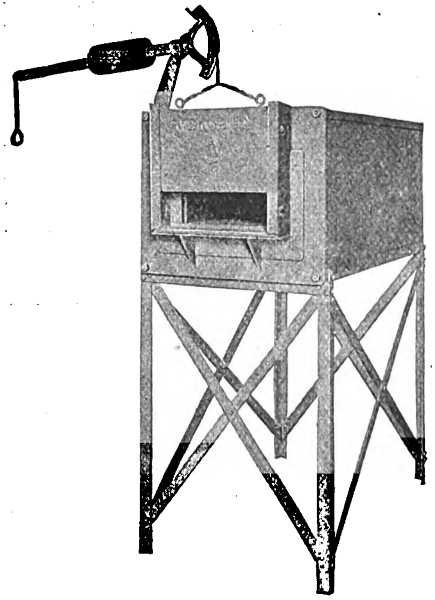
The air bell is so arranged that it can be pumped up to the shut-off pressure of the filter press pump. After the suction pipe valve is closed at the transformer drain the pump is stopped and the stored air pressure is automatically released against the oil in the suction piping. If this piping, the pump stuffing boxes, etc., are in good condition, it is possible to hold the pressure of 20 lb. or so for several hours, although 10 or 15 minutes will be sufficient to test, as any leaks will generally show up immediately. Leaks will now be outward and will show oil coming through so that they can be readily located and corrected. The actual pressures obtained during this test depend upon the relative volumes in the air bell and the suction piping, and hence will vary somewhat with the conditions of the installation. Air bells are available as supply material for equipping existing filter presses with this new feature.



Oil Dryer and Filter With Capacity of 25-30 Gallons per Minute

Electric Furnace for Heat Treatment

A NEW industrial hearth-type electric furnace for operation up to 1,850 degrees Fahrenheit has been recently perfected by the Westinghouse Electric and Manufacturing Company. These furnaces, known as type B, are made with hearth sizes ranging from 4 in. wide and 10¼ in. deep to 12 in. wide and 36 in. deep. They are suited for such operations as annealing, hardening, tempering, normalizing, carbonizing and case hardening. Automatic temperature control makes it possible to duplicate heating conditions and enables a predetermined manufacturing schedule to be carried out.



Electric Furnace with Control Pyrometer

A distinctive feature of this new furnace is that the muffle plates, which completely inclose the heating chamber, are perforated so that heat is radiated directly from the heating element to the charge. This unusual construction permits a high temperature in the heating chamber without undue deterioration of the heating elements. These elements, which are S-bend coils of nickel-chromium wire, are placed on all four sides of the heating chamber and are supported and aligned by molded studs on the muffle plates.

The door of the type B furnace is suspended by a chain from one point. The operating handle is counterweighted so that the door opens or closes easily and will remain in any position. Angles bolted to the guides hold the door closely against the front casting but allow it to move easily.

Standard insulating bricks next to the shell are supported by the high temperature insulation, which is in the form of slabs, relieving the muffles of the weight of the insulation. The furnace shell, or casing, is of heavy sheet steel, with the sides and bottom in one piece. The top, however, is a separate piece to facilitate removal for repairs to the insulation or heating element.

The rear casting design is a frame supporting an asbestos panel through which the ends of the heating coil protrude. Heavy air-cooled connectors join the coils in series and connect to the lines.

The automatic control of this furnace enables the operator to maintain a desired temperature indefinitely. In the control instrument, a stationary pointer carrying two electric contacts is set at the desired temperature and the furnace turned on by a conveniently located push button. As the temperature rises, an indicating hand moves along the scale. When it reaches the upper of the two contacts carried by the stationary pointer, the relay is energized, opening the magnetic contactors and cuts off the current. When the temperature falls to the point where the indicating hand reaches the lower of the contacts on the stationary pointer, the relay cuts the current on again. By this means the temperature may be kept within limits of approximately 1 per cent without any attention on the part of the operator.

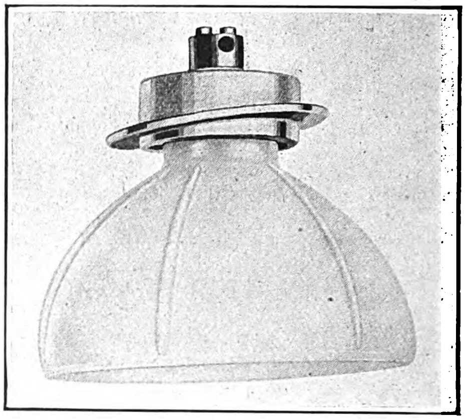
Red Lead-Graphite Primer

THE Joseph Dixon Crucible Company, Jersey City, N. J., has placed on the market another paint product known as Dixon's red lead-graphite primer, after tests lasting for over a year. The pigment of this primer consists of flake silica-graphite, red lead and high grade oxide of iron. The vehicle is boiled linseed oil. The primer will dry perfectly in 22 hours under normal conditions and will cover approximately 400 sq. ft. to the gallon on metal surfaces.

The new primer is said to have qualities of red lead together with the well known water-repellant advantages of a silica-graphite paint. Under application it lessens the "drag" on the painter's arm and is not so severe on the wearing qualities of the brush as red lead. It will not chip nor scale off, has greater covering power than red lead, and costs considerably less.

Reflector Specially Designed for Bus Lighting

A REFLECTOR designed especially for 21-cp. lamps used in bus lighting has been placed on the market by the Ivanhoe Division of the Miller Company, Cleveland, Ohio. This reflector is of light opal glass, which allows about 30 per cent of the light to be transmitted through it for general illumination and to light up the advertising racks. The reflector is comparatively deep and shields the lamp well. Approximately 65 per cent of the light is directed downward. The construction of the holder is extremely simple, and the usual fastening screw has been eliminated, thus reducing the likelihood of noisy rattling. Two types of reflector have been designed, one for use where the roof is flat, and the other where the roof slopes.



Opal Glass Shade for 21-Cp. Bus Lamp

Asphalt Composition Rail Filler

THE Philip Carey Company, Cincinnati, Ohio, is putting on the market a rail filler of specially tempered asphalt composition. This acts as a resilient cushion between the rail and the pavement, absorbing traffic impact, rail vibration and traffic noise. It comes ready formed to fit any rail section and is readily shaped to fit any track curve. Moisture or temperature changes do not affect it.

The new rail filler is made to extend a short distance beyond the rail itself, so that the paving is laid not against the steel rail but against the filler, being thus cushioned against impact with the rail. The cost of installation is extremely moderate, as one man can place it in position with a mallet.

Association News & Discussions

Improvements in Motor Car Design*

Trends in the Design of Electric Railway Rolling Stock Considered from the Standpoints of First Cost and Maintenance—Bodies, Running Gear, Ball and Roller Bearings, Brakes and Other Parts Discussed

BY H. DUBATH
Engineer Swiss Industrial Company, Neuhausen, Switzerland

FROM the point of view of the running gear, double-truck cars present less variety than single-truck or two-axle cars. The two-axle cars are from 23 ft. to 33 ft. over bumpers, with wheelbase varying from 5 ft. 6 in. to 9 ft. or occasionally as high as 11 ft. with radial axles. With wheels of 31-in. to 37-in. diameters, as commonly used in Europe, determined by the size of the motors, the wheels are sometimes projected into pockets in the car floor. This arrangement is not held in much favor, drop platforms for the purpose of lowering the step height being considered preferable.

In many of the older car designs common in Europe the axles are supported directly from the body. In this type the point of attachment of the platform is always relatively weak, and requires heavy reinforcement.

The Americans were the first to build two-axle cars with the running gear separate from the body. This construction has numerous advantages, particularly due to the spring support of the greater part of the weight and to ease of repair, but it is heavy, the dead weight per passenger being in the neighborhood of 660 lb.

Replies to a questionnaire sent out by the author indicate that the large number of available types of trucks hinders the development of pressed steel designs, since the expense of dies limits the application to quantity production. It is not felt that the use of pressed-steel trucks increases the difficulty or importance of repairs. With the use of autogenous and electric welding processes repair work is facilitated and the total cost is likely to be less than for a running gear assembled of standard sections. Pressed steel for fabrication of trucks in quantity permits an economical proportioning of material, thus making possible a reduction in weight of the truck that may reach 20 to 25 per cent.

Light metals may be used advantageously for the purpose of reducing the weight of the truck in the construction of small trailers. For motor cars, however, the reduction in weight cannot be obtained without jeopardizing the strength and solidity of the truck. Light metals are useful for small parts and accessories where strength is not a controlling factor.

ELASTICITY OF BODY SUSPENSION

The number of different spring suspensions of motor cars is in proportion to the importance of the subject. Laminated, helical and conical springs are all used. A good suspension should be cushioned, should have sufficient working range, and should be damped in action. Laminated springs alone combine these qualities. Helical springs are used frequently over the journal boxes, but this faulty construction is being abandoned.

Although satisfactory tests have been made of greasing laminated springs, the results do not justify extension of the practice. The collected dirt on the leaves cannot do other than harm their action. Furthermore, it is necessary to use leaves of special design, which increases considerably the price of the springs. It is believed that careful cleaning and lubrication of the leaves with oil and graphite will suffice to maintain the flexibility of the springs. Inspection of springs in service, however, indicates that frequently the laminations are allowed to rust in their guides, completely destroying the flexibility of the springs.

Laminated springs should have their leaves as long as possible, with very large section, assuring a stable suspension. For use in cars where the running gear is suspended from the body, or in the case of swiveling trucks without side play, the spring hangers may be connected through small helical springs carried in telescoping cases. This arrangement absorbs the minor shocks in order to reduce the movement of the leaves so that the latter may be supported directly from the body.

The exact calculation of axle stresses is not simple, for it is not possible to determine closely all the forces acting. Various experiments have now made it possible to establish an empirical relation taking account of all the influences. Breaks due to faulty construction or too small dimensions are relatively very infrequent. They start most frequently from flaws in the material resulting from molecular strain in consequence of the continued shocks sustained by the axle in service, and the breaks occur after a considerable number of miles have been traveled.

The use of high-quality steel is demanded in the manufacture of axles. Despite the high price of special materials, nickel steel and chrome-nickel steel have been tried by many companies with satisfactory results. The only exception is the railway in Algiers, which tried without success axles of 2 per cent nickel steel having a tensile strength of 62,000 lb. and 25 per cent elongation. These axles cracked when the distance run was only about 9,500 miles. This bad result is due undoubtedly to the poor quality of that particular steel.

Chrome-nickel steel is but little used on account of its high price. Its excellent qualities should now permit a reduction in size of the axles. This has been tried in the new cars of the Paris system.

In the following table are presented the characteristics of various special steels used in axles, as furnished by the technical head of the Swiss Railway Commission on secondary railways. These figures correspond quite closely with those furnished in response to the questionnaire sent out by the author:

Type of Steel	Siemens-Martin	Crucible	Nickel	Chrome-Nickel
Tensile strength, lb. per square inch....	70,000–85,000	85,000–100,000	85,000–100,000	100,000–114,000
Elastic limit, minimum, lb. per square inch..........................	50,000	57,000	62,000	71,000
Elongation, with a length between supports of 10 diameters, per cent.......	20	18	18	15
Elongation, with a length between supports of 5 diameters, per cent........	24	22	22	18
Reduction in area, per cent...........	45	45	45	50

The following table gives current practice regarding the material used for the body of solid or spoked car wheels:

Type of Wheel	Spoked Wheels			Solid Wheels		
Material	Cast Iron	Soft Steel	Steel Casting	Soft Steel	Soft Steel Rolled	Steel Casting
Tensile strength, lb. per square inch..........................	50,000–57,000	48,300–58,300	54,000	57,000	52,600–62,500	54,000
Elongation for length of 10 diameters, per cent..............	18	25	20	20	20	20
Elongation for length of 5 diameters, per cent..............	18		..	24	24	..
Reduction in area, per cent......	35	50	..	50	45	..

Tires are most frequently made of Siemens-Martin steel, occasionally of crucible steel or electric furnace steel. The properties of the former materials are shown in the following table:

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*Abstract of a paper presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

	Motor Cars		Trailers
Tensile strength, lb. per square inch	100,000–114,000 or	114,000–128,000	92,400–106,600
Elongation for length of 10 diameters, per cent	15	13–12	16
Reduction in area, per cent	30–40	30–40	30–40

For tires, the same authority quoted above states that the material is satisfactory if the product of the tensile strength in lb. per square inch and the elongation is equal to or greater than 1,400,000. For the bodies of solid wheels with solid tires this is considered satisfactory, while cast steel should have from 70,000 to 85,000 lb. per square inch tensile strength with 12 per cent elongation and 30 per cent reduction in area.

The tendency is to permit the use of very hard tires having a tensile strength of 106,000 lb. per square inch or over. Tires of this sort may exert an unfavorable influence on track maintenance if the quality of the rails is inferior and if the curves are not carefully maintained. The outer rail may be seriously damaged, particularly where there is no spiraling at the entrance. This has been the experience of a number of companies which have used tires of a tensile strength from 107,000 to 114,000 lb. per square inch.

BALL AND ROLLER BEARINGS

Only the results will be cited briefly of various trials and experiences in service with ball and roller bearings. In 1921 the Swedish State Railways supplied roller bearings to a series of ore cars with a light weight of 12.7 short tons and a weight fully loaded of 38.6 tons. In the course of a series of experiments made under similar conditions and comparing with ordinary friction bearings, the following results for train resistance were obtained at a speed of 25 miles per hour: For a car provided with ball bearings, 2.12 lb. per short ton; with friction bearings, 3.28 lb. per ton. This corresponds to a reduction of tractive effort of about 38 per cent in favor of the ball bearings. The starting resistance is reduced enormously, being not over 10 to 15 per cent of that obtained with cars having friction bearings. The tonnage of a train can be increased some 35 per cent without causing an overload on the motor.

Tests made on the tramways of Schaffhouse, Switzerland, have given equally favorable results with ball bearings. These tests, made in August, 1921, with a single motor car weighing 13.65 short tons and loaded with 2.2 tons showed a reduction in train resistance of 40 to 50 per cent, while the starting resistance was not over 35 per cent of that of the same motor car provided with friction bearings.

Unfortunately, the theoretical advantages of ball bearings are not sufficient to overcome the drawbacks. The high cost, about 2.4 times that of ordinary friction journal bearings, the breakage of balls, the abnormal wear on the journals following the rotation of the ball race and scoring of the ball race following shocks, are among the troubles which have caused an increase in expense of operation.

Summarizing, the author considers that ball bearings, on account of their delicacy, are not suitable for use in rolling stock.

Roller bearings are in use on several Swiss tramways, while others are waiting for the necessary funds to proceed with the substitution. A series of tests were made in March, 1923, by the German Rolling Stock testing department, of a car equipped with roller bearings. This test car, with a light weight of 53,600 lb. and carrying normally a load of 110,000 lb., was provided with roller bearings. The tests consisted of projecting the car against a shoe fastened to the rail, or against a loaded tender, at speeds of impact from 7 to 22 miles per hour. While in one case the impact was so severe that the end of the car was damaged, the roller bearings were in perfect condition throughout the test and after its completion. Measuring the bearing with a micrometer there was no deformation whatever, neither of the rollers or of the race.

For the use of roller bearings in electric cars it is not considered necessary to provide a special electrical contact between the journal box and the axle. The Swiss tramway companies and light railways, which have adopted roller bearings, have found the contact quite sufficient.

The cost price of the complete journal box for roller bearings is about 2.5 times greater than that for an ordinary friction journal box, although this may be reduced in quantity production. From the operating standpoint the economy of lubricants and the reduction of handwork in maintenance justify their adoption even at the present price.

MECHANICAL BRAKES

The brake rigging used on tramway and light railway cars is in general heavy and complicated, and the cost of maintenance is always high. This latter may be reduced materially by the use of pins of tempered steel and by attaching a rod on the brake rigging to the journal boxes. The higher first cost of this arrangement will be quickly balanced by reduced cost in service. Then, also, the repair of the wearing parts on the rod by acetylene or electric welding will be found economical, and the use of steel bushings, at least in a number of cases, will be found advisable.

The necessity of reducing the dead weight of motor cars in particular, has led to experiments on the application to rolling stock of the principles now found in the design of automobile brake rigging, with braking by means of a drum placed on the axle.

The advantage of a brake drum for a motor car is that it may be placed in such a position as to reduce the initial force necessary to obtain the braking effort, and consequently permits a reduction in the weight of the brake rigging. This simple reason leads to the solution applied on automobiles, that of placing the drum on the motor shaft. [As an example of this style of brake rigging, the author makes reference to the Paris cars which were described in ELECTRIC RAILWAY JOURNAL, for Dec. 2, 1922, page 878.—EDS.]

Comparing the modern cars with the older ones, their simplicity and harmony of lines is noticeable. This has been accomplished by the elimination of useless accessories and simplification of shapes, all of which have gone to reduce the weight of the cars. Framing of wood is used in general, oak being the preferred material.

Panels are usually made of black sheet iron or of wood. In many cases sheets of aluminum of 1.5 mm. thickness have been used but the results have not been entirely favorable. Along the seashore the metal does not resist salt air very well and in some cases has been replaced with wood.

Another interesting result noted is the decomposition of the aluminum sheets at points where they are in contact with iron, the aluminum being reduced to powder in a few years. In Switzerland aluminum has been adopted for sheathing by many companies with good results. The weight of aluminum sheathing is about one-third that of iron, notwithstanding the greater thickness of the panels. The price is about 50 per cent more than that of sheet iron. The painting, however, is simplified and the paint is more durable on account of the absence of rust. In order to make the paint adhere well to the aluminum sheets they should be roughened with sand paper.

TRAIN SIGNALS

The management of the Zurich Tramways has tried a new system of transmission of signals between conductors of motor and trail car and the motorman, and has introduced with success an optical signal invented by H. Schaub, assistant engineer of the company.

The signals are given by means of lamps with colored lenses mounted in parallel on the trolley circuit. On each platform, motor car or trailer, a mercury switch is placed against the bulkhead so that its motor shaft projects through and permits the conductor to give the signals from the interior. The signal lamps are placed on each platform before the motorman.

The red lamps correspond to the motor car, and the green ones to the trailer. Signals are given in the following manner: (1) While the train is running the lighting of the red or green lamps or both indicates "stop at the next regular station." The start is not made until the lamps are all extinguished. (2) Successive lighting and extinction of either red or green lamps signifies "stop immediately" as signaled by one or the other conductor. As in the first case, the train is not started until all the lamps are extinguished.

On account of the frequency of operation (about 1,000 per day) it is necessary to use a special type of mercury switch. This has given excellent results, and has been tested up to four million of interruptions.

METALLIC CAR FRAMING

The considerations that have led to the construction of cars entirely of steel in America for car bodies of subways, suburban steam railways and later by large railway companies do not apply with equal importance to rolling stock for tramways or light railways. The design is very much less. Likewise the effect of speed on these latter in the danger of telescoping does not exist to the same degree. The results on the cost of maintenance, however, may justify in itself this form of construction.

In Switzerland the Geneva Tramways placed in service in 1920 a set of 10 double-truck trailers, weight 11.65 short tons, seating 34, and having a total capacity of 64, being 363 lb. per total passenger. The frame is formed of pressed sheets 3 mm. thick, the sheets of the sheathing being of Siemens-Martin steel 2 mm. thick, those of the platform 2.5 mm. The posts and the car lines have furring strips of wood on the inside to which the sheathing or headlining is attached. To avoid rusting the frame and the running gear have been protected by the Schoop process.

ONE-MAN CARS

Since the very complete report on this subject presented at the last congress by P. M. Nieuwenhuis, manager of the Arnhem Tramways, various companies have investigated the question. Everywhere the authorities have taken the point of view that safety of the system with variable fares does not make the extension of the use of this type of motor car desirable, yet one-man cars have been placed on certain lines of light traffic.

STANDARDIZATION OF MATERIALS

The standardization of materials, desirable from all points of view, has encountered great difficulties. The enormous number of types of motor cars and trailers is evidently the natural consequence of varied and particular conditions of development in each system. Had the principle of standardization of materials been considered in the original plans, the promoters would have in a number of cases adopted approved types and exercised a good influence in the selection of material. Considerations often quite secondary have led to the opposite result, and the number of car types is growing greater and greater.

Today, the idea of standardization of material has made great progress. The ideal would be to limit the number of types to a few. The management of the electric railway of Little-Roubaix-Tourcoing gives the following statement on the subject:

"If we consider the city and interurban tramway systems, except Paris, it appears that the types of cars necessary may be reduced to four:

"A two-axle city type motor car of 42 to 45 passengers capacity, with two motors of 35 hp. each and a total weight of 10 (metric) tons;

"A two-axle city type trailer of the same capacity, weighing 5 tons;

"A double-truck interurban type motor car of 55 to 60 capacity, with power determined by the demand;

"A double-truck interurban type trailer of 55 to 60 capacity.

"In the case of those concerned with the two former types, the leading question is the wheelbase, which may not be settled easily, not all parties being agreed on the possibilities of a car with two rigid axles and a wheel base of 3.5 m. (11 ft. 6 in.) going around curves of 18 m. (60 ft.) in an economical manner."

For motor cars, this last point is solved in a very satisfactory manner by the elastic suspension as used in the light motor cars of the Paris system, the motor not being mounted on the truck.

But standardization does not apply alone to new equipment, and first cost and maintenance may be reduced proportionally by the standardization of the principal car parts.

On the Swiss tramways and light railways alone, we have taken account of at least 100 types of tires, for example. Under such conditions, replacements are very costly, and the delays in delivery are always very long on account of the low tonnage requirements. It is therefore indispensable to work for standardization of these and similar parts, to permit manufacture in quantity.

Excepting for the electrical equipment the author proposes the standardization of the following parts:

Axles, wheel bodies, tires, journal boxes, suspension springs, brake rigging, brake beams, brake shoes, couplers, parts of the car body framing, truck parts, pressed steel parts, glass and window frames, ferrules, etc. This will have not only a favorable influence on the first cost and on the maintenance of these parts, but also on the weight of the car. Standardization of this sort is particularly desirable for the smaller companies which find it impossible to obtain the advantages of construction of cars in quantity on account of their limited requirements.

REDUCTION OF CAR WEIGHT

As shown in this paper there are several factors that can produce a reduction in car weight. The dead weight carried per passenger is evidently too great, especially for tramway motor cars. Thus the mean established for the motor cars of 13 companies responding to the questionnaire give the following proportions: Weight empty, 14.2 short tons; seats, 28; total passengers, 56; giving a dead weight per seat of 1,015 lb. and of 508 lb. for all passengers.

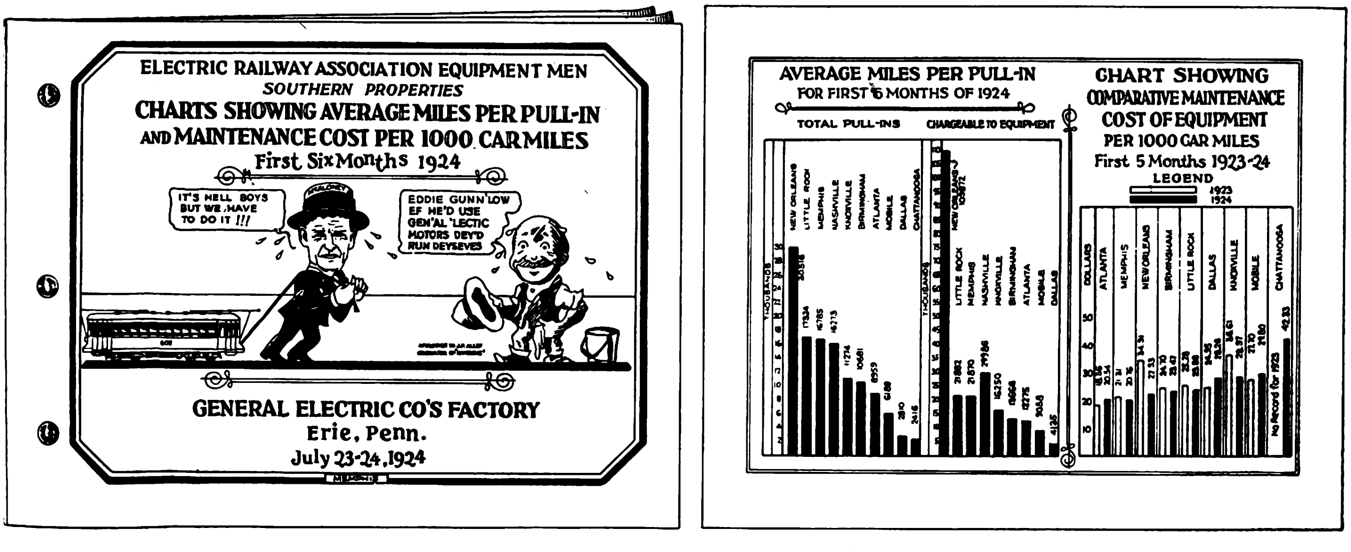
In Switzerland the average of all tramway motor cars is less favorable. This is due principally to the heavy grades, necessitating extra strong brake rigging, magnetic track brakes almost universally adopted, a very strong construction, capable of standing frequent and prolonged brake applications. The average figures follow:

Weight empty, 11.3 short tons; seats, 18; total passengers, 35; being a dead weight of 1,250 lb. per seat and 645 lb. with respect to the total carrying capacity.

The new light weight motor car, Type L, of the Paris system, has a light weight of 13.8 short tons; seats, 30; total capacity 49; dead weight per seat 920 lb.; dead weight per passenger 563 lb.

Southern Equipment Men Mix Fact and Fancy

A FEATURE of the meeting of the Electric Railway Association Equipment Men, Southern Properties, held at Erie, Pa., July 23 and 24, 1924, was the attractive booklet distributed to the members present. Fact and fancy were judiciously mixed in the preparation of this booklet. The front and back covers showed W. H. McAloney, superintendent of equipment Georgia Railway & Power Company, Atlanta, Ga., and J. M. Kington, master me-


ELECTRIC RAILWAY ASSOCIATION EQUIPMENT MEN
SOUTHERN PROPERTIES
CHARTS SHOWING AVERAGE MILES PER PULL-IN AND MAINTENANCE COST PER 1000 CAR MILES
First Six Months 1924
IT'S HELL BOYS BUT WE HAVE TO DO IT !!!
McALONEY
EDDIE GUNN 'LOW EF HE'D USE GEN'AL 'LECTIC MOTORS DEY'D RUN DEYSEVES
GENERAL ELECTRIC CO'S FACTORY
Erie, Penn.
July 23-24, 1924
AVERAGE MILES PER PULL-IN FOR FIRST 6 MONTHS OF 1924
TOTAL PULL-INS
CHARGEABLE TO EQUIPMENT
THOUSANDS
NEW ORLEANS
LITTLE ROCK
MEMPHIS
NASHVILLE
KNOXVILLE
BIRMINGHAM
ATLANTA
MOBILE
DALLAS
CHATTANOOGA
17324
16785
16273
11274
10681
8959
6188
2810
2416
NEW ORLEANS 105872
21882
21870
29986
16250
13664
12275
9068
4135
CHART SHOWING COMPARATIVE MAINTENANCE COST OF EQUIPMENT PER 1000 CAR MILES
First 5 Months 1923-24
LEGEND
1923
1924
DOLLARS
ATLANTA
MEMPHIS
NEW ORLEANS
BIRMINGHAM
LITTLE ROCK
DALLAS
KNOXVILLE
MOBILE
CHATTANOOGA
No Record for 1923
42.33

Front Cover and One of the Interior Pages of Southern Equipment Men's Booklet chanic Knoxville Power & Light Company, Knoxville, Tenn., in characteristic poses. The interior of the booklet was devoted to charts showing the average miles per pull-in and the maintenance cost per thousand car-miles on the various railways connected with the association.

Pacific Claims Men Discuss Safety Measures

STAGING of a general "accident prevention day" on the Pacific Coast, advocation of compulsory liability insurance for all autoists, concrete suggestions for new traffic rules, standardization of accident reports in all cities and recommendation that new autoists be required to pass examinations in order to obtain new licenses were the principal topics of discussion at the fifteenth annual convention of the Pacific Claim Agents Association, Spokane, Wash., June 23-25.

S. A. Bishop, general claim agent Pacific Electric Railway, was elected president of the association, to succeed P. O. Solon of Oakland, Calif. Other officers elected are V. F. Bennett, first vice-president; C. R. Peck, second vice-president; F. J. Furman, third vice-president; and B. F. Boynton, secretary-treasurer. The new executive committee consists of J. H. Handlon, chairman; Colonel Thomas G. Aston, H. G. Winsor, W. H. Moore, C. A. Blackburn, F. D. Oakley, H. K. Relf, A. M. Lee, C. M. McRoberts and P. O. Solon.

Internationaler Strassenbahn und Kleinbahn Verein

THE program for the convention of the Internationaler Strassenbahn und Kleinbahn Verein, or the Association of Street and Interurban Railways in the central countries of Europe, has just been made public. The convention, as already announced in the paper, is to take place at Homburg, v.d. Höhe Sept. 4 to 5. A list of the papers to be presented and their authors follows:

1. "Operation of One-Man Cars and Their Possibilities in the Way of Reducing Platform Expenses"; by Mr. van Putten of Amsterdam and Mr. Hultman of Malmö.
2. "The Automobile in Supplementary Service to Interurban Railways"; by Mr. Geiser of Schaffhausen.
3. "Rating Transportation Employees on the Basis of Car Miles Operated per Year"; by Mr. Nórregaard of Copenhagen.
4. "Determination of a Reasonable System of Fares for Street Railways"; by Dr. Patz of Budapest.
5. "Track Construction and Maintenance"; by Mr. Goetz of Leipzig.
6. "Standard Sections for Girder Rails"; by a member of the committee on standards.
7. "Magnetic Track Brakes"; by Mr. Barth of Christiania.
8. "Controllers and Control Sys-by Mr. Pforr of Berlin.
9. "Practical Experience with Self-Ventilated Motors"; by Mr. Nier of Dresden.
10. "Roller and Ball Bearings for Electric Motors and Car Journals"; by Dr. Videky of Budapest and Mr. Pforte of Hagen.
11. "Fares in Non-Expanding Territories"; by Mr. Winter of Vienna.

The business session of the association for the election of officers, etc., will take place on the afternoon of Sept. 5. On Sept. 6 and 7 the German Street and Interurban Railway Association will meet.

American Association News

Plans for Annual Convention

ARRANGEMENTS for the Annual Convention to be held in Atlantic City Oct. 6-10 are progressing. Nearly all the acceptances for the program have been received. Expectations are that it will be ready to submit to the membership, at least in tentative form, by the end of this month.

Committee reports are being received from the chairmen, and the work of editing and printing is being followed up as rapidly as possible. There are, however, some reports that have not been received, and it is hoped at association headquarters that they will be in hand so as to insure distribution prior to the convention.

Annual Convention

and Exhibits

A. E. R. A.

Atlantic City, N. J.

October 6, 7, 8, 9, 10

Engineering Association Nominations

THE nominating committee of the Engineering Association, John Lindall, chairman, announces the following nominations for officers and members of the executive committee for the coming year:

President, C. H. Clark, engineer maintenance of way Cleveland Railway, Cleveland, Ohio.

First vice-president, R. C. Cram, engineer surface roadway Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

Second vice-president, Charles R. Harte, construction engineer The Connecticut Company, New Haven, Conn.

Third vice-president, Daniel Durie, general superintendent West Penn Railways, Connellsville, Pa.

Secretary and treasurer, James W. Welsh, executive secretary American Electric Railway Association, New York, N. Y.

Members of executive committee: R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C.; E. H. Scofield, engineer power and equipment Twin City Rapid Transit Company, Minneapolis, Minn.; M. B. Rosevear, superintendent of distribution Public Service Railway, Newark, N. J.; Frank H. Miller, vice-president Louisville Railway, Louisville, Ky.

City and Interurban Operation

THE committee on editing appointed at the St. Louis joint meeting of the committee on city operation and the committee on interurban operation met Aug. 8 at association headquarters in New York. Those present were G. C. Hecker, J. S. Bleecker, G. W. Welsh and Morris Buck.

The contributions submitted by the regional vice-chairmen for the handbook were read and judged for publication with a view to selecting carefully for inclusion in it those descriptions of practices pointing the way to improvements that can be of value to other properties.

It was decided that the entire joint report of the two committees should be followed by the reports of the regional vice-chairmen, as this method will eliminate duplication and present the discussion in more logical form.

The reports of the regional vice-chairmen were read. It was found that each treated the subject matter from a different viewpoint. All but one of the regional vice-chairmen has presented a report for inclusion in the annual report of the committee. Work on the handbook is progressing in line with the recommendations made.

Special Reports Available

THE following special reports have been prepared by the Bureau of Information and Service of the American Electric Railway Association and are available to member companies in good standing upon request:

Electric Railways Operating Buses: A revision of the compilation of March 1, 1924, bringing up to date the data on number of routes and buses operated, type of bus and seating capacity, fare charged and transfer privileges of approximately 165 electric railways.

Trend of Electric Railway Operations: A month by month record of the traffic, revenues, expenses, taxes, car-miles, operating ratio, etc., of a group of 80 companies. Graphic curves showing the principal trends are presented to illustrate the figures, bringing the record of operations down through May, 1924.

Traffic Ratios — Part III, Combination City and Interurban Lines: There is shown for each of about 85 companies the average speed, revenue passengers per mile of track, per car-mile and per car operated, operating ratio, revenue per mile of track, passengers per car-mile, operating income per mile of track and other ratios.

Electric Railway Fares in Cities of More than 25,000 Population: A brief summary of fare systems and rates in each city, with a general summary reviewing changes which have occurred in recent years.

Relief from Paving Charges: Tabulated summary of 48 cases in which electric railways have been relieved either wholly or partially of the burden of maintaining the pavement between their tracks.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared, bringing them down to date.

The News of the Industry

$700,000 Spent for Track

Large Expenditure Made by Detroit Municipal Line Last Year for This Item Alone

More than $700,000 has been expended by the Department of Street Railways at Detroit during the last year for track construction, repair work, rehabilitation and extensions. A summary report by H. M. Gould, acting assistant general manager, discloses this fact. Major operations undertaken by the department during the year are divided in the report into five classes: New trackage constructed, special trackwork renewals, track reconstruction, major track repairs and work required in connection with the widening of twenty-one streets, the cost of which to June 30, 1924, was $53,000. The cost of completing this work is estimated at $111,650.

According to Mr. Gould's report, since May 15, 1922, when the city lines of the Detroit United Railway were purchased by the city, consistent and steady progress has been made toward rehabilitation of the property so acquired, new cars have been placed in service, in part replacing obsolete cars, trolley wire and overhead equipment renewed, power station equipment overhauled and repaired and track and pavement reconstructed. At the same time additional track mileage has been constructed and detail studies have been made to cover service for districts not now served with transportation.

SUMMARY OF WORK PRESENTED

New trackage cited includes four streets totaling 23,601 lineal feet of single track, part standard monolithic type construction and part open type construction.

Special trackwork renewals have been made in numerous locations where the life of the old special trackwork has been exhausted. The total of this special trackwork is 270 tons.

Track reconstruction was carried out on six streets where the former tracks were built in 1894, 1895 and 1909.

By major track repairs is meant the complete uncovering of the track to its very foundation; the tightening of the existing rails and ties on the foundation and the repair of the track joints by cutting in new pieces of rail where joints are broken down, and the placing of a new pavement.

Major track repairs are shown on fourteen streets. A summary follows:

Old track joints replaced	850
Lineal feet of straight rails resurfaced and relined	95,000
Square yards of pavement replaced	26,000
Cubic yards of concrete foundation replaced	1,000
Feet of rail corrugations ground	90,000

The report points out that numerous individuals and various associations have, from time to time, taken up with the Department of Street Railways the matter of extending service into districts not now served. In order to handle this very pertinent subject in an intelligent way the department has set up a traffic survey crew. The function of the members of this body is to make detailed studies of the sections involved, taking a house-to-house canvass to determine the exact number of potential car riders as part of the effort to procure what the Department of Street Railways considers a very necessary arrangement—transportation through co-operation. In a territory approximately 21 square miles in area the total cost of the survey was approximately $40 per square mile. These studies are designed to aid both the petitioner and the Department of Street Railways in determining the most economical and feasible type of transportation where it is shown that transportation is required. The sections now being studied embrace an area of approximately 41 square miles.

Fare Cut Denied to Cities

Commission Holds Connecticut Company's Rate Reasonable—Bridgeport Fare Advanced—Segregation Denied—In 1923 Company Earned About 4½ per Cent on Its Investment

THE token fares established by the Connecticut Company, that is, three for 25 cents, were recently declared reasonable by the Public Utilities Commission. Thus did the commission establish a uniform rate for all lines operating in Connecticut, as was referred to in the ELECTRIC RAILWAY JOURNAL of Aug. 2. This opinion was handed down in denying the petition of the cities of Hartford, New Haven, Waterbury, New Britain and Stamford, for reduction in fares. The rate in Bridgeport was ordered increased from 7½ cents, or two tokens for 15 cents, to 8⅓ cents or three tokens for 25 cents. In doing this the commission refused to make any segregation of the company's system.

The commission finds that the company in 1923 earned about 4½ per cent on its total investment. It said that if proper deduction for depreciation were made and a fair and reasonable estimate of present value ascertained, the rate of return now being earned would be considerably less.

The company received from all sources of revenue in 1923 about $14,780,000. After deducting wages, maintenance of property, state and municipal taxes and other general expenses, a balance of $2,530,000 was available for depreciation, return on property and reasonable surplus. The passenger revenues for the period Jan. 1 to Feb. 10, 1924, continued falling off at the rate of more than $1,000,000 a year. At the end of that period the 8⅓ cent token fare went into effect, except for the city of Bridgeport and adjoining communities. Revenue for the first three weeks subsequent to that fare increase after excluding Bridgeport showed an increase of 9 per cent when compared with the three weeks preceding Feb. 10, which were under the 7½-cent token fare. In addition, the company still owes the state of Connecticut nearly $802,000 in overdue and unpaid taxes.

The commission stated that the New York, New Haven & Hartford Railroad requested that it be allowed to intervene to the extent of asking that the Connecticut Company be accorded the right, if it could, to earn a fair return on the fair value of its property. For this purpose it made a statement covering the financial relations of the two companies since 1910, the year in which the Connecticut Company acquired its properties from the New Haven road. During this period the New Haven road has expended in interest on underlying bonds of the Connecticut Company about $10,000,000, and $2,500,000 for retirements and contributions to the sinking funds of these bonds. The New Haven has advanced the Connecticut Company in the same period the sum of $6,750,000, of which $500,000 has been repaid. The New Haven Company now holds $1,000,000 of overdue debentures, about $4,569,000 in demand notes, both issued by the Connecticut Company, as well as the beneficial ownership of the $40,000,000 of capital stock, or a total present investment of about $45,569,000.

In the matter of segregation the commission stated that the different cities asking segregation of the company's system offered no suggestions as to what territory outside of the city proper, each forming the nucleus of a division, should be included, and confined themselves to a claim that certain lines now included in the present divisional arrangement should be excluded. The commission said that since it appears conclusively that no division as at present constituted was earning a fair return on the fair value of the property in that division, it was obvious that there could be no advantage in regrouping of existing divisions resulting in an increase in the rates of some and probably in no case resulting in a decrease in rates for others. Further, it stated that the only advantage to be gained in a regrouping of the system into other operating and accounting divisions, would be the establishment of a rate of fare which might be lower for some divisions so created, although higher for others. Such rearrangement, no matter how carefully planned, would not eliminate certain fixed charges and inter-related expenses applicable to the company as a whole, and which would have to be allocated among the several divisions.

The commission said that in the absence of power to abandon non-paying lines, there might be a question as to the right to segregate the corporate property of the company into separate rate areas, as this would result in confiscation of that part of its property located in non-paying sections.

TOKEN FARES DECLARED REASONABLE

The commission said, therefore, that, based upon the foregoing, it was of the opinion that the token fares established by the company, to wit, three tokens for 25 cents, were not unreasonable; that the token fares in Bridgeport and adjoining communities should be increased from 7½ cents or two tokens for 15 cents, to 8⅓ cents or three tokens for 25 cents, and that the commission was not justified at this time and in these proceedings to make any arbitrary segregation of the company's railway system or to change the existing divisional lines. It was therefore ordered that the petitions of the cities of Hartford, New Haven, Waterbury, New Britain, and Stamford be denied. It was further ordered that the petition of the Connecticut Company for an increase in the token rates in Bridgeport and adjoining communities be granted, and the company was authorized and directed to establish and put into effect on and after Aug. 3, 1924, a token fare of 8⅓ cents or three tokens for 25 cents on the Bridgeport lines where the 7½-cent token fare was in effect.

New Power Rates Beneficial to Toledo Company

The City Council at Toledo has approved a rate settlement between the Community Traction Company and the Toledo Edison Company which will not jeopardize the interests of either company in present court and utilities commission actions, but will benefit the railway by assuring it a material saving in power costs. The new rate is retroactive to April 1 and approximates 1.3 cents a kilowatt-hour, showing a saving of about 3 mills per kilowatt-hour over the old rate. This amounts to a flat saving of more than $7,000 a month.

As compared with a similar period last year the company payrolls are showing a saving of approximately $30,000 monthly. In June this saving was $31,752.

Indianapolis Considers Bus

The use of buses to supplement city railway service is being considered by officials of the Indianapolis Street Railway, according to Robert I. Todd, president of the company. He said that definite action would be taken by the board of directors of the company after extensive surveys are completed concerning the advisability of their installation. If the buses are put in operation, they would be used to transfer passengers between lines at certain designated points and as extensions to car lines in rapidly growing sections of the city. The question of the company operating buses was brought up when officials of the company appeared before the City Council with a request for a fare increase. At that time members of the Council asked for information on the bus system and the company explained that because of its financial condition it would be impossible even to consider the matter. However, the company officials have decided to institute a survey, the result of which will decide the question of bus installation.

Port Huron's Anti-Safety Flurry Is Ended

Street cars were restored to service in Port Huron, Mich., on Aug. 9, and all but the bus men were happy. Service over the electric railway was shut down on Aug. 4 when the City Electric Railway (Detroit United Lines) started the operation of one-man cars. Hugh E. Stringer, chief of police, parked his car across the rails, as evidence that he was with Mayor McIlwain and the City Commission in their opposition to one-man car service.

As the company clearly could not afford to continue running twenty-four seat cars with two men each and at a 5-cent fare, it looked as though a long drawn out lesson in transportation economics was in store for the 35,000 inhabitants of Port Huron and their thousands of summer visitors. Happily this did not prove to be the case. The public had already secured most of its education vicariously through the troubles of Neighbor Saginaw. It had no desire to go through the same mutual recriminations and losses. An ordinance passed by the City Council required that service be restored by Aug. 7 under penalty of the loss of the franchise.

Pending a settlement of the dispute with the railway the city granted operating permits to a collection of motor substitutes ranging from the finest interurban multidoor de luxe coach to the shabbiest touring wreck. But every blessed one of them charged 10 cents and only one operator who owned several coaches did anything to make free transfers effective and his was a feeble effort. The realization that they were in for double and quadruple fares on vehicles operated by one man brought the public and its official sentinels to a rapid recognition of their inconsistency in opposing one-man direction of the cheaper, more commodious and tax-paying trolley.

That's why the City Commission accepted on Aug. 7 the suggestion put forth by Elliott G. Stevenson, president of the railway. He proposed that:

> 1. Service be restored on the basis of 50 per cent one-man cars and 50 per cent two-man cars, so that patrons can become acquainted with each.
> 2. The people be permitted at the election of Sept. 9 to decide this question: Do you prefer one-man car operation at 5 cents or two-man car operation at 7 cents?

The suggestion thus advanced was accepted.

First De Luxe Bus Run by Detroit Municipal

Ross Schram, general manager and other officials of the Department of Street Railways at Detroit, made a trial run of a Fageol fifty-eight-seat double-deck bus through the Grosse Point district and other places on Aug. 8 as the first step toward the expansion of the city's activity in this field. As announced in the Aug. 9 issue, the Department of Street Railways is planning to go into the bus field in a larger way than its present operation of a few supplementary buses and the Belle Isle Service.

The six-cylinder bus, borrowed for the occasion, is of the low-hung pneumatic-tired type with the wheel and axle housings placed so that there is no interference with the seats. The twenty-six seats on the lower deck are of the transverse type, upholstered in soft leather and of ample width for two wide-gage riders. The upper deck, seating thirty-two, comprises a longitudinal back to back bench made of heavy wicker weave and formed to permit comfortable, non-sliding riding. The bright color of the bus and its decoration with the city's seal (now decalcomaniad on all cars as they go through the paint shops) attracted much attention. During the run, the bus was stopped at one of the carhouses where it was subjected to valuable comment by conductors and motormen.

The following statement was issued by the Street Railway Commission:

> The sincerity of the Street Railway Commission in the matter of the plan for bus operation having been questioned by one of the papers, we wish to state that there can be no doubt as to our sincerity in the matter. The question has been studied by the commission for many months with the special assistance of William B. Mayo. It has been discussed with Mr. Martin, as Acting Mayor, and the general policy has been agreed upon by the officials concerned, merely awaiting final detail recommendation from the operating staff.
>
> The question of ordering or non-ordering of a definite supply of buses is not at this time important, as orders can not be given until we have a definite recommendation from the operating department upon which to act and with which to go before the Council for proper authorization.
>
> In so far as the ability of the commission to obtain buses is concerned, we wish to state that we have definite assurance of the delivery of from 75 to 100 chassis within ninety days, of course, subject to our approval of that design of vehicle.

Mr. Mayo, chief engineer of the Ford Motor Company, was formerly general manager of the D. S. R., and is still associated with the department in a consultant capacity.

Paving Being Done by Court Direction

Paving is under way between tracks in the village of Grandville, Mich., by the Michigan Railroad, now operating under Stewart Hanley, Detroit, receiver. The paving will be of brick and will be around a single track instead of a double one over which the company's cars hitherto passed. The strip to be paved is a mile long. It will cost about $57,000 to carry out the work. The construction follows a dispute of some years standing. After many months in court the railroad was ordered by the Supreme Court of Michigan to pave, but this was not done, company officials saying material was not then available. Recently residents took matters in their own hands and blockaded the tracks. Their action led to the hastening of the appointment of a receiver by Judge Clarence Sessions in United States District Court on petition of certain Chicago interests. The federal court ordered that as part of his duties as receiver, Mr. Hanley see that the work of paving was done.

St. Louis Bus Company Changes Original Petition

The St. Louis Bus Company applied on Aug. 6 to the board of Public Service of St. Louis for permits to open four routes from outlying sections of the city to the downtown district. This was a decided departure from the originally announced policy of the new organization, to furnish supplemental service to the cars of the United Railways with transfers from bus to street car and vice versa.

Two of the routes sought are virtually the same as those for which the People's Motorbus Company now has applications on file. The others conflict with plans of the rival bus company also. The formation of the new bus company followed the failure of the reorganization committee of the United Railways to come to terms for the purchase of the People's Motorbus Company and the rejection by the latter organization of the plan of Col. Albert T. Perkins, general manager for the United Railways, to furnish supplemental service to street cars with an interchange of transfers.

Mayor Henry W. Kiel of St. Louis conferred with the organizers of the St. Louis Bus Company on Aug. 5 and he expressed the belief that supplemental bus service as originally planned by the new company was not sufficient, contending that the people wanted through service on buses. The change in the plans of the St. Louis Bus Company resulted from the conference with Mayor Kiel. The Mayor has just returned from a trip to London where he attended the convention of the Advertising Clubs of the World. He is said to have informed interviewers that he considers surface street cars obsolete and regards motor buses and subways as the modern method of handling metropolitan transportation.

The new company plans to permit a transfer system with the United Railways and all money earned above a fair return on its invested capital will be given to the United Railways. Later when the United Railways reorganization is completed the bus lines will become part of the railway system. A contract is being drawn up to permit a fair adjustment on transfers between the buses and street car, subject to the approval of the United States District Court and the Missouri Public Service Commission.

The Board of Public Service at its meeting on Aug. 6 considered the applications of both the St. Louis Bus Company and the People's Motorbus Company for the new permits but took no final action.

Portland Electric Power Seeks Crosstown Bus Franchise

Formal petition for municipal franchises for the operation of "cross-town" buses at railway fares, and with car transfer privileges, has been filed with the City Commissioners in the form of a proposed ordinance, by the Portland Electric Power Company, Portland, Ore.

The franchise requested in the petition provides primarily for the operation of buses as an extension of the railway service. It also provides for the optional operation of buses in either or both directions on a number of additional streets in the city.

Duration of the franchise has been fixed at six months, Mr. Fuller explaining that the contemplated service is merely an experiment. Provision is made that if unusual storms or snowfall tie up the service, the franchise shall not be revoked if effort be made in good faith to continue such service.

The proposed ordinance stipulates that bus fares shall be the same as those charged on carlines operated by the company, and that passengers shall be entitled to the same ticket rates, transfers and other privileges as are granted railway patrons.

The company will provide for property damage insurance in the sum of $1,000 and liability insurance covering personal injury in an amount not less than $10,000 for one person in any one accident, and not less than $20,000 for all persons receiving personal injuries by reason of any one accident.

Continuation of the service and the operation of extensions thereto, will depend upon the financial returns of the experiment.

Bus Terminal Interest Acquired by Twin City Company

As the result of its purchase of the Twin City Motor Bus Company, announced in the issue of ELECTRIC RAILWAY JOURNAL for Aug. 9, the Twin City Rapid Transit Company, Minneapolis, has acquired the bus company's interests in the Union Bus Terminals in both St. Paul and Minneapolis.

The Minneapolis Depot is owned equally by six bus companies, and the St. Paul terminal by seven. The Twin City Motor Bus Company held an equal share with the other companies in each terminal, and under the terms of the purchase the railway acquires this interest as well as the other physical property of the bus line.

Contracts between the members of each depot company give the company the option to purchase the interest of any stockholder who desires to sell. Each participating stockholder cannot own more than a fraction of the total stock equivalent to the number of members in the terminal at any time.

Both the railway and the bus lines have expressed a willingness to continue under the original arrangement, so that the buses acquired by the railway in the purchase of the Twin City Motor Bus Company will continue to use the terminals as heretofore. The railway has become a participating member in the management of the two terminals. H. L. Bollum, general manager of the railway's bus interests, is a member of the board of directors of both the Minneapolis and the St. Paul Depots.

Orders Three-Cent Charge for Transfers

Replying to the demand of the city of of Tacoma, Wash., that it receive 3 cents for each transfer of the Tacoma Railway & Power Company taken up by the municipal car line, the company has made a counter proposal that the city and company take up each other's transfers without collecting anything for them. The proposal was submitted to the Council by E. J. Rounds, superintendent of the traction company, and referred to Mayor A. V. Fawcett, who has charge of the municipal line. The Mayor and the Council upon consideration, refused the company's offer, and notified the company that its transfers would not be honored on the municipal line unless the company agreed to pay 3 cents for each transfer collected by the city. Mayor Fawcett presented to the Council figures showing that the city would lose about $250 a month by adopting the system proposed by the company.

Ten-Cent Fare Sought in Johnstown

The Johnstown Traction Company, Johnstown, Pa., has filed with the Public Service Commission a new schedule of rates to become effective Sept. 5. The tariff provides for an increase to 10 cents, or four tickets for 30 cents. The present fare is 7 cents or four tickets for 28 cents. Special tickets to school children will remain at 5 cents.

The increase is made necessary, according to Manager Shannon, by the increasing demands for public improvements, street paving, relocations of tracks and in maintaining the present high standard of service. The increase in the use of the automobile has resulted in a decrease in railway receipts. In May, 1924, receipts were $99,761 as compared with $108,502 in May, 1923, in June receipts were $90,676 compared with $105,233 in June, 1923. July receipts for the first twenty-four days amounted to $68,351 compared with $82,624 in July, 1923.

Buffalo Bus Hearing Set for September

At the conclusion of the hearing before the City Council of Buffalo on the application of the International Railway and the VanDyke Motor Bus Corporation to operate a fleet of double-deck buses in Buffalo on a 10-cent fare, Mayor Frank X. Schwab said he would proclaim a transportation emergency existed on certain avenues and streets in the city and permit the operation of buses without the consent of the City Council or Public Service Commission.

Neither the International Railway nor the VanDyke Motor Bus Corporation would indicate whether it would take advantage of the proposed emergency order of the Mayor in view of the fact that a similar order was issued during the last street car strike and the higher courts of the state ruled buses were being operated illegally and ordered the Mayor to revoke the emergency permit.

It was evident that the City Council sought to sidestep definite action on the applications of the two companies for consent to operate buses in Buffalo so that the matter could be taken up with the Public Service Commission of the state. The Council said it would reconsider the applications early in September after the summer adjournment of the Council.

Mayor Expected to Report Soon on Chicago Purchase Terms

A special meeting of the City Council will be called during the summer recess to consider Chicago's traction problem. Several days ago Mayor Dever revealed that this was his plan. Whether he will submit a definite suggestion looking toward the municipalization of the traction lines of the city at that time or will report failure in the negotiations, the Mayor would not say.

The conferences called by the Mayor with officials of the Chicago Surface Lines and the Rapid Transit Company are nearing an end. The Mayor is awaiting definite figures from Samuel Insull, chairman of the board of directors of the elevated, touching certain phases of the valuation. These figures will be among the matters presented to the City Council, according to present plans.

Within several weeks at the latest, it is expected, the City Council will have before it the verdict of the Mayor and his traction advisers respecting the wisdom of the plan to purchase the existing lines at the price set upon them by the representatives of the various companies.

More Moves Made in Minneapolis

Significant events continue to follow each other rapidly in the history of the Minneapolis Street Railway, Minneapolis, Minn. The latest development is an attempt by the socialist-labor aldermen in the City Council to force the hand of the Minnesota Railroad & Warehouse Commission to reduce fares to 5 cents from 6 cents, with free transfers. Another move is the introduction by Alderman A. R. Gisslen of an ordinance to permit operation of jitneys in competition with the street cars. He said:

> In case the Railroad & Warehouse Commission does not find in favor of the city for a 5-cent cash fare with six rides for a quarter, we will run the railway out of the city.

The commission has practically finished the work of taking testimony in the Minneapolis Street Railway valuation case and a decision is expected before the end of the year as to a permanent rate of fare.

The jitney ordinance would be effective Oct. 1. It is proposed that the Council shall fix rates of fare and routes; that all jitneys must get city license, in the application giving names of drivers, provide a minimum bond of $10,000 liability for each bus with insurance of at least $5,000 for any person injured or killed; that each bus must pay annually $25 for each 7-passenger capacity, plus $2 for each additional seat; and loading must not be more than 50 per cent above seating capacity.

Jitneys were formerly operated, but they were withdrawn under the terms of a gentlemen's agreement that the Council would issue no jitney licenses.

O. J. Turner, chairman of the street railway committee of the Council, opposes the view favorable to the jitneys. He said the jitneys would take the short haul or cream trade and thus deprive the railway of the main source of passenger revenue. This would result in either decreased service or higher fares. He said:

> Under the state control act the fare is based on cost of service and the City Council should co-operate with the company in reducing service costs to the minimum.

Free bus service is offered to Glen Lake Sanatorium by the Twin City Rapid Transit Company. Buses are operated between Minneapolis and the sanatorium and the Yellow Cab Company competes with taxicabs marked "Fare same as bus fare to Glen Lake." Now the suburban trolley offers free bus service from Glen Lake station to the sanatorium. Commutation and regular tickets from Minneapolis include bus transportation at the regular cash fare of 24 cents or commutation fare of 20 cents.

Railway Extensions Proposed in Oakland

The Key System Transit Company, serving the East Bay cities in California, in addition to two bus lines in Alameda and three in Oakland, is planning two electric line extensions as a result of the traffic survey now in progress.

The first of these will give Piedmont easier access to San Francisco. In all, this will include about a half mile of new trackage along an old right-of-way never before used by the company and partly along tracks used by another line. Work has already been started on this line.

Piedmont, a city that adjoins Oakland, has applied to the State Railroad Commission for a transfer privilege from the cars of the traction company serving that city to Key System trains running to the San Francisco ferry. The new extension is a compromise on this matter.

The second electric line extension planned is one in Oakland. This will include about 1,000 ft. of trackage up Trestle Glen, serving the Glenview district, residents of which also are seeking more direct means to reach San Francisco than are at present afforded. Trains of the Key System Transit now run part way up the Glen, a district recently developed by a realty concern.

Strike Because of One-Man Cars.—The motormen and conductors of the Slate Belt Transit Company, Pen Argyl, Pa., which operates between Bangor and Nazareth, went on strike on Aug. 1 when they were asked to operate one-man cars between Wind Gap and Nazareth.

Authorities Differ Over Brooklyn Wreck Findings

Two official reports have been made in regard to the wreck on Aug. 5 at the Ocean Parkway elevated station of the Brooklyn-Manhattan Transit Corporation. One is by the New York State Transit Commission and the other by the Board of Transportation of the City of New York. The conclusion reached in both cases is that the brakes were applied too late to prevent the collision. No defects were found in the air brake equipment which might have prevented the proper application of the brakes.

The reports of the two commissions differ principally in the opinions that are expressed in regard to the question of the use of wooden cars versus steel cars for elevated service. The leader train, which was stationary at the platform at the time of the accident, was made up of steel cars while the so-called follower, which rammed the train ahead, was composed of wooden cars.

The report of the Transit Commission states that the operating motor car of the wooden-car train telescoped the rear car of the steel-car train for a distance of 13 ft. In doing so the under frame of the wooden motor car was forced under the rear of the steel car and the forward truck of the wooden car was pushed back so that the brake cylinder head of wooden car was broken. The entire side body frame on each side of the wooden car was demolished and the motorman's operating cab was forced back 6 ft.

The second car of the train made up of wooden cars was in turn telescoped by the front car for 10 ft. The drawbars between the cars were broken and the platform and forward bulkhead of the second car were demolished. The rear platform of the third car of the wooden-car train buckled and the buffer timbers broke. The remaining three cars were only slightly damaged.

The rear truck of the last car of the steel train was pushed forward and the drawhead was broken off. Other than this, the cars which made up the steel train showed no signs of damage.

The discussion as to whether there would have been less damage had both trains been composed of steel cars appears to hinge about the contention that due to the qualities of greater resistance to shock inherent in steel cars there is more danger of cars of this type being derailed and thrown from the elevated structure in case of collision than there would be in the case of wooden cars. The contention has also been advanced that in case of collision between steel cars on an elevated structure the cars would be likely to buckle while with wooden cars their superstructure would be demolished, but the cars would continue in the general direction in which they were headed without danger of derailment or of being thrown from the structure.

The Transit Commission takes the stand that the wooden cars were safe and adequate for elevated operation. The Board of Transportation maintains that the equipment was old and obsolete and consequently unfit for service.

Both Mayor Hylan and G. M. Dahl, chairman of the railway, have commented on the findings.

Brooklyn Company Asks Bus Rights—Zone Fares Suggested

Application was made on Aug. 14 by the Brooklyn-Manhattan Transit Corporation to the Mayor and to the Board of Estimate and Apportionment of the city of New York for franchises or other legal permits for routes for the operation of buses. Without undertaking, at the present time, to specify all of the routes upon which bus operation is desirable, application is made for authority to place buses in operation over routes in the Kings Highway, Brownsville and Richmond Hill sections.

Under the law, the Transit Commission will have jurisdiction of such corporation in respect to a certificate of necessity as to such matters as capitalization, accounts, character and safety of equipment and operation. The company explains, however, that in order that the city and the public may be further protected, it is willing to agree that the city shall have access to the books and accounting of the bus company and absolute veto power on all capital expenditures as well as the veto power on the issuance of securities or stock by the bus company and the price at which such securities and stock shall be sold.

It is suggested that the rate of fare be one which will pay operating expenses, taxes, provide for necessary reserves and give a fair return on the capital actually invested. During an experimental period, to be agreed upon, the rate of fare upon the routes suggested would be 5 cents.

Chairman Dohl for the company says he is willing to discuss with the city authorities the public advantage of a 5-cent fare for short hauls and a higher fare for longer hauls and the establishment of a scientific zoning system as well as the possibility of ultimately providing reduced fare transfers between bus surface and rapid transit facilities.

Safety Measures Considered in Chicago

There will be no more arrests of Chicago motorists who drive their cars across Chicago street car tracks at a speed greater than 10 m.p.h. The corporation counsel has so ruled. The city ordinance under which the arrests had been made was passed some years ago. It was intended to safeguard both the driver and the occupants of other vehicles from possible injury. The corporation counsel, his attention called to a recent ruling of the State Supreme Court that the right to prescribe speed regulation lies in the state authorities, agreed that the ordinance could not be legally enforced.

For the first time in its history Chicago will try safety loading zones. It was intended to start with them some time during the week ended Aug. 16. Both motor clubs of the city, called into conference with Leo J. Winiecki, director of the public service department, agreed that the city's traffic problem might be helped with the installation of loading zones. Zones 6 ft. wide and 55 ft. long will be painted on the pavement alongside the tracks. Parking will be prohibited 25 ft. back of the end of the zone which will be marked by removable standards. It is planned to operate the zones from 7 a.m. until 6.30 p.m. Two zones on Clark Street at Madison and Monroe Streets will be the first ones instituted.

"Go Slow!" Warns Court

Kansas City Jurist Gives Car Riders Some Facts to Ponder—Open Minded on Bus

Judge Kimbrough Stone, in charge of the receivership of the Kansas City Railways, has urged against premature action by the city on the subject of bus operation and has stated that "the court is entirely open minded" on the subject of operation of bus lines by the railway, "but has not the information and has not given the subject sufficient serious thought to reach any conclusion." The subject, however, was held to require careful study and consideration, both from the standpoint of the utility of the bus as an additional transportation agency in Kansas City, and from the position of the creditors of the railway, whose funds would be used if a new bus service under railway direction were instituted.

The court held that operation of an independent bus system in competition with the railway might work so serious an injury to the existing transportation agency that it would permanently cripple railway service in the city.

These ideas by the court were expressed in a letter addressed to the receivers of the railway. Except for the salutation, the letter follows substantially in full:

> As to bus operation by other than the railway the court has definite ideas derived from observing the actual effects of a similar form of competition from jitneys. As to operation by the receivers the court is open minded but has not the information and has not given the subject sufficient serious thought to reach any conclusion.
>
> Experience with jitneys in Kansas City has proved that regular operation of well equipped bus lines would result in dangerous loss of patronage and revenue to present street car service—a service made possible only because the wisdom of the city officials has done away with jitneys.
>
> The undoubted greater loss from regular bus lines probably would necessitate abandonment of many lines, unprofitable even now; might, if sufficiently threatening, force the court, to order stoppage of all service.
>
> Some manufacturers of buses get an operating franchise or permit from a city; go into operation; harm the railway and then sell to the railway at a handsome "water" profit.
>
> Right now in St. Louis a company controlled by the same bus manufacturing corporation whose representatives are clamoring to operate in Kansas City is, I am informed, demanding a profit of $1,000,000 or about 80 per cent above actual investment on the bus lines there. This court never will permit the car riders of Kansas City to be victimized through the purchase of a competing bus line.
>
> Whether railways should operate bus lines is a new and difficult problem. The question becomes particularly grave when the answer must be made by this court concerning property of others. Such a step involves:
>
> 1. A venture into new fields which have not (so far as this court knows) been thoroughly proved under conditions present in Kansas City (such as topography, density of population, character of paving, traffic congestion, traffic control, etc.)
>
> 2. A de luxe service not possible regularly to most street car riders because of the higher fare, or possibly, because of lack of transfer rights. However, it is clear that a combination of the two grades of service may react unfavorably upon the cheaper service, through removal of the richer class of the present street car patrons to buses or in other way.
>
> 3. The expenditure of a vast sum of money painstakingly accumulated to pay debts long due from an insolvent property to hundreds of creditors, many of whom are sorely in need of their money.
>
> No self respecting court would determine matters so seriously affecting the property and rights of others and of the public without full information and careful consideration. That information will be collected without undue delay or unseemly haste.

On the presumption that the receivers would desire to make the letter public, the court said:

> This court has had four years of intimate association with the railway problem and believes the welfare of the system and the well being of this community are inseparable. The court will do its best to preserve both. It can not, however, say what forms of transportation Kansas City shall select and have. That is the problem of the people of Kansas City and their chosen officials. Upon them must rest the burden of the responsibility of determining whether two competitive transportation systems can survive in Kansas City.
>
> To the correct solution of this problem the court bespeaks the careful, earnest thought and action of every serious minded Kansas Cityan. Unless you are convinced that the street car is no longer necessary, is it not wise to be cautious lest you cripple the only transportation system you have so that it will be unable to serve you except haltingly if at all? It is a matter for genuinely serious pause and thought.

Union Terminal in Los Angeles Will Be Decided by I. C. C.

The long-drawn out battle waged by the city of Los Angeles to force the railroads entering Los Angeles to establish a union depot at the Plaza has practically been closed with the city of Los Angeles on Aug. 5, filing its briefs for a decision by the Interstate Commerce Commission at Washington. The city requests the commission, in its order, to have the Southern Pacific abandon its main-line tracks on Alameda Street for the operation of passenger and freight trains, while a request was made that the Sante Fe line, the Union Pacific system, and the Pacific Electric system abandon certain grade crossings. At the same time, the Southern Pacific, Union Pacific and Pacific Electric joined their cases in one brief and argued for the establishment of a union station at the present arcade depot of the Southern Pacific while the Santa Fe objected to unification.

During the latter part of June the California State Railroad Commission and the city of Los Angeles presented their definite plans for the Plaza union passenger station for the trains of all the roads. The new plan of the commission proposes not to shut off any street nor would it eliminate the plaza from its historic position.

When this matter developed it was based upon the action of the California State Railroad Commission ordering the four rail lines to unify their lines in a joint terminal. The railroads fought the order of the commission and carried the case into the United States Supreme Court. That body ruled that the commission was without jurisdiction in making its order. The city of Los Angeles then carried its fight before the Interstate Commerce Commission.

In its application to the federal rail regulating body, the city asked that the original Plaza plan be ordered executed.

News Notes

New Tariff Filed. — The territory served by the Port Jervis Traction Company, Port Jervis, N. Y., in accordance with a new tariff filed with the Public Service Commission, has been divided into two zones, each with a 5-cent cash fare. This represents a reduction of 3 cents from the former rate. Between any point in Zone 1 and any point in Zone 2 the 8-cent cash fare will remain. Books containing ten tickets will be sold for 75 cents. Such tickets will be accepted for passage between any two points on the company's lines where the cash fare is 8 cents (reduction 5 cents). These tickets will also be good for certain joint transportation in connection with the Port Jervis Transit Company, Inc., a new bus company.

Thomas E. Mitten Safe.—Thomas E. Mitten, chairman of the board of directors of the Philadelphia Rapid Transit Company, Philadelphia, Pa., was not in the automobile accident in the Canadian Rockies in which his brother William E. Mitten was killed. Reports at first had it that the Philadelphia traction official had been killed along with his brother, but Thomas E. Mitten had left the party and was in Seattle at the time of the accident.

Joint Rates Continued. — Continuation of joint freight rates between the Bamberger Electric Railroad, Salt Lake City, and the Denver & Rio Grande Western Railroad has been ordered by the Public Utilities Commission of Utah. The Denver & Rio Grande Western fifteen months ago filed tariffs to cancel joint rates and increase rates on all classes and commodities of freight originating west of the Colorado-Utah line, which was to be shipped over both roads. The Bamberger Electric, which serves the centers of population, opposed discontinuance of the joint rates and acceptance of increased schedules. The commission takes the position that the proper development of the country, and the best interests of the shippers make necessary this continuance of railroad rates.

"Pass" Under Consideration. — The Ottawa Electric Railway, Ottawa, Can., is studying the "weekly pass" plan. The management in a recent issue of *O. E. R. News* stated that it was anxious to try any plan that would make for good service and a satisfied patronage.

Wages Advanced Ten per Cent.—A decision in the case of the employees of the Trenton & Mercer County Traction Corporation, Trenton, N. J., increases the men's wages approximately 10 per cent. The agreement followed a conference attended by James H. Vahey, Boston, Mass., representing the Union; Albert Richey, Worcester Polytechnic Institute, for the company, and Lewis C. Parker, chosen by the other two. The men asked for a 35 per cent boost. The new awards are as follows: An increase of 5 cents an hour retroactive to April 1; a payment of 10 cents to each employee who makes out an accident report; a credit of ten minutes' time to men for making out their daily reports; permission for the company to operate twenty swing runs and to pay not less than nine hours to be worked within fourteen hours. All early and late straight run work over nine and one-half hours to be overtime at time and one-quarter payment.

Plans to Extend D. T. & I. Railroad.—Henry Ford was authorized on Aug. 1 by the Interstate Commerce Commission to construct approximately fifty-six miles of new line for his Detroit, Toledo & Ironton Railroad at a cost of about $7,500,000. The commission also authorized the issuance of first mortgage bonds to raise the funds. The authorization was to the Detroit & Ironton Railroad, a subsidiary corporation, which Mr. Ford organized to build from Malinta, Ohio, to Durban, Mich. The new line will shorten haulage distances over the Detroit, Toledo & Ironton. Mr. Ford's plans looking toward the electrification of the Detroit, Toledo & Ironton have been referred to previously.

Wage Scale Renewed.—Trainmen of the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, on Aug. 6 signed a contract renewing the present scale and working conditions for another year. The men had previously sought an increase. The wages paid for another year will be 48, 50 and 52 cents an hour.

Hearing Concluded.—A hearing was held recently before the California Railroad Commission on the petition of the city of San Bernardino for a uniform 6-cent fare by the Pacific Electric Railway within the city limits. It is expected that a decision will be made within a month. The city as was referred to previously in the ELECTRIC RAILWAY JOURNAL is seeking to have the present 6-cent fare boundary limit extended from Mill Street to Esperanza. A 9-cent fare is now required on cars south of Mill Street. This is the rate between San Bernardino and Colton.

Tokens in Use on Long Island Line.—The New York & Queens County Railway, New York, N. Y., has begun the sale of tokens for 6 cents. This is the same rate as the cash fare, and the tokens are placed on sale as a convenience to passengers. This railway is the only road in New York City selling tokens.

New Rates Sanctioned.—The Public Service Commission has authorized the International Railway to issue a commutation coupon book good for 25 rides any time during a calendar month between Buffalo and Park Avenue, Tonawanda, at the rate of $2.50 per book. The new fares will be effective Sept. 1.

Buses Will Replace Cars. — The Citizens Traction Company, Oil City, Pa., will suspend railway service between Franklin and Rocky Grove. Bus service will be substituted.

Men Receive Back Pay.—The Worcester Consolidated Street Railway, Worcester, Mass., has just completed distribution of $150,000 in back pay among its employees. This money was due the men from Jan. 1 to the date of the decision of the board of arbitration which granted an increase of 10 cents an hour.

Recommend Service at Cost.—A committee of the Chamber of Commerce that has been studying the problem of making it possible for the electric railway in Tulsa to continue in operation has recommended a trial of the service-at-cost plan. The officials of the local railways state that they will be glad to have the experiment tried on their properties.

Will Operate Two-Man Cars.—Officials of the Springfield Street Railway, Springfield, Mass., have announced that they will comply with the request of the public and operate two-man cars from 5 a.m. to 8:30 a.m., and from 4 p.m. to 7:30 p.m.

"Weekly Pass" May Be Installed.—The San Antonio Public Service Company, San Antonio, Tex., is considering the advisability of the "weekly pass" plan for application on its system. The management believes this arrangement will increase the revenue. San Antonio now has a 6-cent fare with universal transfers.

Will Not Intervene in One-Man Car Protest. — The East St. Louis City Council has decided not to interfere with the plans of the East St. Louis Railway to install one-man cars on the Main Street and Cleveland Avenue divisions. This decision was reached following a conference with Mayor M. M. Stephens, city commissioners and W. H. Sawyer, president of the company. Mayor Stephens called the meeting after he had received a number of petitions protesting against the one-man cars. The City Council decided that it had no power to prevent the company from using one-man cars.

Unnecessary Service Ruled Out.—The Corporation Commission of Oklahoma has refused to permit J. A. McIntyre of Norman to establish a bus line for passenger service between Oklahoma City and Lexington via Moore, Norman and Noble. The commission holds that with the hourly service afforded by the Oklahoma Railway between Oklahoma City and Norman there is no necessity for the motor service and that public convenience would not be served thereby. The applicant was allowed to establish a bus line between Norman and Lexington via Noble.

Difficulties Settled. — Difficulties between the Michigan Electric Railway, Lansing, Mich., and its employees have been temporarily settled. The company has agreed with local Trades and Labor Council to reinstate after thirty days' suspension two bus drivers and 12 street car operators who were dismissed on charges of violating the rules.

Hearings for Buses in Framingham Settled.—Public hearings on the petitions of the Boston & Worcester Street Railway for permission to substitute buses in Framingham, Mass, on its Framingham Center and Saxonville branches will be held before the selectmen on Aug. 19, at the Framingham town rooms and before the state department on Aug. 22 in the State House. More trolley lines are said to enter Framingham than any other community in the state, outside of the larger cities.

Foreign News

Japanese Railway to Electrify

The electrification of the Tokaido Railway line between Tokio and Akashi has been approved by the directors of the divisions making up the entire railway system of Japan.

The work under consideration at present consists of the portion of the Tokaido line extending from Numazu to Akashi, a distance of approximately 300 miles. This work, not including the cost of locomotives, is estimated to require the expenditure of about 21,983,000 yen (approximately $10,700,000), made up of the following items:

	Yen
Substations	6,833,000
Overhead construction	13,203,000
Communication equipment	846,000
Train sheds	1,101,000
Total	21,983,000

It has been definitely decided to operate at 1,500 volts direct current, with single catenary overhead construction, fed from approximately twenty-five substations. It is estimated that approximately 80,000 kw. will be required to operate the system, which power will be purchased from private companies for the time being, though ultimately the government railways will construct a hydro-electric plant on the Tenryu River having a capacity of 65,000 kw.

Active construction work will begin early in 1925. The first section should be completed by the end of 1926, and the electrification of the entire Tokaido line is scheduled for completion by the end of 1928.

In addition to the electrification of the Tokaido line, the Railway Department has already prepared tentative plans for electrifying both the Central and the Northern lines.

While the foreign electric locomotives have so far dominated the field, at least one Japanese company is active in competing for this business. A trial locomotive recently completed and tested by the Hidachi Engineering Works in design embodies many features introduced by American manufacturers.

Traffic Project Proposed at Milan

Traffic congestion in Milan has become so serious that a committee was recently appointed to study the problem. A plan has been proposed, and approved by the Prime Minister, to decentralize the trams which terminate in Piazza del Duomo, a magnificent square with eight narrow streets leading into it. Under the new plan the trams would terminate at the Naviglio, a canal encircling the city about a mile out, and electric cars of the American light car type would carry passengers from the canal through the square to a destination on the further side of town. The type of car contemplated for inter-city service is a one-man storage-battery auto bus having a carrying capacity of forty to fifty passengers. This would mean economical operation and permit the cars to keep to the left, thus allowing two streams of traffic. It is expected that 150 new trams will be put into service soon to replace old running stock and also increase efficiency of service.

Extension of Paris Subway Is Planned

A project for the extension of the Paris Metropolitan Underground Railway to the suburbs at the east and south of the French capital is under consideration by the Paris Municipal Council. The first line it is proposed to extend will be that from the Bastille to Vincennes and that from the Luxembourg Gardens to Sceaux, making use of the present steam-operated surface railway line. The inner belt line railway, which joins the principal railroad stations in the capital, will for the time being be left out of the plan. The first problem to be decided is that of financing. Two committees working together, representing the Paris municipality and the government Ministry of Public Works, will formulate plans, through which the project may best be carried out.

Substantial Amount Invested in Barcelona Property

At a meeting of the holders of the 6 per cent first mortgage bonds of the Barcelona Traction, Light & Power Company, Barcelona, Spain, held recently in London, E. R. Peacock, speaking as president of the company, reviewed briefly the history of some of the important events in the development of the companies there. He said that since 1915 a substantial amount had been invested in the business of the operating companies, mainly from sale of securities of these companies.

In addition more than £2,500,000 had been put into the business out of earnings. It had been the policy of the company to keep the equipment in a high state of efficiency as part of the operating expenses but that any great operating company must year by year put back into the business a substantial portion of its earnings if it is to continue to grow and prosper. And further that it must confine its increases of capital to those required for the large developments which are called for only at long intervals. At the meeting resolutions were passed approving the proposal for the readjustment of the finances of the property. When the reorganization is completed the company, in the opinion of Mr. Peacock, will be in a sound position.

As originally contemplated the plan provided for the issuance of £2,000,000 of new consolidated 6½ per cent bonds to purchase and cancel £260,000 of prior lien bonds and for the redemption of the outstanding balance of £1,100,000 of 8 per cent debentures at 106.

One-Man Cars Operated in London Suburbs

The experiments carried out by the London United Tramways with a single-deck one-man car have been so encouraging that the company is now constructing others of the same type which will incorporate further improvements. The driver will be provided with a seat and he will control the car from an inclosed platform.

The car embodies many features of the one-man cars used in the United States, having doors with folding steps and interlocked control.

New Tramway in England

The Dearne District Light Railway of York, England, was formally opened for traffic on July 10. The company was organized over ten years ago, but was held up on account of the war. It is one of the few new tramway undertakings inaugurated in England in recent years. The line is 13 miles long and connects a number of mining towns and villages. As a precaution against decreased revenue, should mining operations cease, a special form of track construction was used at a cost of about £6,500 per mile of single track. Thirty single-deck thirty-six-passenger cars are employed.

Station Reconstruction Speeds Traffic

An increase of 500,000 passengers per annum is the result of the modernizing of Westminster Station of the Metropolitan District Railway. This station is now one of the most up-to-date of all the London underground stations as regards handling of traffic. The large circulating area, widened staircases and electric automatic passimeter ticket-issuing equipment have greatly facilitated the movement of traffic. The passenger inserts the correct fare in the ticket machine. This issues his ticket, dated and cancelled, releases the turnstile, registers him on a recorder and locks the turnstile after he has passed through.

New Railway Under Consideration.—N. B. Seblich, an electrical engineer of Berlin, is making an investigation of the traffic possibilities of an interurban electric railway to run from Mexico City to Cuernavaca, 75 miles. He represents Swiss financial interests, according to his statement. Power for operating the proposed line will probably be obtained from the plant of the Mexico Power & Light Company at Necaxa. Cuernavaca was the most popular tourist and week-end resort in Mexico in pre-revolutionary days.

Motor and Trolley Buses Denied in Croydon.—A committee of the House of Commons has denied the application of Croydon Town Council to run trolley buses and motor buses in connection with its tramways. Frank Pick, assistant managing director London General Omnibus Company, opposed the application, stating that it was the ambition of his company to be the sole provider of bus traffic in the metropolitan area and that wasteful competition should be eliminated.

Financial and Corporate

Good Year for Illinois Power & Light Corporation

The income from the properties of the Illinois Power & Light Corporation, Chicago, Ill., in 1923 showed a substantial increase over previous years. While the gross earnings were $27,930,854, an increase of 11.4 per cent over the year 1922, the net earnings were $9,119,047, or 24.6 per cent more than in 1922, the largest previous year. This is the first report of the company since the properties were merged, on May 25, 1923, into the Illinois Power & Light Corporation. The opinion is expressed by Clement Studebaker, Jr., president, that the consolidation of the properties formerly comprising the Illinois Traction System and the Southern Illinois Light & Power Company has proved in every way advantageous to the territories served, to the bondholders and stockholders and to the properties themselves.

DISPOSITION OF NET EARNINGS OF ILLINOIS POWER & LIGHT CORPORATION

Total net earnings		$9,119,047
Less fixed charges:		
Interest charges, etc.	$4,135,583	
Bond discount amortized	220,713	4,356,296
Surplus available for depreciation and dividends		$4,762,751
Dividend on preferred stocks, Illinois Power & Light Corporation and subsidiary companies		1,358,330
		$3,404,421
Appropriated for depreciation, in accordance with terms of trust indenture		761,943
Balance available for common stock dividends, etc		$2,642,478
Dividend paid on common stock, $1 per share		400,000
		$2,242,478
Additional appropriation for depreciation		1,238,057
		$1,004,421
Adjustment of prior year's dividends from subsidiary companies		30,536
Balance, Dec. 31, 1923		$1,034,957

It is explained that since the formation of the new company the officers and engineers have been intensively studying its physical needs with a view to creating and maintaining the highest type of service in its various communities. This involves the consolidation of sources of power supply and the installation of the latest production and distribution methods and modern equipment. In consequence in addition to minor power plant and transmission line developments, many changes of first magnitude are contempated. These extend to new and enlarged power houses, construction of new transmission lines and improvements to the railroad department. Thus the power supply of the railroad between St. Louis and Springfield will be increased. Specifically listed among this work are six new electric locomotives, 100 new box cars and seventeen new one-man interurban cars. It is also stated that provision has been made for the purchase of motor coaches and for the adoption of present rolling stock equipment to one-man operation so as to permit more frequent and efficient service.

For the purpose of tying the company's operations more closely to the communities served, an intensive sale of its preferred stock to customers has been carried on by the investment department. More than $3,000,000 of this stock was disposed of in a few months to the public and employees, with the result that at the time of the annual meeting last April there were 7,390 preferred stockholders.

COMPARATIVE STATEMENT OF EARNINGS OF COMPANIES CONSTITUTING ILLINOIS POWER & LIGHT CORPORATION

	1919	1920	1921	1922	1923
Gross earnings from operations:					
Electric light and power	$6,471,155	$7,891,608	$9,209,945	$10,442,752	$12,400,998
Gas	1,122,384	1,302,671	1,623,829	2,195,048	2,722,533
Interurban lines	5,930,525	7,175,663	7,161,772	6,939,641	6,676,610
City lines	4,036,349	4,714,116	4,596,796	4,506,913	5,178,391
Heat	513,799	557,246	527,454	574,258	620,363
Water	68,645	71,926	77,872	90,415	100,190
Miscellaneous	249,721	381,140	302,215	315,584	231,769
Total gross earnings	$18,392,578	$22,094,370	$23,499,883	$25,064,611	$27,930,854
Operating expenses, maintenance and taxes	13,257,580	16,352,776	17,066,428	17,746,168	18,811,807
Net from operating	$5,134,998	$5,741,594	$6,433,454	$7,318,443	$9,119,047

Deferred Payment Plan Explained

Frank L. Dame, president of the North American Company, New York, N. Y., has announced the purposes of the "deferred payment" plan, in connection with the offering to the stockholders of an opportunity to purchase, subject to allotment, $10,000,000 aggregate par value of the company's preferred stock. He said that one purpose was to provide additional capital for the requirements of the company; another purpose is to afford to the stockholders a means of purchasing on deferred payments, a high-grade security, and a third reason is to give to the stockholders the full benefit of the present low money rates, by procuring for them a 4 per cent interest rate per annum on their deferred payments. The essential features of the "deferred payment" plan are the requirement of subscribers on or before Aug. 15, 1924, to make an initial payment of $20 per share of stock subscribed for, the remaining $30 of the purchase price being payable in three instalments of $10 each on Jan. 2, 1925, or April 1, and July 1, 1925. Stock certificates to be delivered to the subscribers upon completion of payments on the specified dates will in each instance carry all dividends paid on the preferred stock after the date of completion of payments.

Hearings on Property Valuations in Twin Cities Concluded

In the hearing before the Minnesota Railroad and Warehouse Commission to set a permanent rate of fare in the Twin Cities testimony has been concluded as to property valuations of the St. Paul City Railway and the Minneapolis Street Railway. Hearings on the operating expenses of the Minneapolis Street Railway have been held and in the case of the St. Paul City Railway the similar hearing was set to begin on Aug. 13.

It was predicted by Comptroller D. J. Strouse for the Minneapolis company that revenues for 1924 would fall $1,000,000 from the $8,504,294 total for 1923. He placed the probable total at $7,611,922.

On the property valuation of the companies several bankers testified for the company. Those who appeared included E. W. Decker, president of the Northwestern National Bank; R. W. Martin, of Dillon, Read & Company, New York; L. E. Wakefield, vice-president of the Wells-Dickey Trust Company; R. W. Webb, president of the Minneapolis Trust Company and W. B. Baird, vice-president of the Merchants Trust Company, St. Paul.

In effect this testimony went to show that traction securities are not so favorably regarded among investors as are other utility investments. Mr. Decker said the rate of return of the properties of the railway companies should be at least double the average rate of interest on the bonds issued by the companies.

Traffic on Increase in East Bay Cities

Electric railway traffic in the East Bay cities of California is increasing. The Key System Transit Company, Oakland, shows a gain of 1,614,238 in the number of passengers carried for the first six months of this year compared with the similar period last year. The semi-annual report shows the following:

Passengers Carried	1924	1923
Traction Division:		
Revenue passengers	38,512,998	37,869,303
Transfer passengers	10,435,625	10,084,985
Total traction division	48,948,623	47,954,288
Key Division:		
Revenue passengers	8,879,086	8,259,243
Entire System:		
Revenue passengers	47,392,084	46,128,546
Revenue and transfer passengers	57,827,709	56,213,531

Normal increase in population, given as the principal reason for this gain, does not tell the whole story. It is said that auto-parking conditions in the bay cities have driven many autoists back to the street cars. There is a forty-minute limit on parking in Oakland, but it has been found impossible properly to enforce this. As a result the business section is congested on week days with parked cars.

Interurban Doing Well

Management of Kansas City, Clay County & St. Joseph Line Alive to Changing Conditions

The operations of the Kansas City, Clay County, & St. Joseph Railway, Kansas City, Mo., for the year ended Dec. 31, 1923, show an increase in both gross and net income. The passenger revenue was $1,026,706, a net increase of $4,887 over 1922. Of this amount $15,304 was an increase on the Excelsior Springs Division and $10,416 a decrease on the St. Joseph Division. The number of passengers carried was 2,353,224. This is a net increase of 100,115, of which 125,807 was an increase on the Excelsior Springs Division and 25,692 a decrease on the St. Joseph Division. The complete line comprises 72 miles of track.

R. P. Woods, vice-president and general manager, explains that the year 1923 was an abnormal one for the farming industry and that on account of the depression both the through and the local business on the St. Joseph Division fell off materially since much of the business on this part of the road is made up of patronage incident to the farming industry. On the other hand business on the Excelsior Springs Division was low because the highways leading into the Springs were practically cut off during the entire year owing to highway rebuilding work. This made the business in Excelsior Springs the poorest which has been experienced there in many years. It is expected, however, that the completion of the hard surface roads will make business in Excelsior Springs this year a banner one.

Mr. Woods explains that extensive repairs to equipment were made during the year. Two-thirds of the passenger equipment was completely overhauled and repainted with the result that the equipment is in splendid condition so that if it should become necessary to make radical reductions in operating expenses the equipment account could be materially reduced without serious difficulty.

The pamphlet report of the company is a most complete and unusual one. Included in the statistics reproduced herewith are earnings from freight which cover the years 1915 to 1923. This is a most interesting comparison. Moreover, the tenor of the report indicates that the management is thoroughly alive to the need for the intensive cultivation of the riding habit and that it is going after business, both freight and passenger, intensively. Just as an instance, the trainmaster's entire time is spent riding the trains, seeing that all rules of the company are enforced, and that the equipment is properly handled. This official keeps in close touch with the dispatcher and advises him when necessary to add additional cars to any train on account of extra travel from any point.

Bus Line Sale Price Considered Too High

The plan to purchase the bus lines in St. Louis in the interest of the successor to the United Railways fell through when the committee representing the bondholders of the St. Louis Transit Company declined to advance the money needed to swing the deal. The Transit bondholders are understood to have held that the price asked was too high, especially when the bus company was operating merely on revocable permits issued by the Board of Public Service.

Col. Perkins, general manager for the receiver of the United Raliways, in his address in opposition to the proposed new bus lines, charged that although the Missouri Public Service Commission, in its valuation of the properties of the United Railways had not allowed anything for franchises the purchase of the bus lines for $2,400,000 would have placed a franchise value of more than $1,000,000 on the bus permits granted by the city.

He stated that if the new bus lines are opened the railway will have to increase its fare, curtail service and reduce the number of employees or cut the wages of all its workers. He also stated that the policy of granting permits for bus lines to compete with the existing railway had already made it difficult to obtain capital needed to reorganize the railway and lift the receivership.

W. Frank Carter, counsel for the bus company, denied that the price asked for the bus lines was exorbitant. He said that the company had already invested $1,400,000 in the system and had $700,000 in bank for additional buses, garages, etc. He said that the company planned to employ 800 men eventually and that this would more than offset any employees the railway might lay off because of bus competition.

Earnings in Atlanta Show Appreciable Decrease

Railway earnings of the Georgia Railway & Power Company, Atlanta, Ga., showed a decrease for July, 1924, compared with July, 1923, of $38,779 or a drop of nearly $1,300 a day. Out of the twenty-four city car lines operated by the company, nineteen showed substantial decreases for the same month, and July, 1923, the company states, was a month far below normal.

The reason for this drop in earnings is attributed by the company "to the in-

OPERATING DATA OF THE KANSAS CITY, CLAY COUNTY & ST. JOSEPH RAILWAY

COMPARATIVE INCOME STATEMENT

Railway operating revenue:	1923	1922
Railway transportation, St. Joseph division	$755,191	$772,841
Excelsior Springs division	466,525	425,652
	$1,221,716	$1,198,493
Other railway operations, St. Joseph division	6,333	9,498
Excelsior Springs division	6,991	4,299
	13,325	13,797
Total operating revenue	$1,235,041	$1,212,291
Railway operating expense:		
Way and structures	$107,071	$101,987
Equipment	85,695	68,533
Power	107,715	136,177
Conducting transportation	228,032	223,924
Traffic	7,966	6,856
General and miscellaneous	157,354	154,882
*Depreciation	100,060	100,004
Taxes (not including federal income tax)	29,094	30,396
	$845,087	$822,759
Net railway operating income	$389,954	$389,531
Net operating income:		
Interest from funded securities	2,490	2,677
Interest from unfunded securities	4,039	2,701
Interest from sinking fund	1,509	486
	$8,038	$5,865
	$397,992	$395,397
Deductions from gross income:		
Interest on funded debt	161,450	161,304
Gross income	$236,542	$234,093
Less estimated federal income tax	24,892	20,262
Balance available for surplus and dividends	$211,649	$213,830

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* The auditors have taken the accrued depreciation, less expenditures for renewals and replacements, $79,926 as an appropriation of surplus. Add that amount to check their surplus net income of $291,576.

SUMMARY OF COMPARATIVE OPERATING EXPENSE†

Operating Expenses	1923	1922	Cost per Car Mile (Cents) 1923	Cost per Car Mile (Cents) 1922
Way and structures	$183,277	$178,181	9.87	10.23
Equipment	101,783	84,575	5.45	4.85
Power	137,578	143,942	7.41	8.26
Conducting transportation	228,032	223,924	12.28	12.85
Traffic	7,966	6,856	0.43	0.39
General and miscellaneous	157,356	154,884	8.47	8.89
† Not including taxes.	$816,992	$792,362	43.97	45.47

OPERATING STATISTICS

1923

	Total	Average per Day	Average per Car-Mile (Cents)	Average per Track Mile
Operating revenue	$1,235,041	$3,383	66.51	$15,521
Passenger revenue	1,013,244	2,776	64.41	12,734
Freight revenue	194,988	534	84.07	2,450
Operating expenses	815,992	2,235	43.94	10,255
Car-miles (passenger)	1,572,912	4,309		
Car-miles (freight)	231,921	635		
Car-miles (service)	52,030	142		
				Average Fare
Revenue passengers	2,322,817	6,391	1.26	43.62
			Kw.-Hr.	Cost per Kw.-Hr.
Power, kilowatt-hours	7,559,720	20,711	4.07	1.527
Car-hours (passenger)	84,423	231		
Car-hours (freight)	13,018	36		
Passenger trains, regular	....	88		
Freight tonnage	96,351	269		

FREIGHT STATISTICS

Year	Gross Revenue	Gross Tons	Less Carload Revenue	Carloade Revenu
1915	$59,554	19,970	$54,419	$5,135
1916	69,723	24,177	64,007	5,716
1917	82,676	28,828	74,472	8,204
1918	98,682	37,464	88,024	10,657
1919	112,955	38,327	103,606	9,349
1920	158,252	40,945	148,942	9,303
1921	172,254	36,900	159,520	12,733
1922	176,248	43,180	156,258	19,989
1923	194,988	96,352	148,146	46,842

crease in unregulated jitneys" and, it is added if the loss continues, it will result in "the inevitable disruption of Atlanta's transportation system." The statement then says:

> The railway last year failed by more than $565,000 to earn a reasonable return on the Public Service Commission's minimum valuation of the property. It cannot continue to bear the burden of such losses.
>
> The facts about the transportation situation are being put before the people of Atlanta in the expectation that, in their own interests, they will see that the alarming condition is speedily remedied.

Directors Vote Stock Dividend in Brooklyn.—Through an increase in its capital stock from $12,000,000 to $16,000,000, authorized previously by the Transit Commission, the Brooklyn City Railroad directors on Aug. 13 declared a stock dividend of 33⅓ per cent, or $4,000,000. The dividend is payable Sept. 30 to stockholders of record Sept. 5. The regular quarterly dividend of 25 cents a share, payable Sept. 2 to stockholders of record Aug. 16, also was declared. The company's letter to its stockholders last February pointed out that since October, 1919, when the properties formerly leased to the Brooklyn Heights Railroad were returned, the company withheld dividends and spent more than $4,000,000 out of earnings to increase its facilities.

Union of Properties Viewed With Interest.—Barrons, New York, states that it is reported the Piedmont & Northern Railway, a prosperous electrified railroad in the cotton mill belt of the Carolinas controlled by James B. Duke and his associates, is to be united, both physically and financially, with the now bankrupt Georgia & Florida. In commenting on the report that paper says that if this trade goes through, railroad men will watch the result with interest, for James B. Duke has made a success of every enterprise he has undertaken, whether in tobacco, fertilizer, power, textiles or railroads.

Option Sought on Interurban Shares.—A report is current in Indianapolis that members of the firm of Ball Brothers, glass jar manufacturers, of Muncie, Ind., are seeking a six-months' option on 1,000,000 shares of common and an equal number of shares of second preferred stock of the Union Traction Company, Anderson, Ind. Officials of the railway said that acquisition of the stock, if that was accomplished, would not change the present ownership status of the company, as members of the Ball Brothers firm as stockholders had always taken an active interest in the company's affairs. Edmund F. Ball, a member of the Ball Brothers firm, is a director in the traction company.

Mortgage for Jersey Merger Filed.—The Public Service Gas & Electric Company of New Jersey filed a mortgage for $31,834,000 to the Fidelity Union Trust Company, Newark, recently as part of the refinancing plan of the corporation, made possible by the merger two months ago of the Public Service Gas Company, the Public Service Electric Company and the United Electric Company of New Jersey. The mortgage will secure an issue of bonds bearing 5½ per cent interest and maturing in 1959.

Fort Wayne & Northwestern Deal Approved. — The Public Service Commission of Indiana has authorized the Indiana Service Corporation to buy 95 per cent of the outstanding capital stock of the Fort Wayne & Northwestern Railway, which operates 41.75 miles of interurban line between Fort Wayne and Garrett, with branches to Kendallville and Waterloo. The sale price will be $472,200. The corporation will issue $661,760 of 5 per cent bonds at 82 per cent of par. It will assume $355,000 of outstanding bonds of the company at an agreed price of $328,375. The Indiana Service Corporation will have to pay $800,575 and assume liability for the bonds outstanding. At 82 per cent of par the $661,760 face value of bonds will yield $542,643. The difference between this sum and the total cost, or $257,932 will be paid in cash secured from other sources.

Six Months' Operation Results in Deficit. — The Worcester Consolidated Street Railway, Worcester, Mass., carried 22,803,031 revenue passengers the first six months of this year, compared to 25,139,474 for a similar period in 1923. The operating revenue for the same period was $2,135,528 compared with $2,366,923 for the same period of last year. A deficit of $1,501 was reported for the period.

Meeting to Consider Stock Increase.—A special meeting of the Savannah Electric & Power Company, operating in Savannah, Ga., has been called for Aug. 29 to vote on an increase in stock by $500,000. The increased stock is to be made first preferred or debenture stock designated as series "B," in all respects the same as series "A" stock of this class now outstanding except as to dividend rate and redemption price. Directors recommend that the dividend be 7½ per cent, against 8 per cent being paid on the series "A" stock.

Surplus for Six Months.—For the six-month period ended June 30, 1924, the Eastern Massachusetts Street Railway, Boston, Mass., reports operating revenues of $4,998,720 against $5,533,499 for a similar period a year ago. Operating expenses were $4,355,957 in the first six months of 1923 and $3,901,358 for the period from January-June of 1924. After payment of interest charges and dividends the surplus this year was $95,210 against a deficit of $52,012 for a similar period in 1923.

1925 Budget Lower.—The City Council has tentatively allowed the Seattle Municipal Railway Department $6,354,000 for 1925, in making out the 1925 budget allowances. This is a reduction of approximately $420,000 over the allowance for 1924. The budget committee cut $31,000 from the estimate of D. W. Henderson, general superintendent. Of this amount $25,000 was a power item. The committee based this reduction on the expectation that the city will furnish an increased amount of power for the line during 1925. Mr. Henderson advised the committee that the revenues of the system for the first six months of this year were $3,047,958. He believes they will be more than $6,000,000 for the year. There have been fewer car riders, he said, month for month, than last year, but by the end of the year, the average will be about the same. The 1923 revenue was less than $5,000,000, but Mr. Henderson said the 5-cent fare was partly responsible.

Abandonment Approved.—Abandonment and dismantling of the line of the Aurora, Elgin & Fox River Electric Company, Aurora, Ill., between Fox River park and Yorkville was authorized by the Illinois Commerce Commission on Aug. 6. At the same time the commission issued a certificate to the company to operate buses between Yorkville and Aurora.

Purchase Will Go Before Voters.—Members of the City Council of Seattle, Wash., state that the proposal to buy the Seattle & Rainier Valley Railway for operation in connection with the city-owned system will probably be submitted to the voters, if negotiations to purchase the lines are successful.

Purchases St. Cloud Property. — H. M. Byllesby & Company announced recently its purchase of the St. Cloud Public Service Company and subsidiary companies, which operate electric light and power, gas and railway properties in St. Cloud and supply electric power and light services for fifty-three other communities in Central Minnesota. It is planned to operate the properties as a division of the Northern States Power system. The railway system comprises 8 miles of line.

Stock Issue Petition Heard.—The Indiana Public Service Commission has heard the petition of the Southern Indiana Gas & Electric Company, Evansville, Ind., for permission to issue $500,000 of 7 per cent preferred stock at par. Officers of the company said they planned to sell most of the stock to the customers of the company. They said the company was carrying out a program of extensions and improvements costing approximately $1,454,000. Securities totaling $415,000 as a part of this program, were issued by the company with the consent of the commission the first of the year.

Seeks Abandonment of Certain Lines.—The Newport News & Hampton Railway Gas & Electric Company, Hampton, Va., has petitioned the State Corporation Commission for permission to abandon certain lines in Hampton and Elizabeth City and to be relieved of the obligation of paving and repairing between tracks.

Prices for Substations to Be Announced.—Prices and terms on which the city of Seattle may acquire the railway substations in the city, still owned by the Puget Sound Power & Light Company, will probably be announced shortly. A board of appraisers has been appointed to set the terms upon which the five substations may be purchased. The stations must be acquired by the city before energy to be produced by the municipality at Skagit can be utilized in place of the current that the city, meanwhile, is purchasing under contract.

Line Resumes Service. — The Plymouth & Brockton Street Railway, Plymouth, Mass., which discontinued through service on July 6, has been reopened. The company has filed with the Massachusetts Department of Public Utilities a new tariff, revising the fare limits. Special provisions are made for working trips, with little or no increase in the rate of fare.

Protective Committee at Work.—A committee has been appointed to dispose of or liquidate the property of the Cleveland & Chagrin Falls Railway and the Cleveland & Eastern Traction Company, both operated by the same management in Cleveland, Ohio. The committee has entered into an agreement with the Guardian Savings & Trust Company, Cleveland, for the deposit of the first mortgage bonds on the property. No plan has yet been announced by the committee as to the best method of operation.

Bond Issue for Houston Line Sold.—It is announced by Ed Kennedy, promoter of the Houston, Beaumont & Orange Interurban Railway, Houston, Tex., that a bond issue of $5,000,000 with which to construct the proposed line has been sold to S. P. Thayer & Son, Washington, D. C. He said that the contract for building the road has been awarded to the J. D. Davis Construction Company, Atlanta, Ga. The contract stipulates that the line shall be completed in fifteen months, dating from July 20. Deeds to 82 miles of right-of-way have been obtained, leaving only 7 miles of right-of-way still to be acquired.

File Suits.—The Dayton, Springfield & Xenia Southern Railway, the Oakwood Street Railway and the City Railway, all operating in Dayton, Ohio, have brought suit in the federal court to prevent M. L. Beard, treasurer of Montgomery County, from collecting more than 60 per cent of their 1923 taxes. The suits charge that the holdings of utilities are assessed at 100 per cent of their value, while in both Greene and Montgomery Counties other property is assessed at 60 per cent of its value. This is declared to be discriminatory.

Funds Deposited to Pay Interest.—Holders of the first mortgage 4 per cent bonds of the United Railways, St. Louis, Mo., were recently notified that funds are on deposit with the Bankers Trust Company, New York, and the Union Trust Company, St. Louis, to pay the interest that is due on the bonds plus six months interest on that sum, totaling in all $624,000. Interest on the $30,300,000 of general mortgage 4s due Jan. 1, 1924, was not paid. The mortgage carried a provision providing a period of grace of six months before foreclosure proceedings could be instituted.

Tit for Tat in Denver.—The Denver Tramway has presented the city of Denver, Col., with a bill for $67,000, for the cost of moving its tracks from the old Sixteenth Street viaduct, stating that the former Mayor agreed that the city would pay for this work. The city presents the tramway with a bill for $125,000, the tramway's portion for the construction of the new viaduct, saying that such was the agreement between the company and the former mayor. The company says it made no such agreement. The tramway owes the city $210,000 for back franchise taxes. The tramway answers that if the city will deduct the $67,000 it owes the tramway, the money will be paid.

Personal Items

H. A. Mitchell Heads Californians

Interurban Executive Has Been Elected President of the California Electric Railway Association

H. A. Mitchell, vice-president and general manager of the San Francisco-Sacramento Railroad, was elected president of the California Electric Railway Association at the annual meeting of that organization held in San Francisco on July 7. He is one of the best known and youngest electric railway executives on the Pacific Coast.

Mr. Mitchell was born in San Francisco and was educated in the public schools of his native city. His first employment was with the forces of the Pacific Gas & Electric Company as an office boy. This was in February, 1898. Among the properties of that company is the electric railway system in Sacramento. Mr. Mitchell remained with this concern until August, 1906, when he entered the employ of the Fleishhacker interests. They control the Reno Traction Company, in Reno, Nev., and the Central Traction Company, operating between Stockton and Sacramento, Cal. Here he remained in various capacities until Jan. 1, 1913. At the time he resigned Mr. Mitchell was general manager of the Central Traction Company and the Reno Traction Company. On Jan. 1, 1913, he entered on his present duties with the San Francisco-Sacramento Railroad, known as the Sacramento Short Line.

H. A. Mitchell

Mr. Mitchell is also president of the Pacific Railway Club, which has for its object the advancement of the science of railroading and the best interests of the railroad profession and which aims to bring into closer relationship the men employed in various branches of railroad work on all Pacific Coast roads. He is a resident of Oakland and his headquarters are located in the San Francisco-Sacramento Railroad terminal at Fortieth Street and Shafter Avenue in Oakland.

George L. Maltby Resigns

George L. Maltby, for the past fifteen years superintendent of the Jamestown Street Railway, the Jamestown, Westfield & Northwestern Railroad and the Chautauqua Traction Company, all of Jamestown, N. Y., as well as the city bus lines of the first-named company, has tendered his resignation, effective at once. He has organized the George L. Maltby Motor Car Company in Jamestown and will erect a modern service station for Pierce-Arrow motor cars, trucks and buses. Before Mr. Maltby's association with the utility properties in Jamestown, he was city passenger agent and local representative of the freight department of the New York Central lines. During his many years in the railroad and traction business he has established a wide acquaintance, not only in Jamestown but throughout Chatauqua County. A successor to Mr. Maltby at Jamestown has not yet been announced.

Bert Penoyer, maintenance of way engineer of the Schenectady Railway, Schenectady, N. Y., has resigned to become connected with the Kellam & Shaffer Company, Inc., dealers in stone and masons' supplies. His resignation took effect on Aug. 15 and on Sept. 15 he will take up his new duties. After ten years of varied business life, Mr. Penoyer entered the employ of the Schenectady Railway in 1902. Four years later he was made engineer maintenance of way, which position he has occupied since. In announcing the resignation, E. M. Walker, president, said that it was with sincere regret that he was releasing Mr. Penoyer. "Mr. Penoyer has grown up with the company," he added, "and it is only because we believe that his personal interests will be advanced by his new business connection that we considered his resignation at all."

Richard E. Weber, assistant maintenance of way engineer of the Schenectady Railway, Schenectady, N. Y., has been appointed maintenance of way engineer to succeed Bert Penoyer, resigned. Mr. Weber, has been assistant in the department, for two and a half years and is conversant with the duties of the position. He went to Schenectady from Rochester. Mr. Weber is a graduate of Cornell University.

R. J. Smith, vice-president and general manager of the Tri-City Railway, Davenport, Ia., will take over as additional duties the work formerly performed by Clark G. Anderson, vice-president and general manager of the Clinton, Davenport & Muscatine Railway. Mr. Anderson's resignation from the Moline property was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug 9.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

More Electric Equipment Exported

During the fiscal year ended June 30, 1924, the number of electric locomotives exported from the United States was seventy-four, an increase of twenty-six over the year before. The value of these exports, however, was only $1,955,646 this year compared with $2,758,191 for the year ending June 30, 1923. Electric passenger cars exported during the 1924 fiscal year numbered 89 with a value of $683,491—an increase of only five in number but of $326,009 in value over the year before.

Recent Arrivals

Since publishing in the July 19 issue of the ELECTRIC RAILWAY JOURNAL the list of companies seeking space allotment for the exhibit at the annual convention of the American Electric Railway Association, to be held in Atlantic City, next October, orders for space have been received from 18 companies. They are as follows:

Robert Bosch Magneto Company.
Brockway Corporation.
The Bassick Manufacturing Company.
The C. G. Spring & Bumper Company.
B. J. Carney & Company.
Clark Equipment Company.
Farnham Nelson Company.
Hoe Corporation.
The Indianapolis Switch & Frog Company.
Janney, Steinmetz & Company.
Magnetic Signal Company.
Princeton Tire & Rubber Company.
Public Service Railway Company.
The Railway Materials Company.
E. J. Thompson Company.
Waynesboro Nut Lock Company.
Wilson-Imperial Company.
P. W. Wood.

$1,000,000 Bonus Payments Made by General Electric

The General Electric Company, Schenectady, N. Y., on Aug. 4 paid to those of its employees who have been with the company continually for five years or more, more than $1,000,000 in supplementary compensation. The bonus payments are for the six months ended June 30 last, and amount to 5 per cent of the earnings of the employees during that period. A total of 27,412 employees shared in this distribution, which was paid largely in bonds of the G-E Employees' Securities Corporation. The total amount paid was approximately $1,172,000.

Pressed Steel Car Company Passes Dividends

The Pressed Steel Car Company, New York, N. Y., omitted its regular quarterly dividend of $1.75 on its preferred stock and $1 on its common stock on Aug. 5, both of which were due at this time. Business for the year has been below normal, F. N. Hoffstot, president of the company, said, but added that he expected net earnings for the year would be sufficient to enable the board to resume payment of dividends on both the preferred stock and common stock at the end of the fiscal year. Action on the preferred was deferred at the suggestion of the company's counsel, who advised the directors that dividends for any fiscal year should only be paid from the earnings after the same had been determined at the end of that year.

Treatment of Timber Fellowship Founded

E. R. Weidlein, director of the Mellon Institute of Industrial Research of the University of Pittsburgh, has announced the founding of an industrial fellowship on the treatment of timber. This research, which is being sustained by the Grasselli Chemical Company of Cleveland, Ohio, and is being conducted by Dr. A. M. Howald, has for its purpose a study toward the improvement of the methods of applying zinc chloride in the wood-preservation industry. Investigational work which was begun during 1923 will be continued throughout the present year. An experimental wood-impregnating plant is maintained for practical tests of processes. Research is being done to increase the permanence of zinc chloride treatments of timber by the addition of petroleum oils.

Rolling Stock

Municipal Railway of St. Petersburg, Fla., has purchased fifteen new cars at a cost of $132,700. The order was placed with J. G. Brill Company. The cars are of the one-man type and seven will be double truck.

Seattle Municipal Railway, Seattle, Wash., has announced that the date for opening bids for furnishing from 75 to 125 cars has been indefinitely postponed by order of the Board of Public Works. The original date was set for Aug. 15.

Massachusetts Northeastern Railway, Haverhill, Mass., has recently placed in service on its eastern division with headquarters at Amesbury ten new light-weight double-truck, one-man safety cars. These cars were built by the Wason Manufacturing Company, Springfield, Mass., and are similar in general design to other light-weight cars manufactured by the same car-builder.

Union Traction Company of Indiana, Anderson, Ind., has contracted for fifteen all-steel interurban passenger cars. The new equipment is being purchased as part of a program of additions and betterment planned for this year aggregating about $750,000. The company has financed the improvements.

Track and Line

British Columbia Electric Railway, Vancouver, B. C., is repaving on Main Street at a cost of $50,000.

Key System Transit Company, Oakland, Cal., has started work on the extension from the Piedmont Avenue line, along the right of way to Oakland Avenue, the terminus of the line in the city of Piedmont. The work is in compliance with the recent decision of the State Railroad Commission authorizing the Key System to operate a train and ferry service into the city of Piedmont from San Francisco.

Worcester Consolidated Street Railway, Worcester, Mass., has been authorized by the Massachusetts State Department of Public Utilities to extend its tracks on Burncoat Street.

Harrisburg Railways, Harrisburg, Pa., will start work on relaying track in State Street, to be followed by the double-tracking of Second Street, above Schuylkill Street. Both of these operations are preliminary to the paving construction to be begun by the city in these streets, and are undertaken at this time to avoid paving cuts later.

Tri-City Railway, Davenport, Iowa, has completed work of laying new track on West Third Street between Warren and Fillmore Streets in Davenport. The cost was approximately $40,000. The double track has been replaced in accordance with the agreement with the City of Davenport at the time when the rerouting plan was approved.

Des Moines City Railway, Des Moines, Iowa, has started work on the extension of the Clark Street line and expects service will begin Sept. 1. Workmen began to set poles and string the high-tension wires for the line. A portion of the line will be double tracked. The cost of the project is estimated at $40,000.

Illinois Power Company, Springfield, Ill., will soon undertake the Fifth Street project laying new double rails and new pavement between Washington and Monroe Streets.

Indiana Service Corporation, Fort Wayne, Ind., has sent out calls for bids for the erection of a complete block signal system on the Fort Wayne-Huntington section of the Lafayette Division.

Metal, Coal and Material Prices

Metals—New York	Aug. 12, 1924
Copper, electrolytic, cents per lb.	13.625
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	7.75
Zinc, cents per lb.	6.54
Tin, Straits, cents per lb.	51.625
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.20
Somerset mine run, Boston, net tons	2.075
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.70
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons.	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.35
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.05
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.625
Turpentine (bbl. lots), N. Y., per gal.	$0.90

New York, August 23, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Henry W. Blake and **Harry L. Brown**, *Editors*

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Psycho-Technical Tests for Vehicle Drivers

IN THE decade since the late Professor Münsterberg first proposed to American operators the application of psychological tests to platform candidates there has been a notable advance in the status of psychology itself from a mass of observation and data to that of an exact science. The Münsterberg idea can no longer be classed as chimerical and impracticable. No better proof of this can be offered than the truly classical paper, abstracted in this issue, on "Tests for Motormen and Bus Drivers" which was presented before the June convention of the International Association by L. Bacqueyrisse of the Paris surface lines. Here we have the first extended comparisons of the preliminary judgment of the laboratory and the service judgment of the operator. When psychologist and platform inspector can show 80 to 90 per cent accord, there must be something in a plan that weeds out the unfit before they can cause expense and trouble.

The notable feature of the Paris work, in particular, is the broad co-operation of psychologists and physiologists with the executive staff of the railway, and the recognition that no one or two kinds of tests will suffice for the classification of fit or unfit. Tests involving judgment of speed and distance have made exceptionally good in practice, but there is still a *terra incognita* as regards the behavior of different men under the same emotional stress. The tests for sound and its direction of origin are a long step ahead of the old days. Who does not recall this jest: "Can you hear that clock tick?" "Yes." "Well, your hearing is wonderful. It hasn't run for a week."

In these times when so many employers in other fields have persons of psychological training for employment directors to fit the applicant to the job which best suits his nature, it will not do to say, "Our business is different," when, perhaps, the real reason is that human inertia which keeps us from taking up old things in new ways because of the wrench at deep-rooted prejudices.

Gaudy Colors for Car Painting Are Regaining Their Popularity

THE long familiar policy of economy in car painting seems likely soon to be thrown into the discard. More and more electric railway men appear to be coming around to the point of view that attractively painted cars are a good business proposition. Instead of thinking that "a penny saved is a penny earned" in the matter of car painting they are beginning to realize that a penny judiciously spent on painting may bring in a good return on the investment. An attractive exterior encourages people to ride in a car. Then too, vivid colors that can be seen a long way off have proved helpful in preventing accidents.

For example the luxurious new interurban cars of the Milwaukee Electric Railway & Light Company are painted green below the letterboard and yellow above. Green is used also for the trucks, but the wheels are yellow. What a contrast that presents to the cars so common on many roads a short time ago, painted some dull color all over. Many railways have resumed the use of gold striping to decorate the outside of their cars. Bright green, red and various shades of yellow and orange are now very common. The latter color is widely used to increase visibility. Another company has adopted blue as the color for its cars. Lettering, numbering and striping are done in some attractive contrasting color or in gold or aluminum. Altogether it begins to look as though gaudy colors are regaining their former popularity.

If the Carfare Went from 5 Cents to $130,000,000

WHAT actually had to be done when extremes of inflation occurred was shown in the report of the Elevated and Underground Railway of Berlin for 1923, just at hand. The report shows the average fare per passenger, as measured in marks, for each month during the year. Each month this figure showed a jump ranging from an increase of a modest 5 per cent all the way up to several thousand per cent.

Starting with 49 marks in January, which, by the way, was several hundred times the pre-war fare, the fare in December of last year reached the enormous sum of 130,123,000,000 marks. This increase would correspond in American currency to a rise in the fare from 5 cents to $130,000,000 per passenger.

Of course, an attempt to do business under such conditions must have been more like a nightmare than anything else, but it is only by citing extremes that the force of the necessity for an increased railway fare with currency inflation can be made evident to some people. It is hoped that the time never will come when American electric railway companies will have to charge $130,000,000 for a car ride. But even though they fail to follow the German electric railways to that extent, the companies should be permitted to charge fares that are commensurate with the existing inflation of the currency.

There is, however, a philosophy in this country which admits of no justice in a street railway fare higher than that mentioned in the franchise of the company. People who hold this doctrine cannot see any need for higher fares, regardless of increase in length of ride or decrease in the purchasing power of money. It sometimes makes one wonder if, with a degree of inflation such as that which existed in Germany last year, Mayor Hylan would still have claimed that 5 cents is a reasonable figure for a subway ride. Perhaps the recital of the German experience would do more to convince men of this type than any attempt to show a real justification from reams of statistics.

The Best Form of Public Ownership in Sight

WITHIN the space of a few months, since the reorganization of the elevated lines in Chicago, the financial condition of the company has been improved to such an extent that in the five weeks of the customer and employee ownership campaign more than half of the $5,000,000 issue of preferred stock has been sold. Thus wide local ownership of the securities is being obtained as one of the first steps toward the fulfillment of the company's promises of adequate rapid transit service. In other words, the company by its active promotion of the plan, which has come to be nationally known as "Customer and Employee Ownership of Public Utilities," is actually carrying out democratization of ownership of the industry and the substitution of public ownership of the best kind for possible political ownership. There can be no quarrel with the desire of the company to accomplish these purposes except possibly from political interests, the selfish desires of which might be hurt by the process. In any event the company will secure and retain popular favor only as it deserves it. It cannot well be otherwise.

A thoughtful provision of the present issue contemplates the payment of dividends monthly. Thus the company will be in a position to keep the actual owners of the property almost constantly informed in a most direct way of the progress that the company is making. The necessary consolidations, connections and extensions of the lines can be brought about, the desirable improvements in service can be obtained, and the fare can be made moderate and reasonable, at least, on the rapid transit systems of the city, if the company receives support in the stock sale and the necessary franchises are forthcoming. In the work of securing these things the company appears to have made a good start. After all, to both the owners of the property and the public—and these give promise of being synonymous in Chicago—it is the end that matters, not so much the means.

How Old Is Ann's Brother?

THE theory that sons never grow up has always been a cherished feeling of motherhood and at the same time an elusive hobgoblin for the railway managements to combat. The boy who is six years old at home, five years old at school and four in the street car may be considered as a paradoxical fact. Though he may have come in for a lot of hero worship, ofttimes he is the cause of altercation and humiliation and even in some instances of financial loss.

Superficially, it sounds humorous for a traction concern to sue for 14 cents and it becomes ludicrous when a counter suit is filed for $10,000. But that appears to be the high-class comedy being enacted in one of our oldest and most aristocratic cities, the principals in the cast being the street car company and one of its patrons. The patron contended that her son was four years old and therefore exempt from payment of fare. The company claimed that the boy in question was six years old, and according to law was not entitled to ride free. And so the young man entered upon his first dangerous age. The mother, humiliated and disgraced, she claims, by an uncivil conductor, sought $10,000 damages and the company with boundless faith in the innocent's "erstwhile" four years refused to be out of pocket 14 cents as his transportation fee.

It is conjectural only to assign the contenders to the side of justice but certainly at first reading the whole affair sounds like much ado about nothing. Yet the incident is reminiscent of the day not entirely gone when one frequently heard, "It's only the car company; skin them if you can for they're rich enough." It was no unusual procedure for a person, otherwise just, to "beat the company" if possible though he'd rank first in criticising the niggardly church contributor or the petty political pilferer.

If the company in this case has erred in its judgment then it must suffer the consequences, however grave, of accusation wrongly directed. If, on the other hand, the management has its facts correct the court should establish a precedent which will point the way toward a better solution of the age of Ann and her kid brothers.

The Public Wants Service at All Hours of the Day

SOME electric railways have a policy of giving particular attention to providing good service during the rush hours, and then letting the remainder of the day take care of itself. Others, while attempting to give service in the non-rush, get the schedules so badly distorted in the rush periods that they take the greater part of the following non-rush to get the kinks untangled and the cars back on their correct time. Neither of these methods gives the best service to the riding public that can be provided.

It is true that a great portion of the revenue is obtained in the rush hours, so that it is important to have the service good enough to attract riders at that time. Unfortunately, the service is given at the greatest cost during the rush, as this paper has frequently pointed out. The less intense service of the non-rush provides the backbone of the schedule which is expanded to handle the peak loads. The greater the number of all-day cars, the less the proportionate strain on the system, particularly to provide the additional men.

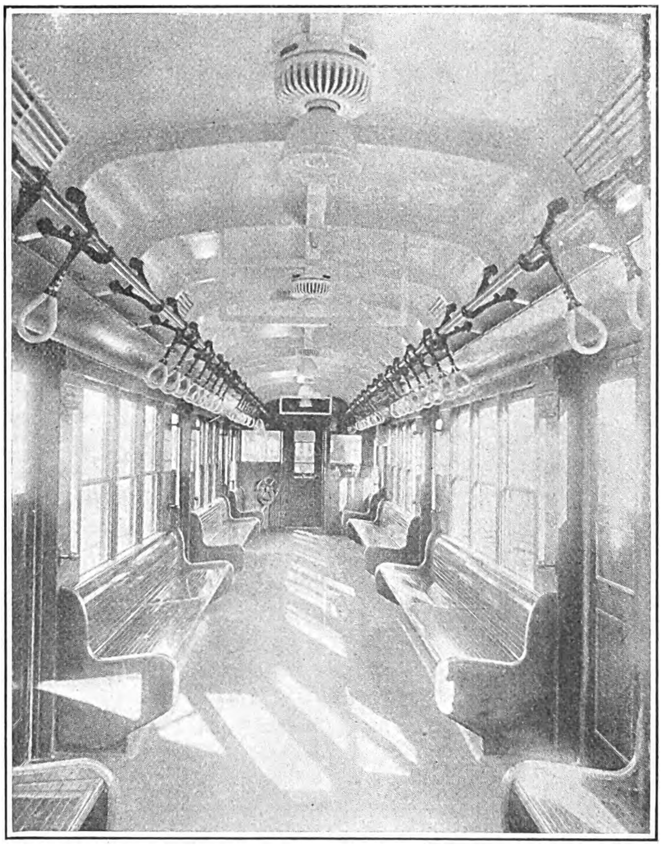
These reasons point to the need for building up a good riding habit in the off-peak hours. To do this the service must be of the best, for here is where the competition of the automobile, the taxicab, and pedestrianism is keenest. With service less frequent than in the rush, a delay may be more serious to the patron. If he allows what he feels is plenty of time to catch a train, or to make an appointment, or to reach the theater in time for the performance, he is not likely to be tolerant when the car is late. Even though it be a trip to the store, the shopper prefers to spend the time looking at bargains to waiting on a corner or sitting in a stalled street car. A few such occurrences and a rider is lost.

This tends to emphasize the necessity for keeping the transportation force on its toes at all times, so that during the period when there is the greatest opportunity for building up good will and increasing revenue, the service will not be found wanting. In the final analysis it is the service that will sell the rides.

Reducing Weight of Rapid Transit Cars Saves $108,000 a Year

Steps by Which Weight Was Reduced, Carrying Capacity Increased and Strength Maintained in New Rolling Stock for East Boston Service—Electric Door Openers Give Good Results

By John Lindall
Superintendent Rolling Stock and Shops, Boston Elevated Railway



The East Boston Tunnel Car, While Narrower Outside than the Standard Elevated Car, Has More Room Inside

STYLES of cars change and it sometimes seems that these changes are as frequent as the changes in the styles of clothing. For instance, when the famous "hobble" skirt was in vogue, the steps of many of our cars had to be changed to meet the conditions. If it should happen that the "hoop" skirt should again come into style, we should probably have to change the cars to meet that condition! Some people seem to have the idea that when a new type of car is desired, the whole matter is conceived and developed in the brain of the car designer the same as an artist paints a picture. This is not true. There are many requirements which must be met in the design to enable the car best to meet the conditions of service. This may be more fully explained by following out, step by step, the development of our latest type, the East Boston Tunnel rapid-transit car, which has several features quite novel and somewhat radical in design.

SPECIAL CONDITIONS HAD TO BE MET

The East Boston Tunnel was built in 1900 to 1904 for the operation of surface cars run singly. It is probable that at the time when it was designed very little, if any, consideration was given to the question of train operation in the future. The tunnel was put into operation on Dec. 30, 1904, and operated with closed double truck cars with 26-ft. 6-in. bodies. As the traffic increased these cars were replaced with the largest type of car that could be used in the tunnel and on the streets. The increase in carrying capacity obtained in this way took care of the traffic growth up to 1917, when it was found that the capacity of the tunnel with single-car operation had been reached. As a means of further increasing its capacity, the operation of surface car trains was started. The number of cars in a train was gradually increased up to four. While this added materially to the carrying capacity of the tracks, it became evident that the capacity for handling passengers on the station platform also had been reached.

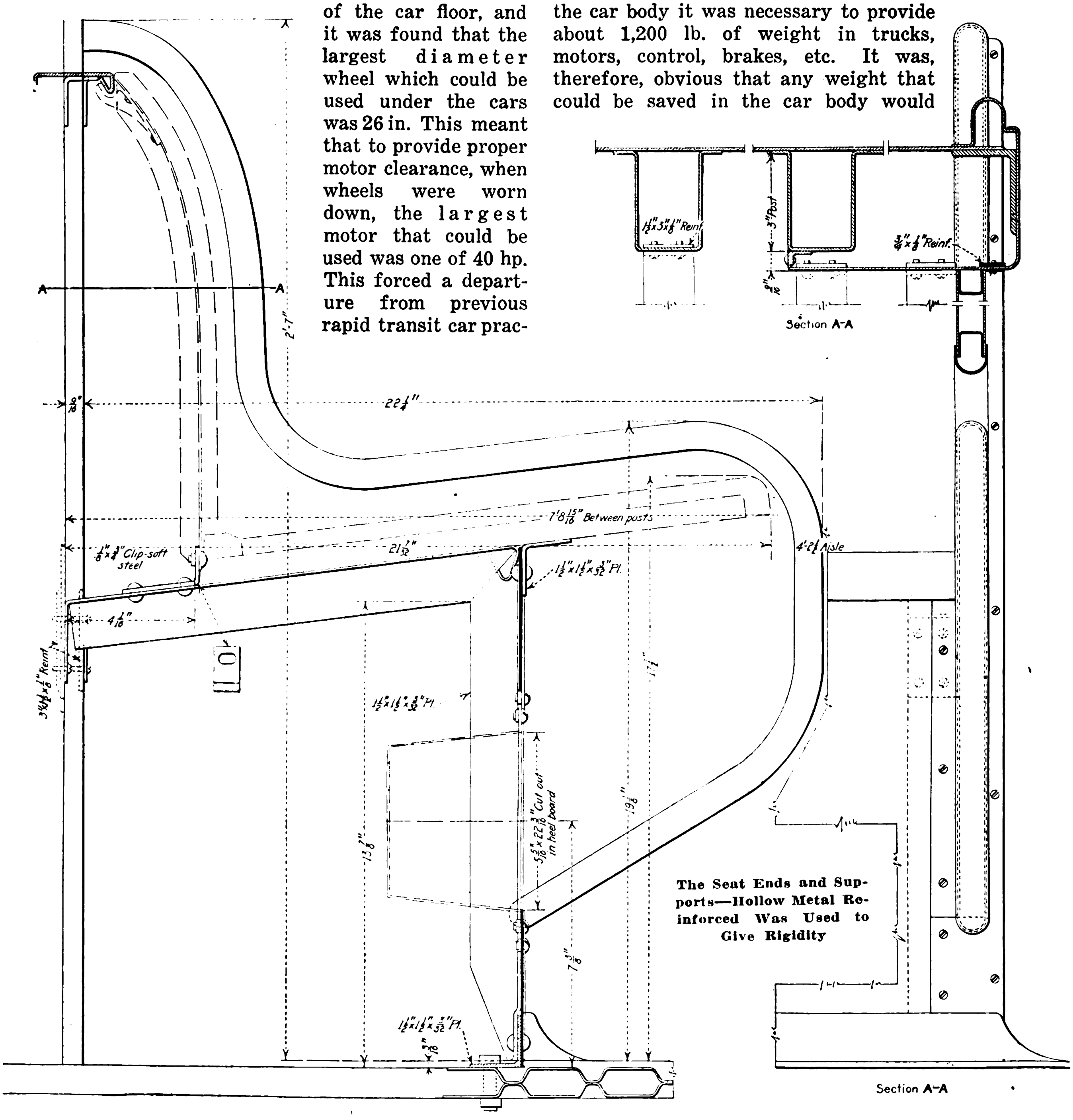
As several car lines were operated through the tunnel with diverse routing after leaving the East Boston end, it was impossible for each car or train to empty the station platforms, as passengers had to wait for the car or train running on their particular routes. This caused serious station-platform congestion.

To relieve this condition and as a means of providing further increase in carrying capacity, it was decided to go to trunk-line service in the tunnel, extend the platforms for six-car trains and provide terminal facilities at Maverick Square, East Boston, for looping the tunnel trains and also the connecting surface cars, with large platforms arranged so that the transfer of passengers could be made at one level.

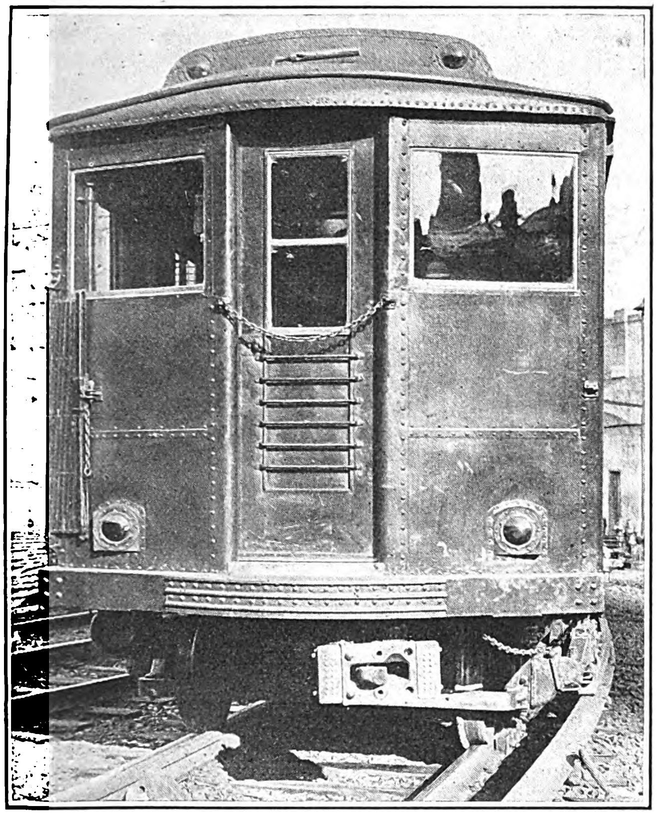
In operating with this arrangement the use of center-entrance motor-car trains was first considered, but this did not prove advisable for several reasons. The design and construction of the center-entrance cars were not suitable to withstand the buffing and pulling stresses which they might be subjected to when operated in six-car trains; overhead trolley operation had never been very satisfactory in the tunnel and with six trolleys on a train, more trouble was to be expected. It was also evident that the center-entrance cars would require more time at stations during heavy traffic than would a car of the rapid-transit type with three doors on a side. There was a further advantage in the rapid-transit type of car, in the reduction of trainmen required for operation, seven men being needed for a six-car train of center-entrance cars and only four for a train of the same number of cars of the rapid transit type. For these reasons, it was decided to use the rapid-transit type of car.

This question having been decided, the logical thing to do, if possible, would be to use the Cambridge subway type of car which had proved so satisfactory in that service; but when the matter of providing clearance for such a large car was looked into, it was found that the cost would be prohibitive. The next question was to determine how large a car could be operated through the tunnel without necessitating material changes in its construction. From tunnel clearance plans it was found that a car of approximately the length and width of the present elevated lines car could be used if its height could be reduced, and it was further found that on account of the low roof of the tunnel over the station platforms these platforms could only be raised to a certain height. This height determined the height of the car floor, and it was found that the largest diameter wheel which could be used under the cars was 26 in. This meant that to provide proper motor clearance, when wheels were worn down, the largest motor that could be used was one of 40 hp. This forced a departure from previous rapid transit car practice of using two motors per car, as sufficient power could not be obtained from two 40-hp. motors. As a matter of fact, it was a very serious question whether a rapid-transit type of car could be built light enough so that the total load would not exceed the capacity of the four 40-hp. motors, considering the number of stops per mile, grades, etc. We were operating the center-entrance cars of approximately 22 tons weight in that service with four 40-hp. motors. A check indicated that we could not safely go much beyond that weight. So our problem was to produce a fireproof rapid-transit type of car with stronger framing, M.C.B. wheels and heavier trucks, without exceeding the weight of the center-entrance motor car. When we considered that the last elevated cars built by this company weighed approximately 35 tons, the solution seemed quite impossible.

A comparison of the weights of the various parts of cars indicated that for every 1,000 lb. of weight in the car body it was necessary to provide about 1,200 lb. of weight in trucks, motors, control, brakes, etc. It was, therefore, obvious that any weight that could be saved in the car body would



The Seat Ends and Supports—Hollow Metal Reinforced Was Used to Give Rigidity



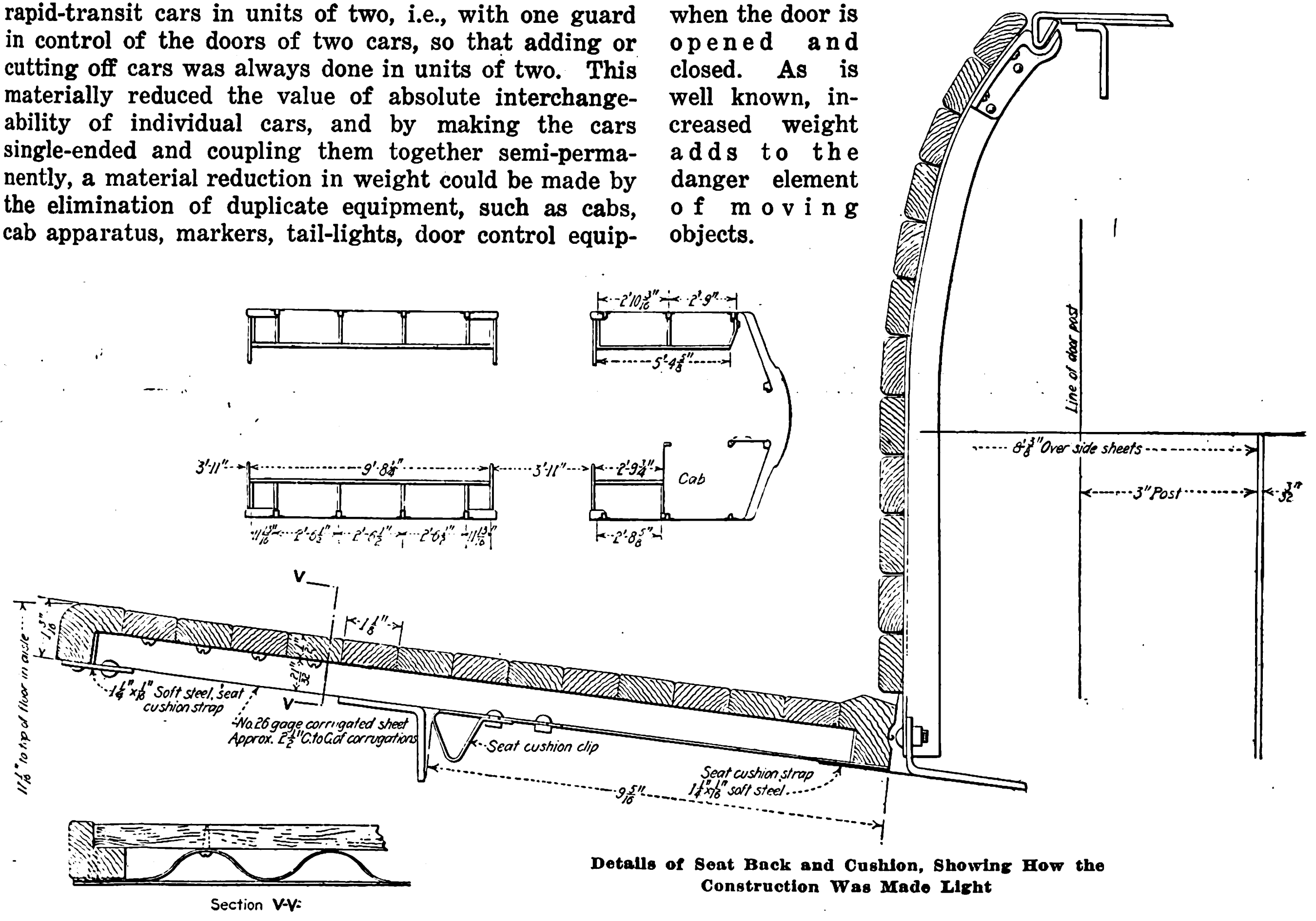
End of a Two-Car Unit. The Inside Ends Have Semi-Permanent Coupling

more than double itself in the total weight saving. With this in mind, we began consideration of means for reducing car-body weight without sacrificing necessary strength. We had developed the practice of operating rapid-transit cars in units of two, i.e., with one guard in control of the doors of two cars, so that adding or cutting off cars was always done in units of two. This materially reduced the value of absolute interchangeability of individual cars, and by making the cars single-ended and coupling them together semi-permanently, a material reduction in weight could be made by the elimination of duplicate equipment, such as cabs, cab apparatus, markers, tail-lights, door control equipment, etc. This amounted to approximately 1,300 lb. per car.

DOORS ON THE OUTSIDE OF CAR REDUCED WEIGHT

It had been universal practice to slide the doors, in both the sides and ends of the car, into pockets in the walls. This meant double walls, glass, etc., at all such pockets—eight per car. These pockets also determine the thickness of the car walls. By placing the side doors on the outside of the car and designing the end doors to swing, we eliminated the necessity for door pockets and were able to reduce the thickness of the walls of the car. This permitted placing the seats nearer the outside line of the car and gave the further advantage of greater passenger carrying capacity. In fact, the distance over side walls of the East Boston tunnel car is less than that of the elevated car, while the aisle space is greater; or in other words, it is a smaller car outside and a larger car inside. This change permitted a saving in weight of approximately 1,500 lb.

The matter of providing suitable fireproof doors on rapid-transit cars has been a serious problem. Sheet steel was generally adopted for this construction, but a number of difficulties developed from its use. The light-gage sheet steel at first used cracked at the corners. There was trouble from condensation of moisture in the interior of the door, and also water would get into the door at the glass rabbet. For these reasons heavier metal was substituted, and in some cases cast aluminum doors were used. Notwithstanding this, the weight and cost of the doors increased. Weight in car doors is doubly expensive. It costs money to carry it on the car and costs additional money on account of having to move that weight twice at each station stop when the door is opened and closed. As is well known, increased weight adds to the danger element of moving objects.


2'10 3/16"
2'9"
5'4 5/8"
3'11"
9'8 1/4"
3'11"
2'9 3/4"
Cab
11 13/16"
2'6 1/2"
2'6 1/2"
2'6 1/2"
11 13/16"
2'8 5/8"
Line of door post
8'3/8" Over side sheets
3" Post
3/32"
V
V
1 1/8"
1 5/16"
2 1/32"
11 1/16" to top of floor in aisle
1 1/4"x1/16" Soft steel, seat cushion strap
No. 26 gage corrugated sheet Approx. 2 1/2" C. to C. of corrugations
Seat cushion clip
Seat cushion strap 1 1/4"x1/16" soft steel
9 5/16"
Section V-V

Details of Seat Back and Cushion, Showing How the Construction Was Made Light

As a remedy and a means of reducing weight, we decided to go back to the wooden door and provide fireproofing by covering the wood with thin sheet-metal. The Fire Underwriters consider a wooden firedoor covered with tin of no greater firehazard in a building than one made of sheet steel. We arranged to seal the sheet metal covering to prevent moisture from getting to the wood, and we interlocked the sheet-metal covering so that in the event of the doors being subjected to temperatures sufficiently high to melt the seal, the sheets could not be displaced. With such doors, we were able to make a reduction of 800 lb. in weight.

Fireproof Floors of Light Weight Adopted

The necessity of providing fireproof floors in cars was the cause of a material increase in weight. The method adopted was to lay sheet-steel flooring, pressed in the form of corrugations to give some vertical stiffness over the underframe, and cover this with a cement composition, the combination resulting in a stiff and rigid floor. This met the fireproof requirements and carried the load satisfactorily. Due to the vibrations set up in the floor, the composition material cracked and became loose. To prevent this, floors were laid with thicker composition, which meant additional weight, and there was the further objection that the floors were cold in winter. Our attention was called to a floor that had been invented by a New York engineer, which was called "Truss-plate" flooring. On investigation we found that two cars having this flooring had been in service several years with apparently satisfactory results. By the use of this material in our East Boston Tunnel cars, we were able to save approximately 2,000 lb. in weight, and the floor, being constructed with a dead air space between the upper and lower plates, seemed to be an effective temperature insulator, making the floor warmer during the cold months. The strength of the floor is entirely in the plates and a thin, flexible composition is used for the wearing surface.

Reducing Weight of the Seats

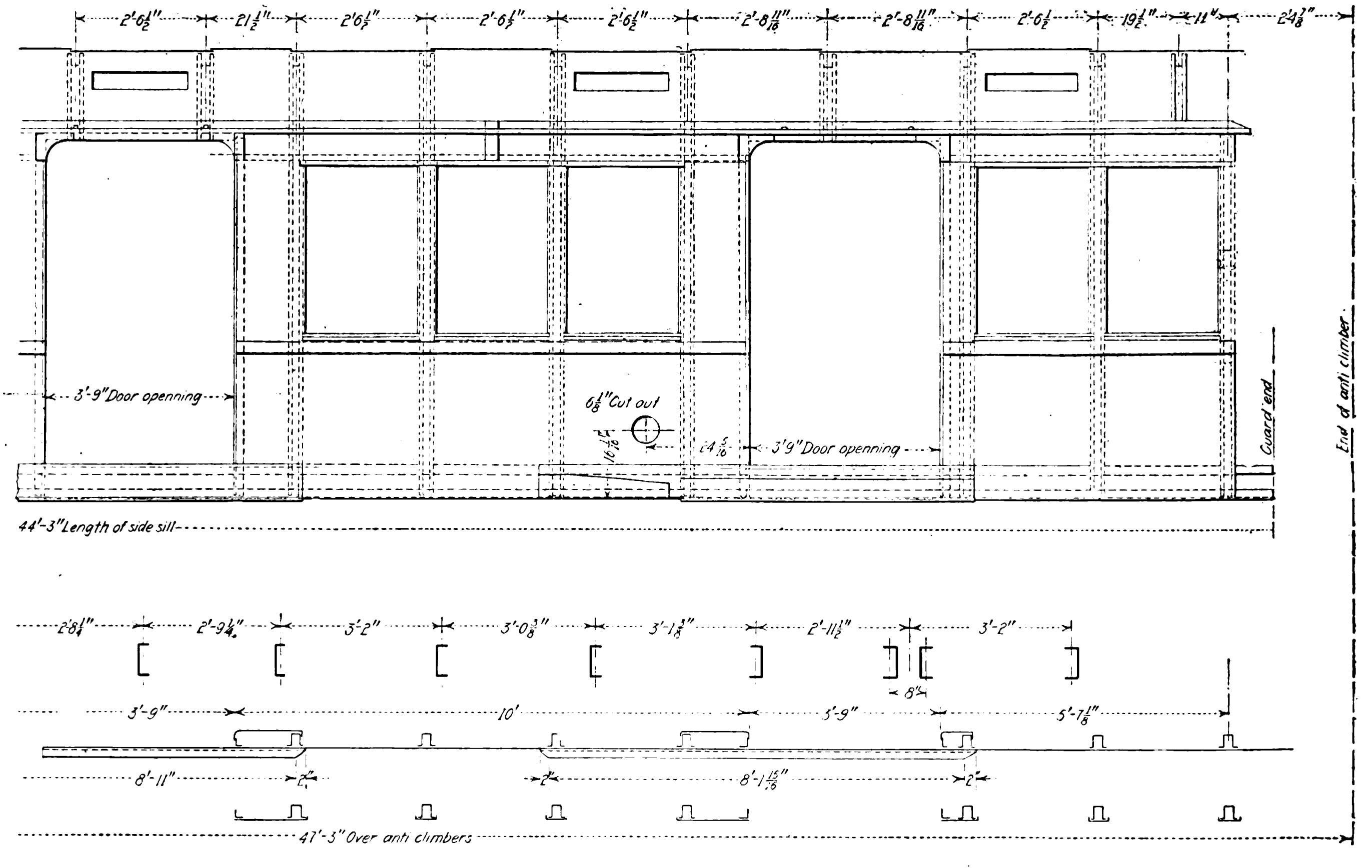
The wooden slat seats in the rapid-transit cars were designed with the necessary strength entirely in the wood; to meet the Underwriters' requirements for fireproofing over heaters and electrical apparatus, the undersides of seat-frames were covered with sheet metal. By redesigning the seat and using the sheet metal in a corrugated form we were able to make the metal furnish the necessary strength and stiffness as well as provide the necessary fireproofing. This change enabled a saving to be made in seat weights of 160 lb. per car.

The total of the items of weight saved thus far mentioned amount to 4,460 lb. in car-body weight. As previously pointed out, weight saved in the body would more than double in the total weight saved. This meant a total saving of approximately 5 tons. Having accomplished so much, it began to look as though the problem might possibly be solved.

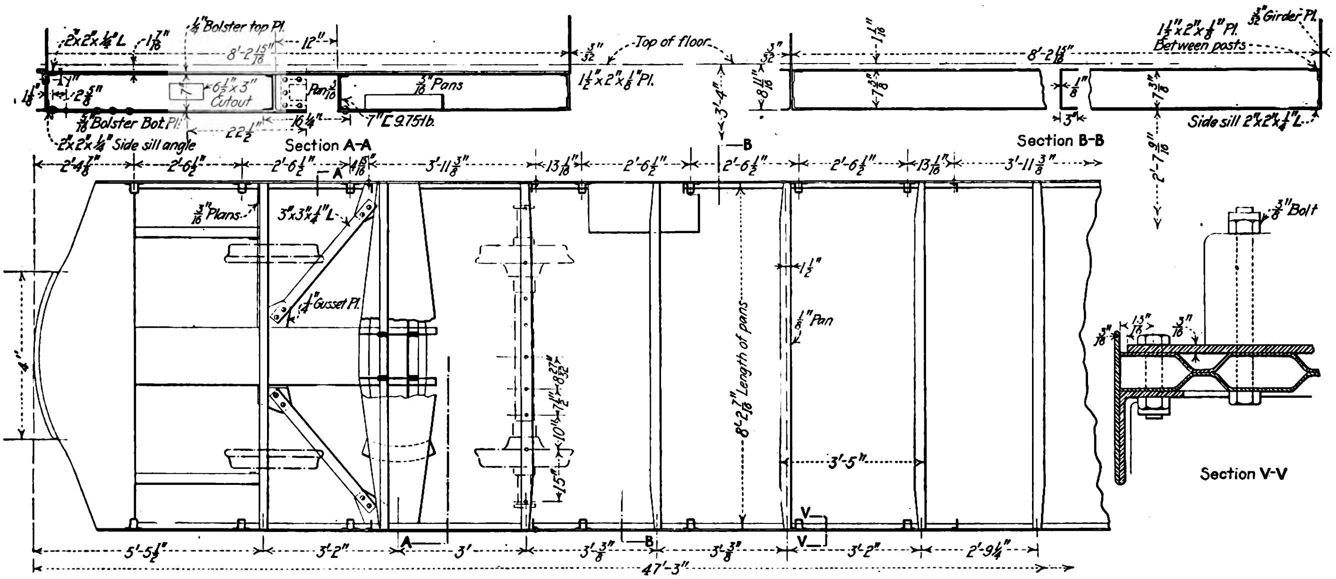
At about this time a trip was made to a number of large cities to see light-weight cars and to discuss our problem with car builders. From the information thus obtained, we concluded that it would be possible, by careful design and careful following of all details, to produce the car we required. We made drawings and specifications accordingly, one clause reading: "The weight of the car body, as delivered to the railway, must not exceed 19,000 lb."

The weight of the car bodies, as delivered to us by the Pullman Company, was 18,320 lb., or 680 lb. less than the weight specified, while the total weight of the car, complete, was slightly under 22 tons.

The operating costs for way, equipment and power,



Details of Side Framing for East Boston Tunnel Car



The Floor Framing Shows a Light but Strong Type of Construction

for these cars in the East Boston Tunnel service, based on $219 per ton per year,* will be approximately $108,000 per year less than if the service were performed by cars similar to those last placed in service on the elevated lines.

ELECTRIC DOOR OPERATING MECHANISM USED

There are two other features of note in connection with the East Boston Tunnel car. The Boston Elevated Railway was the first to operate car doors with pneumatic engines. The practice has now become nearly universal. It has made possible great improvement in operation and economy, but the use of compressed air for that purpose has some drawbacks. In the first place, the conversion from electrical energy to mechanical energy is accompanied by considerable loss. Compressed air is hard to confine and to prevent from leaking. The leak may be small at any one point, but there are numerous points and they are not readily accessible for testing or repair. This means that there is a constant leakage of air as long as air pressure is on the car and the compressor capacity must be proportioned to maintain proper pressure notwithstanding the air leakage. In the case of the East Boston Tunnel car, this meant that while a 16-cu.ft. compressor would be ample to provide air for brakes and control, a 25-ft. compressor would be required if air-operated doors were used. The difference in compressor weights was approximately 300 lb. These were important considerations, but the desirability of eliminating the troubles of sticking and slow working doors in cold weather was of greater importance, and if doors could be controlled directly by electric power it seemed that the results should be economical as well as beneficial from a service standpoint.

We built a car door model and equipped it with an electric motor and controlling mechanism. From the results obtained in this way we were satisfied that the scheme was practical. We issued specifications for electric door mechanism and the Consolidated Car Heating Company was the successful bidder. Our experience, so far, with the electric door operators indicates that they will be an improvement over the pneumatic door operators.

The introduction of light-weight cars of large carrying capacity introduced another problem, that of braking. The usual practice has been to adjust the braking pressure to the light weight of the car so as to reduce the liability of wheel skidding. This trouble is not only disastrous to the wheels but it is a well-known fact that sliding friction between wheel and rail is considerably less than rolling friction. For that reason a longer distance is required to stop a car when the wheels skid. This means that with the brake pressure adjusted to the weight of the car without load, there was no means provided for taking advantage of the additional friction or adhesion between wheel and rail due to the additional weight of the passenger load. This necessarily meant longer stopping distances even with maximum braking conditions, as the load was increased. With our steel elevated cars, the maximum passenger load amounts to 33 per cent of the dead car weight, which is not such a serious difference, but with the East Boston Tunnel car the proportion of passenger load to dead weight is 57 per cent and in the interests of safety and traffic capacity, this factor could no longer be ignored.

We had reached a point where some means must be applied for increasing the available braking pressure as the load was increased and conversely reducing that pressure as the load was decreased. Such a device was in use on the New York Municipal subway lines. On investigation, it was found to work very satisfactorily, but the design was such that it required considerable space for installation which could not be provided on our cars, and its weight amounted to 2,000 lb., which we could not afford. However, designs were submitted by the manufacturers showing a device which would accomplish practically all that the Brooklyn device accomplished; which could be installed in the space available and which weighed only 165 lb. This was adopted for both the No. 5 semi-convertible cars and the East Boston Tunnel cars. These brakes are operating very satisfactorily and seem to meet the conditions fully. It is possible to stop a loaded car in the same distance as that in which the empty car can be stopped. This should make for greater safety and materially add to traffic capacity on lines of dense traffic.

If the East Boston Tunnel cars were to be interchanged or operated with the present elevated cars and were to be subjected to the stresses imposed by the heavier cars, it would have been impossible to make any such reduction in weight; i.e., it would be impossible to design cars for our elevated lines with a weight of 44,000 lb. It may, however, be possible in building future elevated cars, by adopting some or all of the new features incorporated in the East Boston Tunnel cars, to make a material reduction in weight without sacrificing strength.

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*The derivation of this figure was given in an article in ELECTRIC RAILWAY JOURNAL for July 26, 1924, page 122.

Accident Prevention in San Antonio

A Feature Is the Use of Home-Made Bulletins, as They Give a Personal Touch—Their Use Has Been Followed by Accident Reduction

By Harold A. Briggs
Safety Supervisor San Antonio Public Service Company

WE BEGAN a special effort in accident prevention on the San Antonio traction system in November, 1923. The first two months were spent in reconnaissance and in forming an estimate of the situation.

In January, 1924, we began making a thorough investigation of every accident in which there was any doubt as to how it happened. We classified the responsibility for accidents into four classes, as follows, (1) trainman at fault; (2) trainman not at fault but the accident might have been avoided; (3) the other party at fault, no chance to avoid it; (4) company at fault.

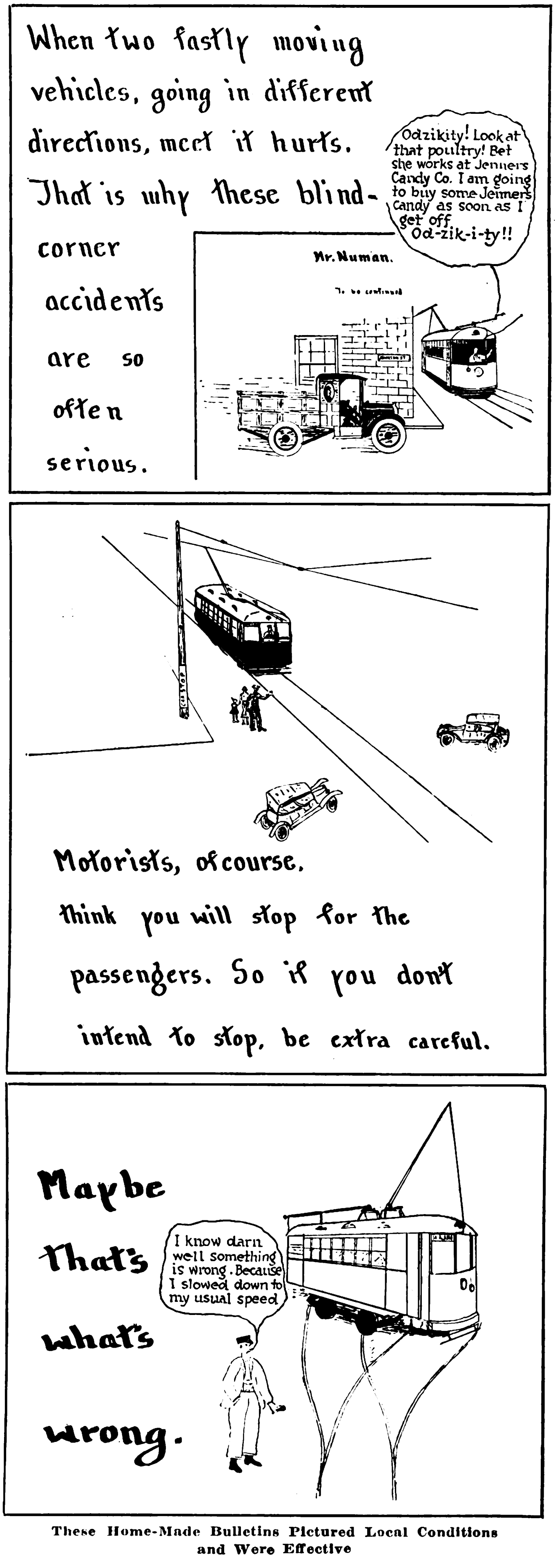
We also classified the accidents according to cause, such as "Following traffic too closely," "Too fast at intersections," "Inattention to duty," etc. With this information before us it was comparatively easy to lay our plans.

Believing that generally a man will do what is right if he knows what right is, we centered our efforts on showing the trainmen what it was safe to do and what was unsafe. A special study was also made of equipment, track, schedules in use, etc., with a view of making it easy for the man to do the right thing.

Our educational work has been carried out through personal instruction by line inspectors and by safety bulletins. The line inspectors who are daily in close personal touch with the men are kept advised of the accident situation by letter or information daily through the chief inspector.

When a man is found doing something wrong he is instructed on how to correct his trouble. After a few days and for some time afterward he is closely watched to see if he is following instructions. In most cases it is found that after the second warning or caution about a particular condition or habit, the man makes a strong effort to follow instructions. However, it has been necessary, in a very few cases, to let men out of the service because they could not, or would not, obey the rules.

Another feature of our educational plans that deserves special mention is our home-made safety bulletins. One great objection to the general safety bulletin is that it lacks the local and personal touch to make it attractive. And they so seldom fit the conditions that the company is especially fighting. Then again, a majority of those who do read them don't get the benefit they should out of them, because they think


When two fastly moving vehicles, going in different directions, meet it hurts. That is why these blind-corner accidents are so often serious.
Odzikity! Look at that poultry! Bet she works at Jenners Candy Co. I am going to buy some Jenners Candy as soon as I get off. Od-zik-i-ty!!
Mr. Numan.
To be continued
Motorists, of course, think you will stop for the passengers. So if you don't intend to stop, be extra careful.
Maybe that's what's wrong.
I know darn well something is wrong. Because I slowed down to my usual speed

These Home-Made Bulletins Pictured Local Conditions and Were Effective

"What does that bird in New York know about conditions here?"

We have been creating our own bulletins, and by using them in conjunction with personal drives by the line inspectors on the same subject have produced good results.

The first poster reproduced shows the dangers of inattention at blind corners, and at Johnson Street in particular. Johnson Street has been the scene of the first of a series of cartoons we called "Mr. Numan," showing some of the predicaments encountered by a new man.

The second poster is of more general interest and was drawn and put on our board the day after one of the men had demolished an automobile because of doing the very thing depicted in the poster.

The third poster was put out on the day after a one-man car had derailed his car by hitting a switch too hard.

The trainmen are beginning to look upon all of the posters now as true pictures of something which has happened, and the first question they ask is "Who did it?" This information soon leaks out and creates a great deal of friendly ridicule and good advertising of the cause of the accident.

These home-made bulletins are drawn to fit local situations and have been found effective at a time when the line inspectors are making a personal drive outside against the same conditions. Especially good results have been obtained.

In January, 1924, our classification showed 33 accidents that were the fault of the trainmen and 52 others that ought to have been avoided. In June the record shows 8 that were the fault of the trainmen and 37 others that ought to have been avoided. This makes a total of 45 in June against 85 in January that ought to have been avoided. Lest some of this gain should be credited to an improvement in the traffic conditions it should be explained that in January 60 automobiles hit street cars, and in June, 92.

There was also a good showing compared with last year. In June, 1923, we went 1,800 miles to an accident of the collision type. In June, 1924, the figures was 2,500 miles per accident.

Dispatching Helps Maintain Good Service

In Denver the Cars Are Operated on Regular Schedules Except When Unusual Conditions Require Special Orders from Dispatcher—System of Peak Load Reports by Telephone Gives Running Record of Loading and Keeps Each Crew in Touch with the Office

CONTROL of car movements by a central dispatcher is combined with regularly scheduled operation under normal conditions on the Denver Tramway Company's lines. In this way the minimum amount of supervision is required to handle the service when things are running smoothly, and at the same time any line on which abnormal conditions occur may be taken over quickly by the dispatcher and an emergency schedule operated under his direct supervision until normal service is re-established. With the combined system that is used, the cars run on time cards for the full 18-hour period, but if for any reason the service becomes irregular, the dispatcher immediately takes over the line, straightens it out and then puts it back on time-card operation.

MAXIMUM PASSENGER LOADS REPORTED BY TELEPHONE

In combination with the dispatching arrangement, a system of peak load reporting by telephone serves the double purpose of putting each car in touch with the dispatcher's office at the end of each trip and at the same time furnishes a complete record of the loading on each line, so that additional service may be added on very short notice to handle unusual loads. At the end of every trip the trainmen report from telephones installed at the ends of all lines to special peak load operators stationed at a central telephone switchboard. These reports give the number of passengers on the car at the peak load point on the line. If the dispatcher is operating the line or desires to issue special instructions, the trainman is switched to the dispatcher's board. Otherwise, the train crew receives an "O. K." from the peak load operator and continues to run on the regular time card for his run.

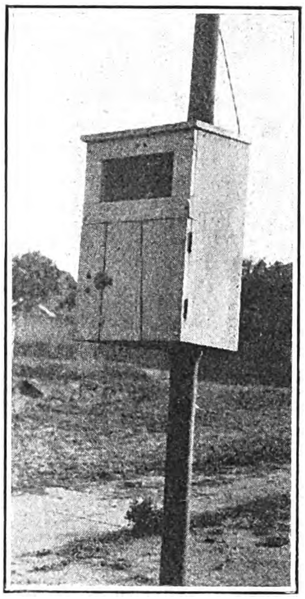
The dispatcher is not merely a trouble man to take records of accidents and car defects, but spaces cars to take care of any unusual condition and is responsible to a large extent for the regular operation of all cars. It is evident that the system used gives a running check on the operation and loading of every car in service. This is obtained up to 11:30 p.m.

Peak load reports coming in from the trainmen are listed on special 5-in. x 8-in. cards in a visible "Kardex" file, so that a comparison for any number of days can be made readily for each run and trip. Separate records are kept for weekdays, Saturdays and Sundays. This record is carefully inspected each day for any unusual conditions. If a car was late during a trip and was overloaded on this account the fact is apparent from the record.

Each section of the Kardex frame in which the cards are filed corresponds to a certain group of runs on a given division of the system. These all terminate at points connected with a certain section of the switchboard assigned to one operator. Each tray of cards includes all the runs on these lines for a certain period of the day. Thus during a certain period all the reports coming in to a given section of the switchboard will be covered by the cards in certain groups of trays.

The cards are filed in the trays by lines, which makes it possible to locate the proper card promptly when a trainman reports over the telephone. The cards are made out in advance, each one containing space for the record of an entire week for a given run. This includes the leaving time from terminals, both inbound and outbound. When a trainman makes a report by telephone, he states to the operator the line on which he is operating the time he left the terminal and the number of passengers on his car at the peak load point, both inbound and outbound. The operator locates the proper card for the line and then finds the leaving time indicated. This is facilitated by having the cards arranged consecutively in the file trays according to the terminal leaving times throughout the day.

As the peak load for each run is reported in, consecutive runs on each line show up in comparison with each other in the record, and unusual load conditions are at once noticed. When a car gets off its proper schedule the actual leaving time at terminals is recorded on the card by the operator and shows in comparison with the scheduled leaving time.

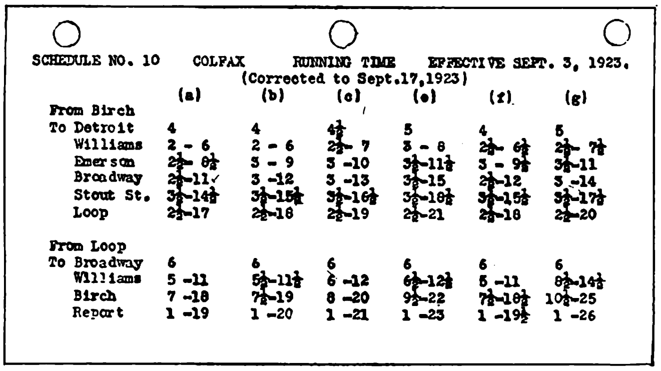


Telephones Located Near the Ends of All Lines Are Connected Directly with the Peak-Load Operators in the Dispatcher's Office

In drawing up a new schedule for any line the peak load cards are used as a guide. The reported loading is averaged for a predetermined period, so as to give the average peak condition for the various trips. The number of cars needed on each line for any given period is thus readily determined. In general, a load of 70 passengers on a two-man car at the peak point on the line becomes the basis for added service in the rush hour. In the non-rush period a seated load is the basis for determining the number of cars required, but on most lines, in order to hold the headway down so as to give maximum practicable frequency of service, the headway, and not the loading, becomes the basis for fixing the number of cars on the line.

EACH TRAINMAN CARRIES ALL SCHEDULES FOR HIS LINE

Schedules are first made up graphically. This shows at a glance the amount of dead time or layover at the terminals. With the schedule thus drawn up, the leaving time for each car is taken off and compiled in time-card form, with cars in service for the entire day shown for the full 18 hours. Extra cars to take care of the peak periods are shown in the same way. From these time-cards the runs are made up and the assignments are then distributed to the divisions for voting by trainmen. Time cards are printed and issued to trainmen. Each man on a given line is supplied with a book containing the time card for each run on the line he is working, as well as his own. Thus the trainman has all the time cards on his line, so that if the dispatcher switches him to another run he will have all the necessary schedule information. When placed on a run different from his regular assignment, a trainman continues to operate on it for that day, or until again changed by the dispatcher. The weekday schedules are printed on white paper, the Saturday schedule on green and the Sunday schedule on pink. The sheets are 2⅞ in. x 6¾ in. As all the schedules for each line are included, there is one complete book outstanding for each car on a given line.



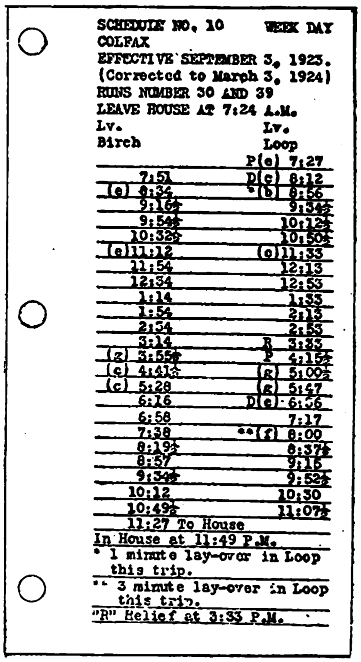
SCHEDULE NO. 10 COLFAX RUNNING TIME EFFECTIVE SEPT. 3, 1923.
(Corrected to Sept.17,1923)

	(a)	(b)	(c)	(e)	(f)	(g)
From Birch						
To Detroit	4	4	4½	5	4	5
Williams	2 - 6	2 - 6	2½- 7	3 - 8	2½- 6½	2½- 7½
Emerson	2½- 8½	3 - 9	3 -10	3½-11½	3 - 9½	3½-11
Broadway	2½-11	3 -12	3 -13	3½-15	2½-12	3 -14
Stout St.	3½-14½	3½-15½	3½-16½	3½-18½	3½-15½	3½-17½
Loop	2½-17	2½-18	2½-19	2½-21	2½-18	2½-20
From Loop						
To Broadway	6	6	6	6	6	6
Williams	5 -11	5½-11½	6 -12	6½-12½	5 -11	8½-14½
Birch	7 -18	7½-19	8 -20	9½-22	7½-18½	10½-25
Report	1 -19	1 -20	1 -21	1 -23	1 -19½	1 -26

A Sheet Is Included in Each Schedule Book, Showing the Running Time Between Important Time Points for Various Periods of the Day. The Dispatcher Specifies the Running Time to Be Used When Cars Are Not Operating on Schedules

In making up schedule books for the trainmen the regular men are furnished with books containing the schedules for the runs on one line only. The extra men in each division, however, carry books containing the schedules for all the lines operating out of the division to which they are assigned.

In addition to the regular schedules for the various runs, each trainman's book contains a sheet which gives the running time between the various time points at different hours of the day, as the running time allowance is varied to allow for differences in street congestion and amount of passenger load and interchanges. These various sets of running times for each line are indicated by letters, as (a), (b), (c), (d), as shown in an accompanying illustration. A sheet of this kind accompanies the group of run schedules for each line, so that the extra men are supplied with a running time slip for each line in their schedule books.



SCHEDULE NO. 10 WEEK DAY
COLFAX
EFFECTIVE SEPTEMBER 3, 1923.
(Corrected to March 3, 1924)
RUNS NUMBER 30 AND 39
LEAVE HOUSE AT 7:24 A.M.

Lv. Birch	Lv. Loop
	P(e) 7:27
7:51	D(c) 8:12
(e) 8:34	*(b) 8:56
9:16½	9:34½
9:54½	10:12½
10:32½	10:50½
(e)11:12	(c)11:33
11:54	12:13
12:34	12:53
1:14	1:33
1:54	2:13
2:34	2:53
3:14	R 3:33
(g) 3:55½	P 4:15½
(c) 4:41½	(g) 5:00½
(c) 5:28	(g) 5:47
6:16	D(c) 6:56
6:58	7:17
7:38	**(f) 8:00
8:19½	8:37½
8:57	9:16
9:34½	9:52½
10:12	10:30
10:49½	11:07½
11:27 To House	

In House at 11:49 P.M.
* 1 minute lay-over in Loop this trip.
** 3 minute lay-over in Loop this trip.
"R" Relief at 3:33 P.M.

Each Trainman Is Furnished with Book Containing All Schedules for His Line. Weekday Schedules Are Printed on White Paper, While Saturday and Sunday Schedules Are Distinguished by Colors

When the dispatcher takes over a line in an emergency he instructs each man reporting by telephone to leave at a certain time, using running time (a), (b), (c), etc., as shown by the time card, until receiving further instructions. The line continues to operate on such telephone orders until all cars have been properly spaced, even though not in their regular locations. When this is accomplished, the dispatcher orders each man reporting to take the scheduled run corresponding with his position at the time of reporting. Each crew then continues to operate for the rest of the day on the assigned run, using the schedule given for that run in the schedule book.

Two factors make this method of dispatching cars practicable for the conditions in Denver. In the first place men are paid for straight time only, so that in the event of extra time because of change in the run to which a man is assigned, the operating cost is not thereby increased by the payment of a higher rate for overtime. In the second place, it has been found that the saving in the number of street supervisors required under the system of telephone dispatching helps to pay the cost of the telephone system and the operators required in connection with it.

USE INDEPENDENT TELEPHONE SYSTEM

A special telephone system forms the means for carrying out this arrangement. The system was installed and is maintained by the telephone company as an independent telephone service on a rental basis. This includes telephone stations wired directly to the dispatcher's office from the terminals of all car lines. These terminal telephones include a total of approximately 90 stations wired directly to the dispatcher's office. In addition there are a number of stations in the central business district which may be reached by trainmen or supervisors.

An accompanying illustration shows the arrangement of the telephone switchboard room in the dispatcher's office. The main peak load report boards are divided into four independent sections connected directly with the stations at the terminals out on the line. In this way the four peak-load operators work independently and communicate directly with the trainmen making reports, without any other switching operations. The dispatcher has a master board, to which any terminal telephone can be connected by means of a simple switching operation by the peak-load operator. Thus, when the dispatcher is operating a line, the particular peak-load operator assigned to that section connects incoming calls to his master board, so that the trainmen receive running instructions directly from the dispatcher. The station is also equipped with a P.B.X. exchange, so that connection may be made with any city telephone through the telephone company's exchanges.

Each peak-load report board assigned to an individual telephone operator has a maximum capacity of approximately 5 calls per minute. This fixes a maximum per operator of about 300 calls from cars per hour.

Peak Load Operators Receive Reports from Trainmen Each Trip. Dispatcher Takes Charge of Line When Unusual Conditions Occur

Compiling Individual Car Mileage in Detroit

Allocation of Car-Miles and Ton-Miles, Made Obligatory by Interurban-City Arbitration, Is Made by Use of Special Record Forms and a Powers Tabulating Machine—The Sorting and Printing Are Done Automatically

By I. N. MERRITT
General Auditor Department of Street Railways, Detroit, Mich.

COMPILATION of individual car-miles by the Department of Street Railways, City of Detroit, was made mandatory by the award of the board of arbitration in connection with the determination of a rate that the department should receive as rental for use of its track for the interurban operation of the Detroit United Railway. Parts of the award dictate a ton-mile rate, while others are on the basis of a straight car-mile division of cost. It was described in considerable detail in ELECTRIC RAILWAY JOURNAL for Jan. 12, 1924, page 67.

A number of systems were experimented with, resulting in the adoption of the method now in use. The Detroit street railway system embraces approximately 375 miles of single track spread over an area of 90 sq.m. The 2,000 cars, including interurban, service, etc., operate monthly 4,525,000 car-miles divided as follows:

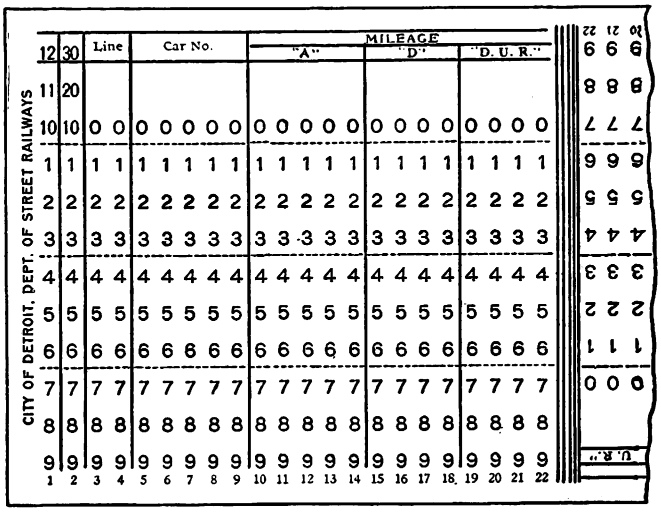
City passenger car-miles	4,300,000
Service car-miles	17,000
Interurban car-miles (D. U. R.)	200,000
Dead mileage	8,000
Total monthly car-miles operated on D. S. R. system	4,525,000

The division of the mileage into classes "A," "D." and "D.U.R.," depending on the type of track and cars, agreed to in the arbitration, is necessary to apportion the rental rate for interurbans, which is arrived at by knowing the combined total of all miles operated over the entire system, the rate being different for the different classes. The system invoked to accomplish this is unique in its simplicity and lack of forms required and it is believed, reduces to a minimum the functions necessary to obtain the final result.

The original information is taken from the conductors' daily trip sheets, the face of which is reproduced herewith. The back contains information on fares and transfers. Space is provided for listing terminal time of arrival and departure, time points and terminal time, car numbers, run numbers, number of trips, etc. In case there is any deviation from the schedules the conductor or operator is required to place an X opposite the part of the trip affected. At the completion of the day's work the operator or conductor turns in the trip sheet, which is checked by the station master to ascertain that he has received a trip sheet for each car or run dispatched and that they are properly filled out and contain all the required information. Then they are forwarded to the auditing division where the mileage is computed.

The schedule makers supply the auditing division with a draft of each schedule. The trip sheets when received are first checked again to see that each line or division is complete, by comparing them with the schedules and the report of schedule deviation forwarded each day from the stations. They are then segregated into groups or divisions, and four comptometer operators compute the mileage from the trips as shown. These operators are furnished with summaries of each schedule showing the starting and ending time and amount of mileage (divided into the various classes) for each run or section of run. The operators also have charts showing the distances between the various terminals of the several lines which they handle.

The mileage which each car has accrued is then entered in colored pencil on the trip report. Where no car change was made, and the run was operated exactly as scheduled, no computation is necessary, the mileage merely being posted as shown upon the schedule summary. In the event of car changes or omitted or additional service, which number about 50 per cent of the total reports, the mileage is computed according to individual trips.



CITY OF DETROIT, DEPT. OF STREET RAILWAYS

12	30	Line		Car No.					MILEAGE "A"					"D"				"D. U. R."			
11	20																				
10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Half of the Punch Card for Tabulation. The Other Half Is a Duplicate, so that the Card Can Be Used Twice

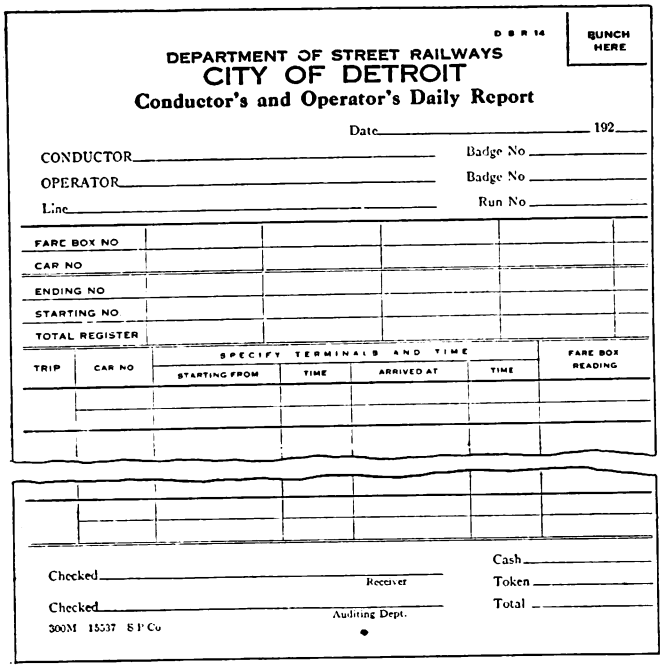
The balance of the segregating and listing of the mileage is accomplished by means of Powers automatic tabulating machines. Two punch machine operators perforate the cards, showing the date, car number, line number, and number of miles operated by the various classes. After punching, the cards are run through the tabulating machine, which prints a list of the daily mileage for each car according to lines and classes for preparation of the daily operating reports. The cards are then filed until the entire month is completed, after which they are sorted by the sorting machine according to car numbers, subsequently being run through the tabulating machine for listing of the month's miles operated by individual cars by classes of mileage. The two punch operators also handle all of the machine work.

The interurban mileage operated over city tracks is computed and tabulated in the same manner from trip reports furnished from the various interurban divisions. This operation requires one additional comptometer operator.

Every movement of a car is reported on some form of trip sheet. Approximately 2,500 are received daily from revenue, non-revenue, and service cars of the department, and approximately 400 from interurban cars. Each comptometer operater handles approximately 600 trip sheets per day. There are approximately 4,500 cards punched each day. The system contemplates the completion each night of the previous day's operations and in the first six days of the month the completion of the previous month's work by individual car-miles. The ton-miles are obtained simply by multiplying the total miles operated by the tare weight of the car in each case.

The individual car-mile record is transmitted to the maintenance divisions at the end of each month for use in connection with the maintenance of the rolling stock and for statistical information in general.

Although the system is a result of many nondescript experiments and was adopted to solve the compiling of individual car-miles, it has proved more than satisfactory, and beyond question, would be continued for this purpose even though the necessity of obtaining this record for segregating interurban costs were abandoned.



D S R 14

PUNCH HERE

DEPARTMENT OF STREET RAILWAYS
CITY OF DETROIT
Conductor's and Operator's Daily Report

Date ____________ 192___

CONDUCTOR ____________ Badge No ________
OPERATOR ____________ Badge No ________
Line ____________ Run No ________

FARE BOX NO					
CAR NO					
ENDING NO					
STARTING NO					
TOTAL REGISTER					

TRIP	CAR NO	SPECIFY TERMINALS AND TIME				FARE BOX READING
		STARTING FROM	TIME	ARRIVED AT	TIME	

Checked ____________ Receiver
Checked ____________ Auditing Dept.

Cash ________
Token ________
Total ________

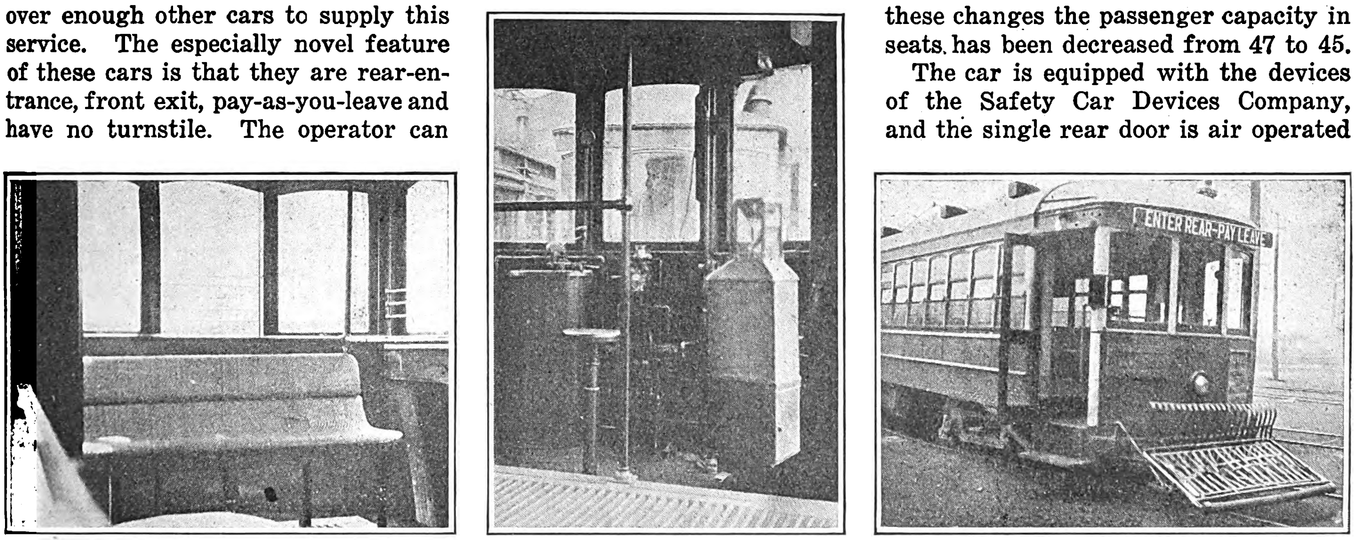
300M 15537 S P Co

Face of Trip Sheet, Showing Trip Information from Which Mileage Is Computed. The Reverse Side Contains Report of Fares and Transfers

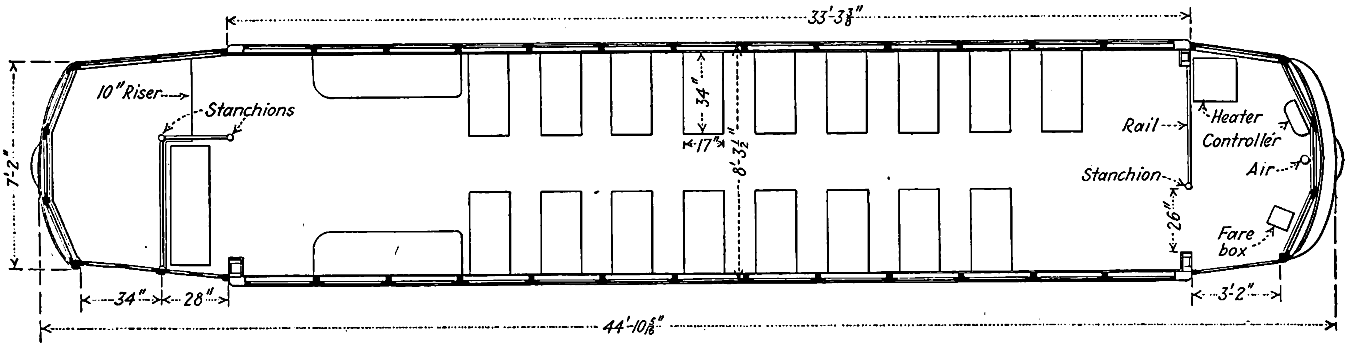
Rear-Entrance, Front-Exit, One-Man Car in Toledo

Ten of These Double-Truck Cars Are Without Turnstiles on a Belt Line—No Difficulty Has Been Found with Loss of Fares

SINCE May 4 Toledo has been operating double-truck one-man cars on the Bancroft belt line of that city. Ten cars have been rearranged for this purpose but six supply the basic service, two more are used during the rush hours and two are kept as reserve. These cars have given such satisfaction that within the last few weeks the company has decided to use the same type of rolling stock on about one-third of the lines in Toledo. Plans are being made to make over enough other cars to supply this service. The especially novel feature of these cars is that they are rear-entrance, front exit, pay-as-you-leave and have no turnstile. The operator can keep the rear entrance under close inspection while the rear door is open and does so to watch boarding passengers. He would be practically helpless, however, to stop any passenger getting off the rear platform without paying his fare. In fact, his instructions require him simply to report cases of this kind and not try to stop them. Up to this time the company has not suffered any loss in this way.



Rear and Front Platforms and Front View of One-Man Car



Plan of Rear-Entrance, Front-Exit, Pay-as-You-Leave, One-Man Car

This is the second attempt of the Community Traction Company of Toledo to operate one-man cars. A previous effort in November, 1922, was stopped by order of the Council on the ground that it was not permitted under the present franchise. While there has been a growing public sentiment favoring one-man cars, the city's legal department has been asked by the Council to ascertain the legal status of the cars.

The Bancroft belt line operates through a territory quite densely populated but one that has lost considerable traffic during recent years through the widespread use of private automobiles. There is not so heavy a rush-hour traffic on this line as on some of the radial lines or those which pass through the factory districts. Most of the rush-hour traffic on the Bancroft belt line is transfer business and shoppers returning from the downtown section.

A plan of the car used, with two interior views are presented. Originally the car was a single-end rear-entrance front-exit car, with a 6-ft. 7-in. rear platform equipped with two doors. From this platform there was a 10-in. riser to the car floor. In the change to one-man design one of the rear-entrance doors has been closed up and the car floor extended back to allow room for a seat for three passengers. By these changes the passenger capacity in seats has been decreased from 47 to 45.

The car is equipped with the devices of the Safety Car Devices Company, and the single rear door is air operated by a selective control which permits the motorman to open and close either door or both by different movements of the same lever. The cars are fitted with Westinghouse 310C motors, air brakes and K36 control. They were built originally by the McGuire-Cummings Manufacturing Company and are heated with hot air.

A ceiling sign within the car reads: "Please move as far forward as possible, leave by front door, pay as you leave—Exact fares will speed up service." A sign on the outside of the car reads: "Enter rear—Pay as you leave." The fares charged are: cash—8 cents; four tickets for 25 cents; children (8 years and under) 1 cent; children (in arms) free; transfer 1 cent. A self-registering farebox is used, the transfers being collected and registered separately by the operator by means of a pedal.

Association News & Discussions

Tests for Motormen and Bus Drivers*

A Number of Psycho-technical Tests for Platform Employees Have Been Used in Paris for Some Time—They Have Now Reached a Point Where the Laboratory Is Correct in from 80 to 90 per Cent of the Cases—This Means a Large Monetary Saving

By L. BACQUEYRISSE
General Manager in Charge of Operation Paris Transportation Company

For many years scientific principles have been applied to the examination of applicants for street railway service. On the larger systems this subject is becoming of constantly more importance, partly because of the increasing cost of accidents caused by incapacity of the personnel and partly because a great number of (French) undertakings pay their men during periods of illness.

AGE LIMIT

Replies to the data sheet from thirty-seven members of the association show that all have minimum and maximum age limits. Shortage of men during the World War led, in the case of conductors, to an 18-year minimum limit in ten cases and a 17-year limit in two. With twenty-one companies the age limit is from 20 to 22. Copenhagen sets the minimum as high as 25 years and Amsterdam at 23. Very young men are not considered sufficiently serious or steady.

The maximum age limit is usually between 30 and 35 years, but in some instances this has been raised to 40 years for war veterans.

In the case of motormen and omnibus drivers, or chauffeurs, eleven railway systems reported that men under 21 years of age were accepted, while the remaining twenty-six set 21 years as the minimum. The maximum age varies usually between 30 and 35 years, partly to insure suppleness of mind and partly (as with conductors) to insure a suitable number of years employment in connection with pension regulations. The tendency is toward men of 21 years minimum who have served their time in the army and attained the desired stability of character. Statistics have also shown that the very young men as drivers are inclined to the recklessness that causes accidents. This is indicated in an analysis of the accidents on the Paris Tramway-Bus system for which motormen or bus drivers were responsible, occurring during the months of January, 1921, April, 1922, and October, 1923. The tramway and bus accidents have been tabulated separately on two bases. In one the accidents were grouped according to the ages of the motormen or bus drivers involved. In the other there was a similar grouping according to the years of service of these employees. The results are shown in Fig. 1. They embody (for the October, 1923, period) the records of 3,611 motormen and 2,037 bus drivers. For the earlier periods the numbers of each class were somewhat less.

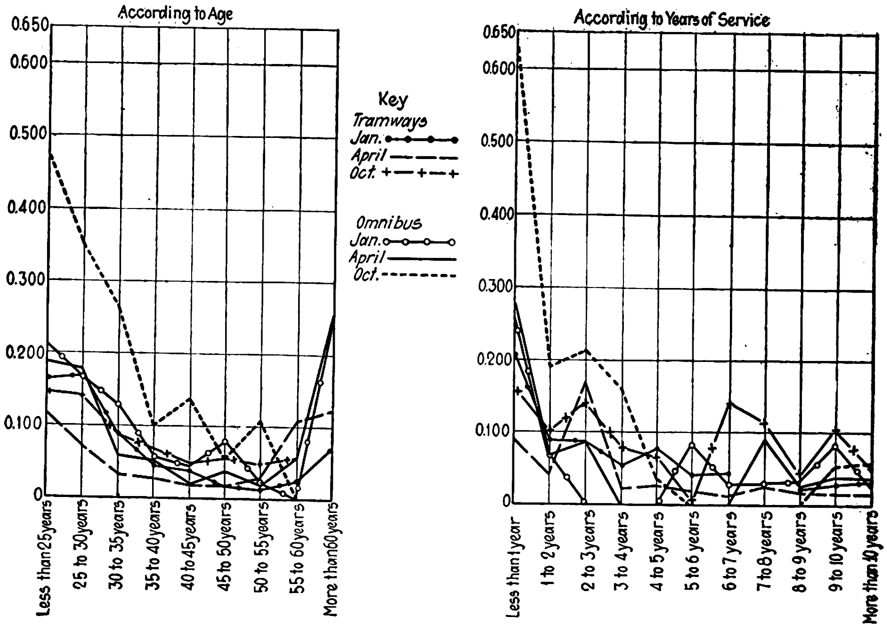


Fig. 1—Average Monthly Accidents per Vehicle Operator, Paris

The graphs based on the age of the men show a gradual decrease of accidents with advancing years, but with a turn for the worse among the men more than 50 years old. These differences are more sharply accentuated in motor-omnibus operation which is conducted under conditions of maximum congestion. The graphs based upon years of service also show a much greater proportion of accidents from beginners.

CONDITIONS AS AFFECTED BY SEX

Preceding the World War the platform employees consisted of men only. The war, of course, led to the employment of female car operators in large numbers. No choice could be exercised at the time, owing to the fact that women were also being drawn into so many other man-short industries. It is therefore impossible to make a comparison that would be fair to the women. It is to their credit, however, that female drivers for cars and buses, who usually had served previously as conductors, did not tend to show a greater proportion of accidents than male operators. As demobilization proceeded, almost all of the front-platform jobs were vacated. There are still many female conductors, but they are bound to go sooner or later.

EMPLOYMENT CONDITIONS AS AFFECTED BY PHYSICAL CONDITION

All companies replying said that they insist upon a medical examination. On small properties the examination is conducted at the office of a responsible physician who certifies whether the applicant for employment appears fit for platform service. Larger systems usually have their own medical examinations, supplemented by laboratories.

Annual Convention and Exhibits

A. E. R. A.

Atlantic City, N. J.

October 6, 7, 8, 9, 10

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*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

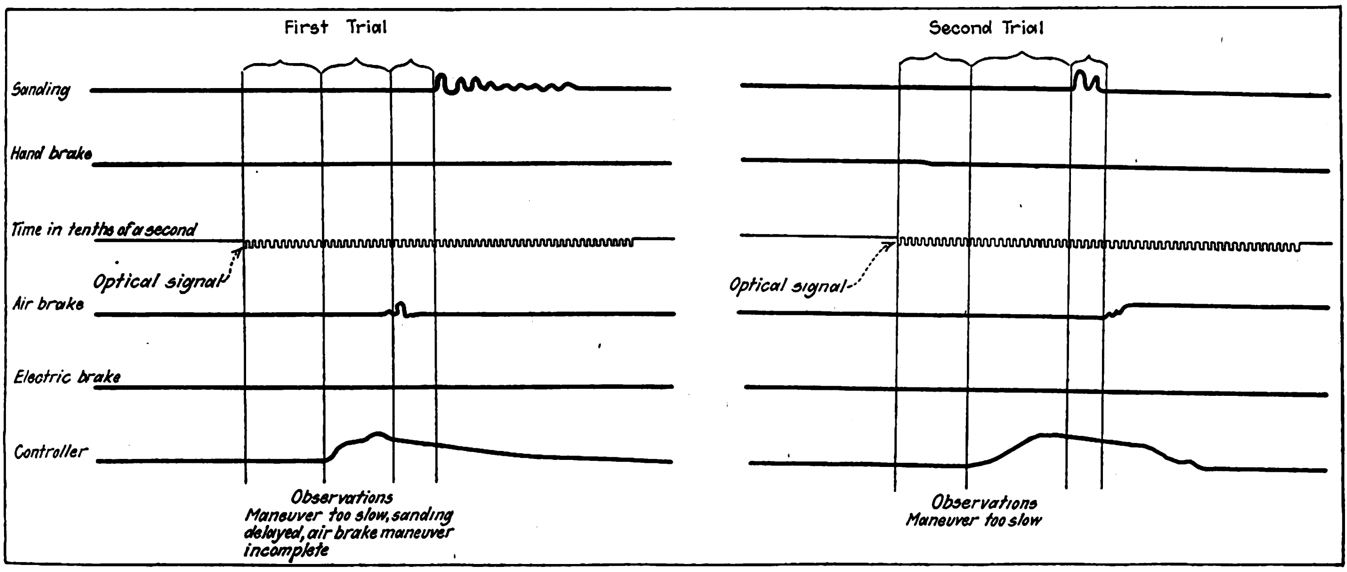


Fig. 2—Graphic Record of Platform Tests, Brussells

Since the applicant may be employed either on the front or rear platform, the examination covers the qualities required in both jobs. The tests appear to be severe, judging by the variety of questions and examinations, including urine analysis. In doubtful cases blood pressure is measured and use is also made of the Bordet-Wasserman reaction to determine incipient syphilis. A few systems also call for trials of muscular strength.

Where it is clearly understood that an applicant will be employed specifically as motorman or conductor, less onerous eyesight conditions are set for the conductor candidates. For instance, motormen (with rare exceptions) must have good vision without glasses, whereas the use of glasses is no bar to the conductor. There are also certain tolerances for conductors in the tests on sharpness of vision based on Monnoyer's scale. Red, green and yellow are employed in color tests.

From its own experience, the Paris system finds that modern traffic conditions call for the best possible eyesight on the part of motormen and bus drivers, particularly in judging speeds and distances, danger of collision with cross traffic and sharpness of vision in twilight, the latter as determined by laboratory test.

With regard to hearing, only two out of eighteen companies reporting made no special tests. The author does not consider the usual standards high enough in the case of motormen and bus drivers, as trials have proved that a person with subnormal hearing tends to locate the origin of various sounds behind him when some actually have originated in front of him. A motorman thus afflicted would get into trouble with an unexpected vehicle. He should also learn to appreciate that the sounds made by various vehicles are affected by their rate of speed.

PSYCHOLOGICAL TESTS FOR CAR OPERATORS

With regard to mentality, the growing severity of traffic conditions makes it highly desirable that transport undertakings make the fullest possible application of the advances in psychology. The employment of men most apt for the service will give safer operation for the public, reduce accident costs, cut down the waste of energy and minimize upkeep charges.

As early as 1700 Vauban made a time and motion study of different classes of work. Some years after physiologists, following the road opened by Lavoisier, began to determine the relations between muscular energy and food (fuel) values. Then came a series of studies by numerous scientists down to this day with its host of volumes on the psychology individual to different professions. The work of vehicle operators has already given birth to valuable knowledge as summarized in the following paragraphs:

The first applications of psychology to platform work were made simultaneously in 1913 at Harvard University and by the former East Parisian Tramways (Compagnie des Tramways de l'Est-Parisien). During the war years the methods applied in choosing men for the air service were a guide to

TABLE SHOWING RELATION BETWEEN EXCITATIONS AND REACTION IN VISUAL AND AUDITORY TESTS

Name ....

No. of Errors: 5

Accuracy Index: 0.94

Excitations		Reactions			
Lamp	Sounds	Left Foot	Right Foot	Right Hand	Errors
Red	Metal				I
Green	Metal				I
Green	Wood		×		
White	Metal	×	×	×	
Red	Wood	×			
Red	Metal	×		×	
Red	Wood	×			
White	Wood	×	×		
White	Wood	×	×		
Green	Metal		×	×	
White	Metal	×	×	×	
Red	Wood	×	I		I
Green	Wood	×	×		
Red	Metal			×	
Red	Wood	×			
Green	Metal	×	×	×	I
Green	Metal		×	×	
Green	Wood		×		
White	Metal	×	×	×	
Red	Metal	×		×	
White	Wood	×	×		
White	Metal	×	×	×	
Red	Wood	×			
Green	Wood		×		
White	Wood	×	×		
Green	Metal		×	×	
White	Metal	×	×	×	
White	Wood	×	×		
Red	Wood	×			
Green	Wood		×		

Excitations		Reactions			
Lamp	Sounds	Left Foot	Right Foot	Right Hand	Errors
Red	Wood	×			
Red	Wood	×			
Green	Wood		×		
White	Metal	×	×	×	
White	Metal	×	×	×	
White	Wood	×	×	I	I
Red	Metal	×		×	
White	Wood	×	×		
Green	Metal		×	×	
Green	Metal		×	×	
White	Metal	×	×	×	
Red	Metal	×		×	
Green	Wood		×		
Green	Metal		×	×	
Red	Wood	×			
Green	Wood		×		
White	Metal	×	×	×	
White	Wood	×	×		
Red	Metal	×		×	
Red	Metal	×		×	
White	Metal	×	×	×	
Red	Wood	×			
Green	Wood		×		
White	Wood	×	×		
White	Wood	×	×		
Green	Metal		×	×	
Red	Wood	×			
Green	Wood		×		
Red	Metal	×		×	
Green	Metal		×	×	

Excitations		Reactions			
Lamp	Sounds	Left Foot	Right Foot	Right Hand	Errors
Red	Wood	×			
Red	Wood	×			
Red	Metal	×		×	
Red	Metal	×		×	
White	Wood	×	×		
White	Metal	×	×	×	
Green	Wood		×		
White	Metal	×	×	×	
Red	Wood	×			
Green	Metal		×	×	
Green	Metal		×	×	
Green	Wood		×		
Red	Metal	×		×	
Red	Wood	×			
White	Metal	×	×	×	
Red	Wood	×	×		
Green	Wood		×		
Green	Metal		×	×	
White	Wood	×	×		
Green	Wood		×		
Green	Wood		×		
Green	Metal		×	×	
White	Wood	×	×		
White	Metal	×	×	×	
Red	Metal	×		×	
Red	Wood	×			
Green	Metal		×	×	
White	Wood	×	×		
Red	Metal	×		×	
White	Metal	×	×	×	

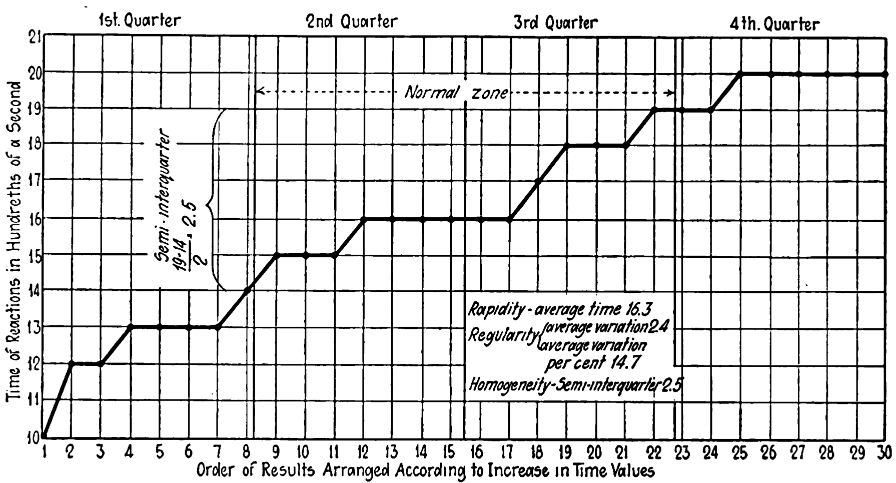


Fig. 3—Record of Reaction Times to Simple Sounds, Paris

psycho-motor tests for women operators of the former Parisian Tramways (la Cie. Parisienne de Tramways). Army tests of this nature as applied to 20,000 automobile drivers showed that nearly 20 per cent were unfit and that ability decreased from 40 years on.

In more recent years psychological tests have been applied by the systems of Amsterdam, Barcelona, Brussels, Milan, Paris, Philadelphia, the German State Railways and others. Examination of results indicates that failure to start with a precise analysis of the job of car or bus driving has caused disappointment in some cases.

This analysis must be based upon a graphic motion study of vehicle operation, under both the diverse conditions of actual running and of laboratory tests where everything can be done in logical order. One aid toward the achievement of this result is the use in Paris of registering and recording devices on cars in every-day service. The following inventory of points to observe has been set up:

Attention or distraction (tests of Amsterdam, Barcelona, Brussels, Harvard, Paris, Philadelphia) is one of the most important to determine in the case of motormen and bus drivers as they are subject to numerous excitations. The tests show how a man reacts, with appropriate handling of his apparatus for a service or emergency application of the brakes, sanding, etc.

Concentration (tests of Amsterdam, Barcelona, Milan) is an analagous function, but in this case there is a single reaction to a single excitation.

Rapidity and regularity of physical reactions are studied by all, but some consider this function as simply a form of attentiveness and others as a simple muscular function.

Local muscular force, i.e., transmission to the muscles and the muscular system which come into play in the motorman's work.

Fatigue resistance (tests of Milan and Paris).

Motor suggestibility (test of Paris) is defined as the subject's aptitude for developing a sense of touch and muscular action that will enable him to exert just the right degree of control almost automatically (or subconsciously) amid all the confusing calls on his attention when running over a busy highway.

Judging speed and distance (tests of Amsterdam, Barcelona and Paris).

Rapidity in perception of images (tests of Paris).

Perception of sound direction.

Impulsiveness (tests of Amsterdam, Barcelona and Paris).

Memory (tests of Milan and Paris).

Intelligence. One does not expect intellectual eminence in motormen and bus drivers, but since intelligence does play a big part in all human activities even candidates for such humdrum work ought to possess a certain minimum of this quality.

METHODS OF PSYCHO-PHYSIOLOGICAL SELECTION

Space does not permit an account of all of the researches made by various undertakings to discover the aptitude of candidates, but the methods can be classified into two groups: (1) That in which the candidate is placed in the psychological condition of a motorman at work to respond to stimuli which simulate street conditions, and (2) that in which a series of purely analytical tests are made.

The former method is that used at Harvard University, Philadelphia and Brussels. Its value is not yet established. In any case it seems premature to admit that a single test of this nature should be allowed to replace one made under practical conditions where a much greater diversity of psychological functions are called into play.

In the case of Hamburg, the quickness of response and correctness of manipulation are noted in the course of the student's schoolroom lessons with actual apparatus, while watching a moving belt, illuminated from the back on which are various marks to represent "proceed," "stop," "man on track," etc. No effort is made to discover the future ability of the candidate as a motorman all at once, but the method does offer a practical examination which reveals the subject's aptitude for learning.

At Brussels the student or veteran under test actuates a pneumatic recording device with each manipulation of the control or braking equipment made in response to various excitations, such as images of vehicles and pedestrians. The times between the excitations and reactions are measured in tenths of a second. Fig. 2 is a typical record. The same scheme is employed at Paris in connection with the preliminary psychological tests. It is noteworthy that the Hamburg plan, which began only as a series of manipulations of apparatus, has become more and more analytical. It now includes, for example, tests in judgment of speed and distance.

With regard to the analytical tests, their effective use is a matter of combining and comparing the results from a variety of experiments, such as the following:

Attention or distraction test. The subject is usually placed in a dark room. Visual attention is then determined by causing the lighting of lamps of various colors in a predetermined order. Likewise, audition is tested by the production of various sounds. The subject's reactions are obtained by means of his differing manipulation of keys or pedals, following the display of different colors or the sounding of different noises. The accompanying table gives the record of a candidate on the Paris tramways who showed an accuracy of 94 per cent.

At Hamburg the subject of this test is asked to keep count of the successive illumination of a lamp despite the occurrence of some mental shock or the distraction caused by the lighting of other lamps. At Paris the latter supplement to the reaction test is effected by means of a moving-picture screen in service and lamps placed around it. The results of this test are determined by reference to the number of errors or omissions in the total number of excitations.

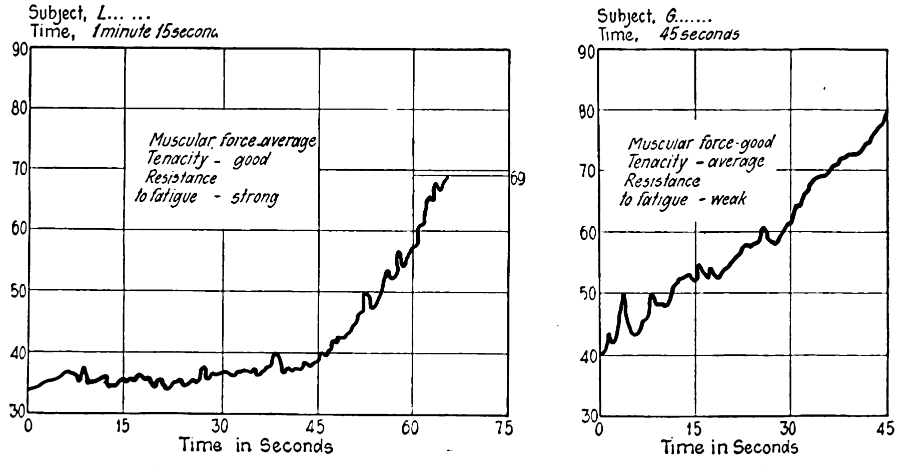
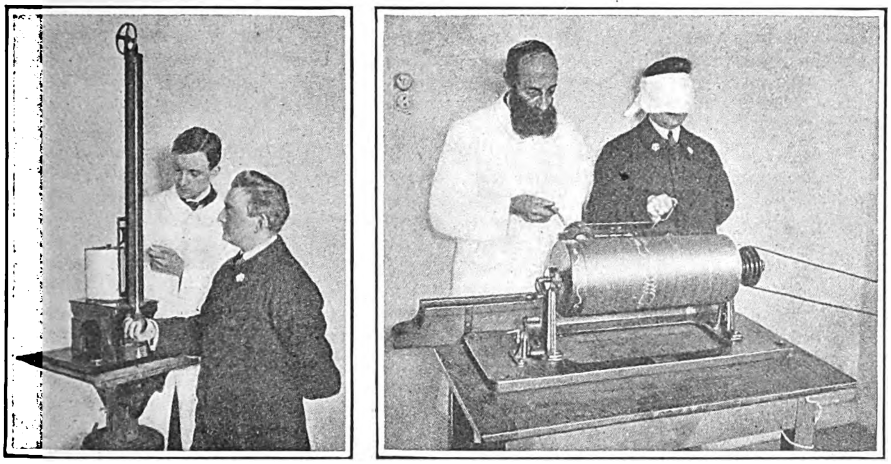


Fig. 4—Graphs of Good and Poor Resistance to Fatigue, Paris

Concentration. Only Milan has applied the classical test of the presentation of printed test cards, carrying certain symbols or signs. Dissatisfaction in that city with the results confirms the objections of those psychologists who had discarded this method. Others have considered the duration of reaction time as a proper measure of the concentration required by the work of a motorman. This is so only when based upon a large number of such tests so that, as at Amsterdam, the average between high and low values of each individual will serve as the concentration index or graph, as the case may be.

Promptness of reactions. Reactions to sounds are considered more practical than reactions to light because sound excitations are faster, but, of course, the results both ways should be compared for the best understanding of the situation.

The audition test is made by striking a special hammer on a table, whereupon the subject presses a key as rapidly as possible. Both hammer and key in making their contacts close a circuit to a chronograph which indicates in hundredths of a second the elapsed time between excitation and reaction. The figures are arranged in order of value, as shown in Fig. 3, to determine the qualities of rapidity, regularity and homogeneity.



At Left—Test for Resistance to Fatigue; the Record Is Shown in Fig. 4. At Right—Test for Suggestibility; the Record Is Shown in Fig. 5

Rapidity is determined by taking the average time interval. An excessively long interval would cause the rejection of the candidate, but generally speaking the rapidity or tardiness of the subject is not the sole standard of judgment.

Regularity is determined by comparing the difference in time between successive reactions against the average of preceding differences in time. It is evident that this is a check of stability or psychomotive equilibrium, a quality which plays a large part in determining the aptitude of a vehicle driver.

Homogeneity, which might be considered as consistency in reactions, is determined by grouping the records given in Fig. 3 in four parts in the order of the time interval. The values of the first and fourth quarters are considered as aberrations and therefore are not utilized. The values in the second and third quarters are treated as the zone of normality. The consistency factor is then taken as half the difference between the last value of the third quarter and the last value of the first quarter. This is figured and called "semi-interquarter" on the graph, Fig. 3.

Muscular force. Unless the hand brake is in frequent use, a test to determine this quality is of no value save as a measure of resistance to fatigue. One of the devices used is Charles Henry's dynamograph. The applicant for employment squeezes a bulb filled with mercury which is thus forced up a tube open at the top. A float in the mercury serves to actuate a recording pen. Two typical records from this device are shown in Fig. 4. The record at the left, while showing a longer period of rise, has fewer peaks and indicates that the person making the record may have less strength but he has greater tenacity and so is less liable to fatigue than the person who made the record at the right.

Motor suggestibility. Tests for this faculty (which has already been defined as a sense of touch and a control of muscular action almost subconscious) have shown a definite relation to ability to operate vehicles in everyday practice. Measurement is made with the Binet apparatus, a cylinder with two recording wheels, one of which is turned by the examiner and one by the subject. When the examiner's wheel is turned it turns that of the subject, but by means of a ratchet the subject can turn his wheel independently of the examiner. After a bandage has been placed over the eyes of the subject the test begins. The examiner simply turns and stops his wheel while the subject strives to begin and end the turning of his wheel in synchronism with that of the examiner. The general method is shown by an accompanying illustration. Fig. 5 is the graph of a normal subject with good sense of touch, showing close parallelism to that of the examiner, while that of a subject not having this faculty shows almost no resemblance to the movements of the examiner.

Judgment of speeds and distances. Analysis of many accidents has shown that the driver's judgment of speed and distance was usually found at fault.

To check this quality, the Paris system has devised what it terms a tachodometer. This comprises a skeletonized table about 13 ft. long on which three toy cars are run at varying speeds and distances. The cars themselves are out of sight, but their position is revealed by projecting masts. These masts aid the examiner to read the distances on the scale which forms a fence for the cars. The subject, of course, is too far away to read the scale. The test consists in disposing the cars in various positions and at different speeds, whereupon the subject is asked to tell in what order the vehicles will meet and at what point. In sizing up the replies, allowance is made for both their rapidity and exactness. At Barcelona this test is considered one of the most important and has justified itself by the results in practice.

Rapidity in perception of images. This quality is important in a vehicle operator as an aid to avoidance of collisions. The apparatus used for this purpose, called a tachistoscope, includes a rotating disk with a slit of variable size. Through this the subject glimpses words, letters and simple pictures thrown on a dark-room screen. The exposures are for intervals from one-tenth to one-thousandth of a second, so that a test can be made of the ratio of recognitions by the subject.

Recognition of sound direction. Reference has already been made to the importance of this test. The subject is blindfolded and then he is asked to indicate from what directions the various sounds are coming.

Impulsiveness. A man who can do everything just right under conditions of security is not much good as a motorman if his emotions can be easily excited. Yet it is not an easy test to make because not all emotions affect everyone alike. Furthermore, a laboratory test may show one thing, and an actual roadway emergency something else. Since all emotions probably have a common center, the most profound researches may be required for a fully satisfactory answer.

However, one helpful test is that of psychic reflexes via a galvanometer. The subject places two fingers of the same hand on non-polarized electrodes in a circuit of less than 2 volts with a Wheatstone bridge in series to measure his resistance. A galvanometer is used to follow the variations in resistance. Note is then made of the intensity of this variation under a variety of emotional shocks or distractions. In one Paris test, a good subject showed a drop from 8,200 ohms, before putting on the test film, to 7,000 ohms following the fourth shock to his emotions, while a poor subject dropped from 7,300 to 5,300 ohms under the same conditions. The Paris system has found a close relationship between the imperturbability (*sang froid*) shown in the analytical tests and those involving the use of equipment.

As soon as a student is reasonably familiar with his equipment, he is put through a test in which unexpectedly a dummy is thrown 33 to 50 ft. in front of the car or motor bus. This so staggers some operators that they abandon their control and brakes. Others are excited to the point of vomiting (one man was ill for two days), while still others apply the brakes too late. The practical effect of this test is to eliminate about 3.5 per cent of the motorman candidates and 5 per cent of the chauffeur candidates.

Memory. Car operators, of course, must have a good memory for the variety of conditions along their run, for signal indications, complicated rules and the like. The usual memory tests are not quite suitable for men in the motorman-chauffeur class. However, application is made of the scheme of word association [somewhat similar to that of the San Francisco Municipal Railway as described in the ELECTRIC RAILWAY JOURNAL for Dec. 8, 1923.—EDS.] The examiner reads to the subject twenty-five pairs of words having some relation in sound or meaning. He then calls off one word of each pair, the subject being expected to give the corresponding word. The comparisons are based on both the accuracy and the speed of response.

Intelligence. The tests so far used, such as the classification of diverse objects, apparently have not given definitely satisfactory results.

Deductions from combined tests. The essential point to consider is that no one test should be used as a basis for the selection of men, but rather that a judicious combination should be made from each type of analysis and with due correlation with the examinations involving manipulation of equipment. To achieve this end best, it is desirable that the greatest possible amount of data from international experience be made available so that a closer and closer relation will be obtained between a given kind of test and its practical application as a measure of the efficiency of the subject as an operator.

OPERATING RESULTS IN PARIS PROVE EFFICACY OF PSYCHOLOGICAL TESTS

To show concretely the relation between the psychological tests and the behavior of successful candidates on the road, the Paris company made the following test:

Several groups of fifty applicants for positions as motormen for cars or drivers for buses were chosen. In one sense these men were already a select class because the company accepts applications for the front end only from employees who have already made good records as conductors. They were also of like ages to make the comparison of greater value. Fig. 6 shows the diverse reaction times of the first fifty. The results were divided in ten classes. Class 1 was called "very good"; classes 2 and 3, "good"; classes 4, 5, 6 and 7, "medium" or average; classes 8 and 9, "poor," and class 10, "very poor." These results were adjusted by various compensation factors based on other tests, and as applied to this and later groups resulted in placing the men in four categories.

To determine the relation between the laboratory and practical ability of the first group (all motormen), arrangement was made to have them examined in service by one of the most trusted and capable platform inspectors. Thirty-six out of the fifty were in this operating test, as two had been eliminated in the course of their apprenticeship and twelve had been assigned to other work or had resigned. None of the thirty-six was examined until at least one month's service, it being recognized that more than one man who shows well during apprenticeship and laboratory tests falls back to his natural low level and proves unsatisfactory when left to himself.

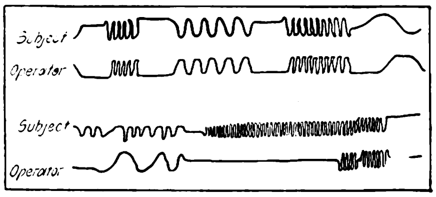


Fig. 5—Record of Tests of Motor Suggestability, Paris

From a comparison of the results of the laboratory tests and service judgments of the thirty-eight, the following facts appeared:

1. Of twenty-seven men classed as "apt" by the laboratory, twenty-three were classed as "good" and four as poor" from the operating viewpoint.
2. Every one of the eleven men classed as "not apt" by the laboratory was classed as either "poor" or "very poor' from the operating viewpoint.

In short, laboratory and operator agreed in thirty-four out of thirty-eight cases, or 89.5 per cent. Where the operator's judgment differed from the laboratory's, the latter profited by securing hints as to the nature of additional tests for bringing out weaknesses heretofore concealed.

Comparisons were made of further groups of fifty with particular reference to the qualities of resistance to fatigue, emotionalism, quickness in perception of images and judgment of speed and distances.

In the second series, thirty-six out of thirty-eight "apt" men were considered "good" and two "poor." Of twelve men classed "not apt," four were considered "good" and eight "poor." In this group of motormen, therefore, the percentage of agreement was 88 per cent.

In the third group were forty-eight candidates for motor bus driving. Of thirty-three classed "apt," thirty were considered "good" and three "poor." Of fifteen classed "not apt," eight were considered "good" and seven "poor." In this group of chauffeur candidates, therefore, the percentage of agreement was 77 per cent.

The average percentage of agreement for the three groups of 136 men was 84.5 per cent.

Such results justify the Paris management in advising others to follow like methods and also to study closely the percentage of agreement between laboratory and operator to the end that it may be raised still higher. The Paris psycho-technical laboratory is equipped to test ten men a day, a capacity which is sufficient to care for all applicants for the position of motorman or bus driver. The collaboration between laboratory and operating tests will be continued.

INSUFFICIENT TESTS ACCOUNT FOR POORER RESULTS AT BRUSSELS

In the case of Brussels, which uses the test in which the candidate is placed in a condition simulating operating routine, the correlation percentage was much less than at Paris. Of thirty-seven men so examined, seventeen had been termed "apt" and twenty, "not apt." All of these men were then put to work and after two months were classified as "very good" if they had caused no accident, "fair" if they had caused but one accident and "poor" if they had caused more than one accident.

Of the seventeen men classed as "apt" by the laboratory, six proved "very good;" seven, "fair," and four, "poor."

Of the twenty classed as "not apt" by the laboratory, three proved "very good"; seven, "fair," and ten, "poor."

Two reasons are offered for the poorer results at Brussels: First, a single test does not take account of such factors as resistance to fatigue and the suggestability factor, which the Brussels management proposes to consider hereafter; second, a classification based upon freedom from accident leaves too much to chance since it is conceivable that a poor operator might have the luck to escape accident-creating conditions.

The Philadelphia method is reported to give an agreement factor of 80 per cent.

At Berlin 5 to 12 per cent of the motormen used to be eliminated during the apprenticeship period. To-day, with psychological selection in use, the

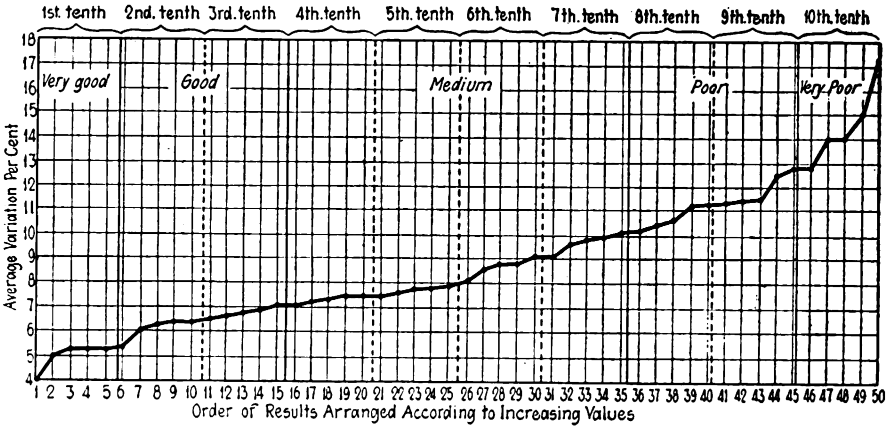


Fig. 6—Record of Regularity of Reaction Times, Paris

elimination figure has dropped to 0.13 per cent. Furthermore, the period of apprenticeship is but 66 per cent as long as before while accidents have been reduced 45 per cent. [The basis on which accident reduction was figured is not given in the paper, and possibly the gain is exaggerated because of the less mileage run in Berlin during 1922 and 1923.—EDS.]

LOW COST AND LITTLE TROUBLE TO FIND CANDIDATES

The foregoing review of psychology applied to selection of platform men shows that while there is yet much to learn, enough is known to be of great helpfulness today. Development along these lines should be encouraged as much as possible to the end that still greater gain may come.

The question has often been asked whether the laboratory tests are not so severe as to cause a shortage of applicants for positions. In Paris and on other Continental systems, this is not observable because drivers are taken from the staff of conductors whose ability in certain directions has already been demonstrated in operation. Hence the psycho-technical tests are intended less for the elimination of the unfit than to fit each man to the type of job he can do best.

Before the days of laboratory tests, also, about 15 per cent of motormen candidates and 23 per cent of chauffeur candidates failed to make good during their apprenticeship. The percentages of rejection in laboratory tests (which precede all the time and cost of apprenticeship) is somewhat higher but appears largely justified in the better grade of men obtained. The selection of better men is not the only advantage of the psycho-technical examination because these men learn faster and more thoroughly.

Following the experience with one installation at the laboratory, the Paris company is installing at every school for motormen a combination of platform apparatus and recording devices which reveal improper operation of control and braking appliances to such a degree that it is possible to follow the progress of each pupil in correct manipulation.

There is the final question: "What does this laboratory work cost?" While it may not be possible for smaller railways to use these methods, there is no doubt that they should be used by the bigger systems because the unit cost is low. At Paris this cost, exclusive of amortization of the laboratory equipment, amounts to 30 francs (say $1.50) for an examination of 90 minutes. To judge whether this is worth while, consider some of the costs with which the Paris system has to deal:

First—The laboratory tests have eliminated 85 per cent of the 650 candidates a year formerly rejected in the course of apprenticeship after an average of seven days' training. This means an approximate saving of 3,850 man-days or about 130,000 francs ($6,500). Considering a reduction of 20 per cent in the duration of the training period on account of the greater uniformity of the students and absence of the unfit, there is a further saving of 12,000 man-days with 400,000 francs ($20,000).

Second—It is permissible to figure that with a more select class of vehicle operators there will be substantial reductions in the 4,000,000 francs ($200,000) annual accident costs due to these employees; in the 57,000,000 francs ($2,850,000) power and fuel charges, and in the 58,000,000 francs ($2,900,000) rolling stock maintenance.

Obviously, a very small percentage of reduction in such costs as these would pay for the laboratory tests many times over.

Thanks are due to the many psychologists and physiologists of various Paris institutions for their advice and their facilities.

THE QUESTIONS OF RE-EXAMINATIONS AND ALCOHOLISM

Most electric railway systems have the rule that platform employees ill for more than three months have to pass a special examination before they are allowed to return to service. In some instances motormen or bus drivers are subjected to a like examination following an accident for which they have been judged responsible. In the engagement of employees, those systems which have a pension system generally also insist upon a thorough examination before putting a man to work.

Of twenty-one companies which responded to the question in the data sheet as to whether they held periodic re-examinations of veteran employees, eight replied that they considered such examinations needless. It is noted, however, that in most cases these were small roads whose managers are probably individually well acquainted with the employees under their direction. The re-examinations conducted by the other undertakings varied as to interval but averaged every three to five years except that some conducted no re-examination until a man was more than 45 years old.

The practice of Paris is to re-examine motormen and bus drivers at intervals of 5 years up to the age of 45 years, at intervals of 3 years between the ages of 45 to 54 years, and every year thereafter. The acuteness of hearing and vision are the essential points in these re-examinations, supplemented by a general medical examination, if necessary.

Psycho-technical tests are still too new to be applied to veteran employees, but a number of the systems reported that they planned to make such tests in future. The Paris re-examinations of men considered responsible for accidents have shown in some cases the need for the tests of judgment of speed and distance, and in other cases that some recent mind or heart (psychiatric or cardiac) trouble was the cause. As a rule, men who can no longer meet the requirements for the front platform are given work on the rear platform where good physical condition is of less importance.

Outside of such cases of alcoholism as are revealed in medical examinations, Continental roads do not seem to follow any other procedure other than reports made by inspectors on employees given to excessive drinking. It seems that alcoholism has been reduced since the World War because of the high price of liquor. At any rate, the managements punish severely, even to discharge, any employee found drunk or reported to be in an intoxicated condition while in service.

Some managements go farther than this and forbid platform employees to visit saloons during working hours and others supplement this rule by furnishing soft drinks without charge, including some hot drink in the early hours of winter days. Low-price restaurants are conducted by some properties and are found of value in keeping the men from temptation. On the Paris system, secret service men circulate in drinking places. Employees found in them are warned by letter. The Paris management believes, also, that its periodical examinations are of value in restraining alcoholic excess.

Finally, welfare activities such as the formation of music, athletic and arts clubs are encouraged as a means of keeping the men out of trouble during their off-hours.

Restoring Public Confidence in the Railways*

By R. B. STEARNS
Vice President and General Manager
Eastern Massachusetts Street Railway

THE fact that the electric railway industry is confronted today with a discussion of whether or not street cars are going out of business, is more or less an indictment of its policy in failing to take the lead. The industry is not going out of existence. It is just getting ready for business on a more extensive basis, and needs only more confidence and support from the public and less fear of decadence. There is no reason why the street railways should not, under proper regulation, continue the business of local transportation and furnish all the local service, whether by the present street cars on rails or by buses and taxicabs.

The Eastern Massachusetts Street Railway is a striking example of what has taken place in the industry in the way of restoring property to its proper usefulness since it crumbled and broke during the war period. One of the first things done under the service-at-cost principle of the public control act was to establish a flat 10-cent fare. The property was divided into separate districts so that when cost in the districts could be determined and conditions warranted, fares could be charged in accordance with the cost of transportation in that district. The organization was put on a divisional basis. The theory of this was that car riders were concerned only with transportation costs and problems in their immediate district and had long felt that they were abused through being required to bear costs in other territories in which they had no interest.

Results have demonstrated that this theory was sound and that it has done much to establish public confidence in the street railway. Every possible operating economy was put into effect including operation of one-man cars, ultimately to the extent of 96 per cent of all service, adjustment of service by local supervisory organizations and the most economical maintenance of roadway and equipment. These and other economies have made it possible from time to time to reduce fares in the various districts so that at the present time, while the basic 10-cent cash fare has been maintained, by the use of reduced rate tickets here and there, the weighted average fare is 6.89 cents.

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*Abstract of a paper presented at the eleventh annual conference of the Babson Organization, Babson Park, Mass., Aug. 8, 1924.

Moreover, in the year 1923, the company earned its interest on the investment.

In our case it was discovered that nothing succeeds like success. Just as soon as we turned the balance slightly in our favor, then those who were most pronounced in their outcries acknowledged that there was nothing else we could have done to save the street railway industry, and that our positive stand assured the preservation of the only reliable transportation needed in the community. At present the overwhelming majority of the people are favorably impressed by the disappearance of the jitneys and the rehabilitation of the street railway property, the introduction of new cars and the general all-around improvement in operation. A minority, of course, continues to howl loudly.

Every street railway should promptly put its property in condition to render the best and most practical service to the public consistent with the maintenance of a sound financial condition, to bring about the restoration of credit and to command the respect and support of the public. There is evidence to show that this is being done in a courageous manner throughout the country.

West Virginia Utilities Convention in November

THE annual convention of the West Virginia Public Utilities Association will be held in Charleston, Nov. 14 and 15. The date of the annual meeting was put off until after the general election. In addition the members of the association will have opportunity to attend the West Virginia-Washington & Lee football game, Nov. 15.

Central Traffic Association Meeting

THE next regular meeting of the Central Electric Traffic Association will be held at Yellow Banks Hotel, Webster Lake, Ind. on Sept. 12 and 13. This meeting will consist of a round table discussion, meetings of committees, committee reports and such other business as may be properly presented.

Badger Railway Men Meet at Madison

Practical Discussion of Operating Problems Features Summer Meeting of Railway Section of Wisconsin Utility Association —Benefit Organizations, Group Insurance and Pension Plans Also Considered

FOLLOWING a day of interesting entertainment, the railway section of the Wisconsin Utility Association devoted the second morning to a discussion of ways of improving track construction, car maintenance, and reducing labor turn over. In addition to these general discussions papers were presented on storeroom practice and accident prevention.

The activities of the first day included a trip through the Capitol building, an inspection of the university and other points of interest, and a boat ride on Lake Mendota. A dinner dance was held in the ballroom of the New Hotel Lorraine that evening. Dudley Montgomery, vice-president and general manager Madison Railways, chairman of the section, opened the meeting on Friday with an address welcoming the 120 railway men and manufacturers' representatives. He referred to the improvements in the financial and physical condition of the industry, and pointed out the recent successful sales of electric railway securities to passengers as examples of the return of public confidence in the business. During the year there has been a steady growing public consciousness that street cars are a vital part of city life. In substantiating this statement he cited the results of attempted bus operation in Saginaw, Akron, Toledo, Bridgeport and Des Moines. However, he stated that buses have an important place in the transportation field in connection with city and interurban service in sparsely settled districts where it would be too expensive to extend and maintain railway service.

"Accidents, Their Causes and Prevention," was the subject of a paper read by J. I. Searles, railway superintendent at Ironwood, Mich., of the Lake Superior District Power Company. Stating that fully 99 per cent of all so-called accidents are caused by carelessness of some one's part, he enumerated the ways by which his company first reduced accidents for which it was responsible, and then minimized the automobile accidents. A bonus plan was inaugurated giving to each car operator a cash award of $50 for every twelve months of operation without an avoidable accident. The plan also stipulates that for the first avoidable accident, the operator is penalized $5, for the second he is given a rate reduction of 4½ cents per hour for a month, and for the third he is discharged. The method has improved conditions to such an extent that during the existence of the plan only two men have been penalized. According to Mr. Searles the communities through which his property operates, experienced 45 automobile accidents during a period of twenty days, while for a period of 45 days the street cars operated 65,000 car-miles, without one accident. He attributes this record to the fact that all car operators are taught to assume that every automobile driver is deaf, dumb, blind and drunk. The latter condition is quite prevalent in his territory, stated Mr. Searles and is the cause of many accidents. One method of combating this accident danger is by working in close co-operation with the police department and causing the arrest and fine of any person found driving while intoxicated. Another method along which has proved successful is to have car operators report daily the persons seen driving carelessly. A letter is written to these persons giving the time, place and nature of the driving and indicating to them their responsibility in the matter. Should such a person later become involved in an accident with the railway, it would be his second offense and prosecution relatively simple. In conclusion Mr. Searles said that only through co-operation with the motorists will streets be free from accidents.

An interesting description of modern store-room methods was given by W. G. Barnett, storekeeper of the Chicago, North Shore & Milwaukee Railroad. In the discussion which followed several manufacturers' representatives asked for closer co-operation between the stores department and the manufacturer in order that purchased material might be delivered before the storeroom stock was exhausted.

In connection with the labor question, J. C. Schade, manager of railways, Wisconsin Public Service Corporation, presented a concise paper dealing with methods employed to reduce turnover.

Bridges, ships, houses, machines, in fact anything made by men can be moulded into exact duplication, but among the millions and millions of men on the earth there are no two alike, and therefore no set formula would be entirely practical in selecting men and welding them into working units. The selection of men is not so important as proper handling after the selection is made.

A man may be the finest mechanic in his line and his selection may be prompted because of his skill, but if he does not fit in with the general scheme of things his workmanship comes to naught. On the other hand if his skill is not recognized and given proper credit he rightfully falls into the ranks of discontent and his efficiency is impaired. Many a man has been forced into the "work, eat and sleep" habit because his initiative has been curbed by an over ambitious immediate superior.

Contentment is the best preventative for commercial unrest, and contentment comes to any man when he knows that his efforts and ability are recognized. The most dangerous misfits are men placed in executive positions who will not recognize the human side. There is a human side to every man's makeup which must be recognized if we expect to keep harmony. This does not mean that we must be sentimental or permit tradition to interfere with new methods or practice, but we should try to reach a happy medium as between the man, his ability, and his general make-up.

Discussing the subject, R. M. Howard, Winona, Minn., explained how his property treated the new man with tolerance, placing him temporarily on probation during which period he was encouraged to become thrifty and keep his mind on his work. The old employees are well taken care of on his property, he said. Three types of employee beneficial work is performed on the North Shore Line, according to B. W. Arnold, the men belonging to an employees' benefit association, sharing in a pension system during old age, and their heirs receiving insurance money through group insurance policies. Mr. Arnold spoke very highly of group insurance as a means of relieving the man's mind while working. Labor turnover will be a minimum if the men feel right toward the officials and have affection for the men at the head of the company, was the concluding statement by Mr. Arnold. Additional discussion by A. J. Goedjen, Menominee, and Nels Rasmussen, Green Bay, commended group insurance and pension plans as means to reduce discontent among employees.

Many practical points about track and paving construction and maintenance were given in papers read by A. A. Oldfield, Fond du Lac, and Clyde L. Hedges, La Crosse, which opened the general discussion of the subject. Both speakers gave specific examples of construction and maintenance methods as practised by their companies. Mr. Oldfield predicted that all new track construction would be of the solid type in order to withstand the heavy vehicular traffic. Manganese switches and crossings are now used as standard by his company. Mr. Hedges explained the various methods of track construction with Dayton resilient ties, using brick and concrete pavement. The discussion which followed was confined to specific examples of construction work carried on by the companies represented.

Believing that too much stress has been put on advantages of light weight interurban cars, E. M. Lunda, Green Bay, pointed out the dangers of going to an extreme in building cars for interurban service that were too light. His paper dealing with "Safety Car Operation and Maintenance" contained many practical maintenance kinks for this type of equipment. The methods employed for periodic inspection of the various details of the car were given by Mr. Lunda.

Maintenance of electrical equipment of cars was the subject which was discussed freely by the mechanical men present. The first paper by Nels Jensen, Wausau, summarized the work performed along these lines on his property. According to Mr. Jensen the worst enemy of electrical equipment is dirt. Consequently the matter of maintenance is fundamentally a question of cleanliness. Methods of protecting the equipment from dirt and removing it, were the outstanding points of Mr. Jensen's paper. E. F. Hara, of Oshkosh, followed with a paper setting forth the methods employed by him in inspecting motors, controllers and other electrical equipment. Inspection of city cars is on a 1,000-mile basis, at which time the motors, brush-holder insulators, and controller fingers are cleaned up. The air compressor is cleaned, inspected and oiled. Interurban cars are inspected on a 1,400-mile basis, while 70,000 miles of service is used as a base for complete overhauling. According to Mr. Hara, systematic replacing of worn electrical parts is the secret of successful operation. A paper on this same subject presented by Henry Cordell of Highwood, Ill., concluded the business session. Mr. Cordell's paper will appear in a later issue.

The last item on the program was a talk by J. W. Colton, editor of *Aera*, summarizing the achievements of the electric railway industry. Among some of the pertinent facts brought out during the talk, Mr. Colton said: "Progressive railway men recognize that the bus has a place in transportation and that place is as a supplement or auxiliary to the rail lines. More than 150 electric railway companies are operating more than 1,600 buses, and at least 400 more are on order. With the public informed about the industry, about the costs of electric railway operation, the costs of bus operation, the effects of unfair competition, the effects of unjust and burdensome taxes, it should not be long before even the most skeptical will be convinced that the electric railway is a permanent institution."

American Association News

Entertainment

A MEETING of the entertainment committee of the American Association was held at Association headquarters, New York City, on Aug. 20 to consider the entertainment features of the program for the Atlantic City convention next October.

Details of the various features arranged were reported on by the various sub-committee chairmen. Mr. Dewhurst outlined the proposed program for the entertainment of the ladies attending the convention. On Monday afternoon there will be obstacle golf on the course of the Marlborough-Blenheim. Tuesday afternoon arrangements are being made for cards at one of the hotels. Wednesday afternoon it is planned to have a concert featuring an opera singer. Thurday afternoon there will be a motor trip.

For general entertainment it is planned to hold an informal dance Monday evening. Tuesday evening's entertainment has not been decided definitely, pending the decision of the meetings and subjects committee as to whether a formal address will be given by some speaker of national prominence. It is planned that in the event there is no speaker assigned for that evening a special entertainment will be provided by Mr. Cotsworth's committee.

The plan for the Wednesday evening feature, "Play Night," was outlined by Mr. Hale. This will be a novel event which will provide amusement and excitement for all, the exact nature of which will be reserved for the present. It will be entirely different from the attractions which have featured previous conventions.

Considerable discussion took place regarding the grand ball to be held Thursday night. Mr. Palmer desired to keep the ball formal in order to make it different and distinct from the informal dances held at various times during the convention. It was decided to have suitable dance programs prepared for the ball.

Those present at the meeting were F. H. Gale, chairman; J. V. Sullivan, vice-chairman; F. L. Butler, Frank Killian, J. A. Dewhurst, L. H. Palmer, M. A. Oberlander, S. J. Cotsworth, G. R. Rowland, A. A. Hale, L. W. Shugg, Morris Buck representing Harry L. Brown, and G. C. Hecker and F. C. J. Dell of Association headquarters.

Transportation and Traffic Executive Committee

THE meeting of the executive committee of the Transportation and Traffic Association was held at Association Headquarters, New York City, Aug. 19. Those in attendance were President J. K. Punderford, chairman, T. C. Cherry, J. V. Sullivan, Edward Dana and W. H. Boyce. G. C. Hecker acted as secretary of the meeting.

The minutes of the previous meeting held in St. Louis on March 3 were read and approved with minor modifications.

The various committee reports were then taken up and discussed and the following committee reports were read and approved for printing, with a few modifications: Accident prevention; Development of New Business; Relief of Traffic Congestion; Trackless Vehicle Operation.

The lists of those invited to discuss the various committee reports were reviewed and several additional men suggested. The secretary was instructed to issue invitations to those suggested for taking part in the discussion and obtain their consent as early as possible.

The committee reviewed the preliminary convention program and approved it including the suggestion made by Mr. St. Clair that the advertising and publicity symposium be placed ahead of the report of the committee on trackless vehicle operation.

Mr. Punderford announced the appointment of a committee on subjects for next year.

The committee discussed the policy in regard to the approval of committee reports in the future. It was suggested that hereafter each committee chairman prepare a sufficient number of typewritten copies of his report and supply a copy to each member of the executive committee as early as possible after July 1. It was the sense of the committee that a meeting of the executive committee should then be called and invitations extended to each committee chairman to be present at the meeting and take part in the discussion of the reports. When the reports were approved by the executive committee they would then be turned over to the secretary for publication.

The next meeting of the executive committee will be held in Atlantic City, Oct. 6 at 11 o'clock.

Maintenance of Equipment

Gaging Trolley Wire by Schedule

By G. H. McKelway

Engineer of Distribution, Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

Many railway companies measure the diameter of the trolley wire either at the ears or in the middle of the sections, and from the results of such measurements decide when and how much of the trolley wire to renew. This method gives an accurate record of the condition of the wire, but if the frequency of the inspection is not specified some lines will receive more examinations than they really need, while others will not be gaged often enough.

Except where there are heavy grades or other unusual conditions to cause the copper to soften or be burned away, the wear on the wire is roughly proportional to the number of cars passing under it. The headway of cars may thus assist in determining the necessary frequency of gaging. Where more than one line uses the same street the headways of the lines should be combined.

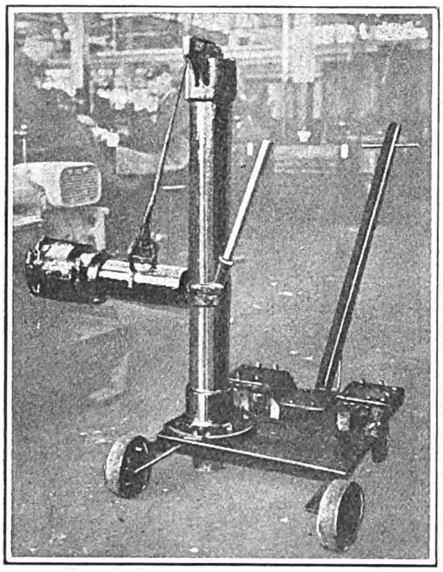
Our practice is to divide inspection into four groups. Some sections are gaged every six months, some every twelve months, others with light service are gaged every eighteen months; and where the service is still lighter every two years.

To make sure that this plan is followed carefully a complete schedule is prepared showing when each line should be gaged during a two-year period. Each monthly heading gives the names of the streets, on which the wire is to be measured during that month. A sufficient number of lines are given to keep the men busy, and yet not to give them more work than they can handle during that month. Where cars are turned back on a long line so that there is not the same amount of traffic over all parts of it, or where other lines turn into the same street, the line is divided into two or more sections and these sections are measured at different intervals.

This plan has worked out well in practice, has prevented the measurement of wire at too frequent intervals, has kept the number of trolley breaks down, and has made certain the gaging of some outlying and unimportant lines which were sometimes overlooked, under previous methods.

Handy Mounting for Pinion Pullers

In the shops of the Department of Street Railways, city of Detroit, the Woods pinion puller used in the armature room is mounted on a portable "buggy" in the convenient manner shown in the accompanying illustration. An upright hollow pillar is securely bolted to the framing of the "buggy" and has mounted at its upper end a set of pulleys over which the flexible cable supporting the pinion puller operates. On the interior of the column a counterweight balances the puller so that it can be readily handled in any position. In addition to facilitating the work of moving the pinion puller from place to place about the armature shop, the arrangement also has an additional advantage from the standpoint of safety. There is sometimes a tendency for the puller to jump away from the armature when a particularly tight pinion suddenly comes loose. With the support illustrated, the puller is confined by the cable and prevented from rebounding any great distance.

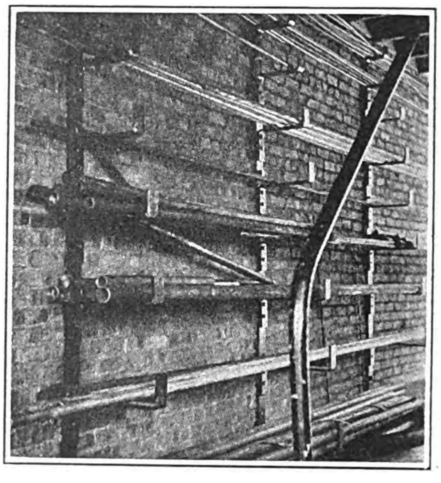


Portable Pinion Puller Used at Detroit

Pipe Supply Kept on Racks

Neatness in the appearance of the pump room at the shops of the Illinois Traction System has been accomplished by racking all pipe in an adjacent room. This room was formerly a passageway from the outside to a stairway leading to the second floor. An opening was made into the pump room and the pipe rack mounted on the wall alongside the door which leads to the outside yard. This location enables long lengths to be placed and removed through this door.

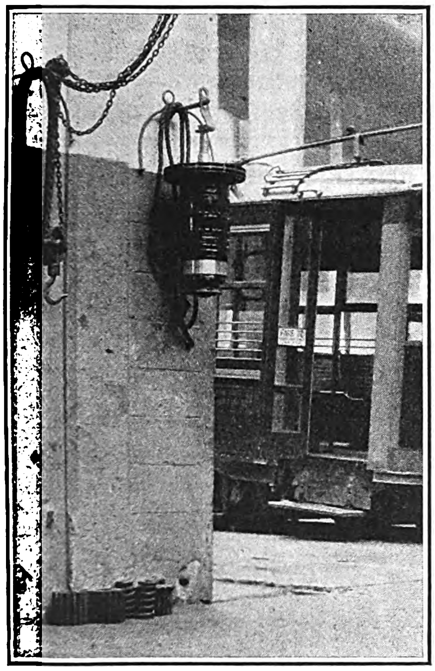
The rack consists of four sets of supports or arms spaced 3 ft. apart, arranged for holding nine tiers of pipe. Large 2½-in. pipe is placed at the bottom and small ½-in. pipe at the top. Supports are riveted to a 2-in. x ½-in. piece of steel which extends from the floor to the ceiling and is securely fastened to the brick wall. They are made up of 1½-in. x ½-in. steel and vary in size and spacing. The largest support is 12 in. long with a leg at the end 3 in. high, and is spaced 12 in. below the next one above. The smallest is 4 in. long with a leg 1½ in. high and is spaced 6 in. above the next one below. Between these two extremes are seven other supports of proportionate sizes and spacings. The rack was built in the shop and has proved a time and labor saver.



Pipe Racks Installed by Illinois Traction System at Decatur Save Time and Improve the Appearance of the Shop

Spare Armatures Hung in Handy Location

A RATHER unusual degree of standardization in rolling stock has been accomplished by the Bangor Railway & Electric Company, Bangor, Me. This company is said to be the first railway in New England to adopt the Birney safety car, and since the original installation nothing but safety cars have been purchased. At the present time the equipment consists almost entirely of cars of this type, both single truck and double truck, and this has resulted in reducing the number of spare armatures which it is necessary to keep on hand. Spare armatures are suspended vertically from brackets on the wall of the carhouse, as shown in the accompanying illustration. A round iron horizontal rod has been driven into the wall. On the outer end of this is a simple hook which grasps the armature by the pinion. This method of storage is feasible on account of the light weight of these armatures.


Vertical Suspension of Spare Armature in the Shops of the Bangor Railway & Electric Company

Gas Cutting Equipment on Wrecking Truck

THE clearing up of a wreck can often be carried out more quickly if gas cutting equipment is used. The Pacific Gas & Electric Company, Sacramento, Calif., has added a portable oxyacetylene cutting outfit to its wrecking equipment carried on a truck. The cutting equipment is inclosed in a metal case about 2 ft. high and 18 in. square. It is arranged so that two men can carry it readily. A cylinder of commercial oxygen and one of acetylene gas are carried in this case equipped with the necessary gages and 25 ft. of tubing. The torch cuts ½-in. boiler plate at the rate of a foot a minute. The total capacity of the tanks is sufficient for operating the torch 7 hours.

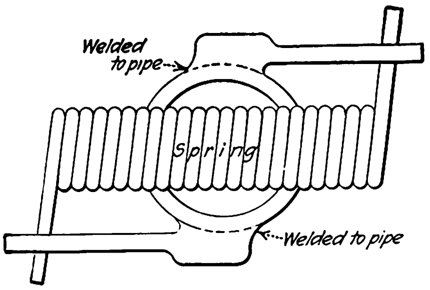
Movable Scaffold for Painting Shop Interior

FOR convenience in painting the inside of its Harmon shops the New York Central Railroad is constructing a scaffolding mounted on a flat car. This scaffolding is in the form of a tower with a top section which can be raised and lowered. With the tower in its down position, clearance is provided underneath the lowest parts of the shop. At lighting bays where the height is greatest, the top extension is raised. Side extensions are also provided so that the sections of the structure which come in between the tracks can be reached readily by workmen. The painting is to be done by the spray painting method.

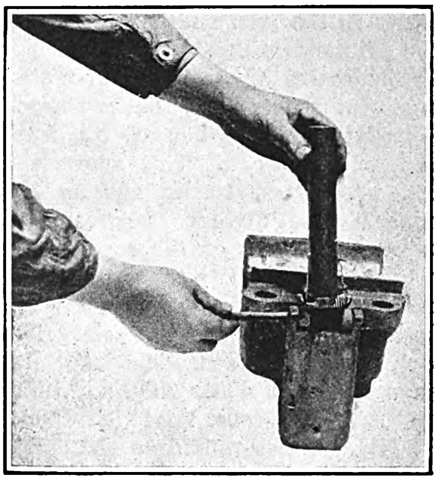
Tool Helps to Insert Springs

WHEN it is necessary to insert new coiled springs for the covers of various forms of oil boxes used on electric railway cars, the job is usually done with the aid of a screw driver, or other hand tool, and the spring is put into place after considerable effort.

In the shops of the Omaha & Council Bluffs Street Railway, the simple jig shown in the accompanying illustrations has been found extremely handy for this work. It is a home-made device which consists of a piece of pipe having two lugs or hooks welded at one end. These hooks project out from opposite sides of the pipe, so that the spring can be inserted between them.



Inserting a Spring in an Oil Box Lid with the Aid of the Jig


End View of the Jig Showing How a Spring Is Held

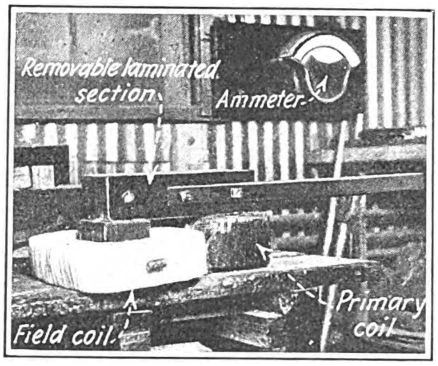
Thus the spring is wound to any desired tension, slipped between the lugs so that the ends of the spring are held, and when the bolt or pin in the box cover is put in place the jig is withdrawn and the spring remains in position with the desired tension. The accompanying sketch shows a view of the end of the jig, illustrating the manner of holding the spring.

Testing Field Coils

NEWLY wound motor field coils are tested at the Decatur shops of the Illinois Traction System by means of an induction tester shown in the accompanying illustration. This apparatus is in effect a core type transformer, of which the field to be tested is the secondary and a special exciting coil the primary. The primary coil is permanently mounted on one leg of a laminated iron core, while the field coil under test is slipped loosely over the other leg of the core. Alternating current at 110 volts, 25 cycles, is supplied to the exciting coil, which induces an electro-motive force in the coil under test.

In operation the field coil to be tested is slipped over the free leg of the core, and the magnetic circuit is closed by replacing the upper section of the core, which is hinged and is readily removed. Current is then turned on in the primary. If there is a short circuit in the field coil under test, the ammeter connected in series with the primary coil will indicate an excess current above that normally required for magnetizing the iron. This latter reading is constant under all conditions, and is known beforehand. It represents the current necessary for cutting up the magnetic flux and supplying core losses in the iron and heat losses in the primary coil.

The entire apparatus is mounted on the work bench so that the lower leg of the core is beneath the surface of the bench. This allows the coil under test to lie flat on the bench. The distance between the two vertical legs of the core is approximately 18 in., so that plenty of room is allowed for slipping any ordinary field coil over the pole. The laminated core is made of No. 24 gage soft steel 4 in. wide, and built up until the core is 4 in. thick. Enough wire is wound on the exciting coil to give a rating of approximately 10 amp. on the a.c. ammeter when the core is closed and a perfect field coil is inserted for test.



Motor Field Coils Are Tested at the Decatur Shops of the Illinois Traction System by This Induction Apparatus

As this company builds all of its own field coils for various types of motors, this apparatus has proved a big asset in accurate testing of these coils and has prevented failures in service.

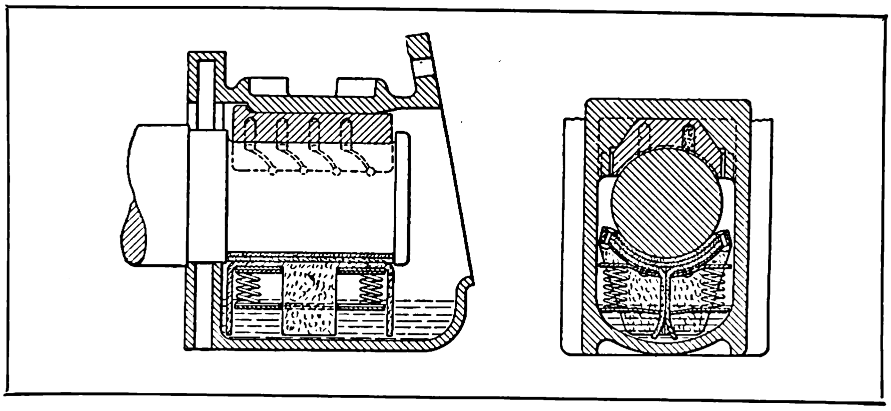
New Equipment Available

Journal Box Lubricating Device

A RECENT development in truck journal lubrication called the Phee system which has been tried in Boston and Milwaukee, is being marketed by the Froedtert Equipment Corporation, Milwaukee, Wis. Initial tests of this device were made on the surface cars in Boston. A car of the Milwaukee Electric Railway & Light Company has been operating with this device since March 17, 1924. A total mileage of slightly more than 12,000 has been made since the device was installed. At that time 1.7 qt. of free lubricating oil was placed in each journal box, and no additional oil has been added since then. This car has 4¼ in. by 8 in. journals.

As shown in the accompanying diagram, a metal plate rests on the bottom of the journal box and supports the upper portion of the device by means of six springs. The upper portion has two metal plates which in turn support three layers of wool felt ⅜ in. thick. The bottom layer of felt projects at each end sufficiently to drop down to the bottom of the box and two additional strips of felt project downward to the bottom of the box through the center of the metal plate. The top two layers of felt are 1 in. shorter than the journal bearing surface to allow for lateral movement, thus the layers of felt when in position are held in contact with the bearing surface by means of springs. In addition, the brass, which is of the standard type, has a series of holes of ⅜ in. diameter and ⅝ in. depth drilled along each side and connected by channels ⅛ in. deep.

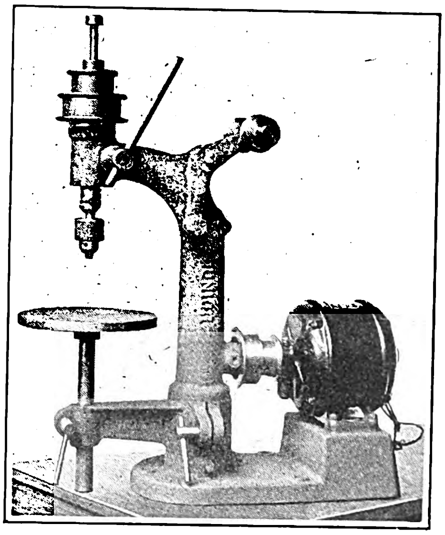
Oil is fed to the bearing surface by the pad remaining in contact with the journal. Additional oil is fed to the pad as required by the four wicks which dip into the free oil at the bottom of the box. These wicks serve not only to feed the oil but also to filter it as it passes up and to act as a guard at each end for preventing foreign matter from coming in contact with the bearing surface. The purpose of grooving and drilling the brass is mainly to insure a plentiful supply of free oil to the bearing surface during the time required to wear the brass to a bearing seat.



Details of Journal Box Lubricating Device

Improved Bench Drill

AN IMPROVEMENT has been made in the 10-in. Junior motor-driven drill manufactured by the Buffalo Forge Company, Buffalo, N. Y. In the older design a pinion and gear were employed which made operation noisy. The new method of drive is through a belt with pulleys keyed to the shaft of a ¼-hp., 1,750-r.p.m. motor. This makes a quiet positive power transmission and saves space. The spindle runs in a large bronze bushing, and is provided with a No. 2-A Jacobs chuck. There are two speeds. Shifting from one speed to the other is accomplished without using any tools, as the idler works with a snap socket. This eliminates the use of set screws.



Motor-Driven Bench Drill

This is the smallest power drill manufactured by this company. It has a substantial cast-iron frame and a finished round table movable in both horizontal and vertical positions. The normal driving speed is 550 r.p.m., although it can be driven as high as 3,000 r.p.m. and still remain in perfect balance. The height of drill is 27½ in. and it will drill holes up to ⅜ in.

The News of the Industry

Mr. Hedley Talks Buses

Subway Head Opposed to Lines Other than Those Designed to Be Run as Feeders

Frank Hedley, president and general manager of the Interborough Rapid Transit Company, New York, said on Aug. 21 that the company would oppose any independent bus system not connected with and feeding the city-owned subway system operated by his company.

His remarks were prompted by a proposal which had been made the day before by the Fifth Avenue Coach Company to establish 35 new bus lines in New York City, comprising 116 miles of route. The crosstown lines would operate on a 5-cent fare and the trunk lines on a 10-cent fare. The city would get 2 per cent of the gross income. It would have the privilege of recapture under arrangements to be made later, but suggested tentatively by the Fifth Avenue Coach Company in the form of two alternative plans.

Mr. Hedley's statement followed quickly upon the announcement of the withdrawal of himself and Vice-President W. Leon Pepperman from the directorate of the bus concern. Frederic T. Wood, president and general manager of the Fifth Avenue Coach Company, has likewise withdrawn from the directorate of the Interborough and the two corporations now apparently stand completely severed.

In this connection Mr. Hedley explained that the Interborough Rapid Transit Company is not interested in an omnibus company and never has been so interested. The stock of the Interborough Rapid Transit Company ten years ago was almost entirely in the treasury of the Interborough-Metropolitan Company. At that time the same company had a little less than one-half of the shares of the company owning the Fifth Avenue Coach Company. That investment at that time represented only about one-third of 1 per cent of the investment of the Interborough-Metropolitan system. Since then the Interborough Consolidated Corporation (successor to the Interborough-Metropolitan Company) has gone into bankruptcy and its investment in the omnibus business in New York was distributed among the creditors of the company.

In regard to the merits of the matter, it struck Mr. Hedley that the bus proposal was a repetition of efforts which were made by Chicago interests about ten years ago, when applications were made for routes not much unlike the present routes. He says that at that time after hearings extending through many months, the policy of the city was definitely laid down against further franchises for bus operation. Since then temporary permits, or short-time franchises, only have been granted by the authorities.

Mr. Hedley said in part:

> At the hearing ten years ago the Interborough's position was stated, and that was that it was not advisable to grant further franchises. The Interborough Company did not then, nor does it now, take any "dog-in-the-manger policy." It is ready today to co-operate with the public authorities to arrange for the bus operation in such localities as may be necessary to serve the public in connection with the city-owned subways.
>
> About thirty years ago the City of New York embarked upon a policy of putting transportation underground to prevent the even then increasing congestion in the city's streets.
>
> Ten years ago, at the hearings mentioned statistics were laid before the city authorities of the terrible accidents in the streets of London and Paris and the intolerable congestion of traffic movement due to the omnibus operation in those cities. It was found in London that the omnibus was ruining the transportation lines owned by the City of London. The Underground Companies, as they are called in London, had to buy them in order to get them rerouted to avoid unfair and ruinous competition and to relieve street traffic congestion.
>
> It was stated to the city authorities ten years ago, on behalf of the Interborough: "We are not in the market to buy anything from anybody. We might just as well be understood now. If anybody gets a franchise, the Interborough is not going to be in the market as the London Underground was to take it up. We will stand the competition first."
>
> That is the position of the Interborough Rapid Transit Company today.

Mr. Hedley did say, however, that the business of the Interborough Rapid Transit Company is solely that of furnishing transportation to the people of New York. It is his idea that with present city-owned subway, with extensions wherever bus operation may be necessary, the needs of the people of New York can be met better by bus routes connected with the subway than by any separate service.

Right of Utility to Advertise Affirmed

The Connecticut State Public Utilities Commission has denied the petition in which the Mayor of Stamford objected to the Stamford Gas & Electric Company's advertising on the ground that the cost of such advertising should be used to reduce the cost of gas to the consumer. It was shown by the company at the hearing that the amounts thus expended were so small that no benefit would accrue to the consumer should the policy of advertising be abandoned. The commission said:

> The experience and observation of this commission has been that frequently complaints by patrons in matters relating to utilities are due to the omission of the utility to provide intelligent information. This commission has always advocated a proper amount of publicity on the part of the utilities companies in order that their patrons may be informed, in a general way, as to operating and financial conditions as affecting the rate payers. A fair and frank statement by the utility on controversial questions will assist in maintaining a relationship of good will and co-operation between the company and its patrons.

Proposes Loop Use

Cincinnati & Dayton Wants to Bring Its Cars Into Cincinnati—Solution of Loop Problem Advanced

A proposition to make immediate use of the Cincinnati, Ohio, rapid transit loop has been presented to the Rapid Transit Commission by Judge Wade Cushing, Presiding Judge of the Court of Appeals. His letter sets forth a proposal made by the Cincinnati & Dayton Traction Company seeking the right to use the loop from its traction terminal, so as to bring its cars down to the subway station at the Canal Boulevard and Vine Street.

Judge Cushing explained that the Cincinnati & Dayton was in the hands of George Sohngen, Hamilton, as receiver, and that Mr. Sohngen wrote to the court recently, stating that it would be a great advantage if the company could use the loop to bring its cars into the heart of Cincinnati.

The court saw in this an opportunity for the Rapid Transit Commission and the city to solve immediately a part of the problem of what eventually is to be done with the loop, and referred the matter to the Rapid Transit Commission.

From the explanation set forth by Judge Cushing, it will be seen that the Cincinnati & Dayton Traction Company contemplates an elevated line from a point west of the Baltimore & Ohio Railroad tracks to reach the loop, thereby doing away with the grade crossing of the railroad at Spring Grove Avenue.

The Cincinnati & Dayton Traction Company controls and operates the traction line between Spring Grove Avenue and Dayton and also the electric railway system in Hamilton. In 1920 a case was tried in the Court of Common Pleas of Butler County involving the foreclosure of numerous mortgages on the property, their sale and a distribution of the money received from such sale. The case was appealed to the Court of Appeals on Jan. 3, 1923. The appeal brought with it the receiver appointed by the court below and imposed the duty of managing the property until distribution. The receiver has greatly improved the physical condition of the interurban properties under his control as well as the Hamilton city lines. The business of the road has been such that whereas it previously showed a loss of about $60,000 a year it now shows a profit of from $60,000 to $75,000 a year.

Mr. Schngen also contemplates putting on two and three-car limited trains between Cincinnati and Dayton. One of these cars will be a chair car. He estimates that such service would greatly increase the travel on the road.

Community Life Altered

Los Angeles, Compelled to Cut Use of Current, Fully Realizes Value of Utility Services

Out where the West begins and ends—Los Angeles, of course—small boys are breathlessly awaiting an official ban on the use of water for bathing purposes, with special restrictions on washing neck and ears. They crave to lend their help in the water shortage crisis which confronts southern California.

It's a good water shortage, as water shortages go. Los Angeles believes in doing things in a superlative fashion, and the water shortage is handsomely accomplished. More lives are affected, more property endangered, a greater volume of business concerned than in any previous drought. It is, after all, a very serious matter, but like many other serious matters it is not without some humorous aspects.

In the pardonable pride which swells the heart of Los Angeles, hardships and hindrances are lost. In all the weeks that one observer has ridden the street cars he never heard a complaint about the temperamental skip-stop system, albeit it has forced girth control on 50 per cent of the railways' patrons.

The skip-stop plan was invoked early this summer to save power. To the laity it appears to be well named, for to the man accustomed to finding his particular car at any time and at any place it now seems that the cars stop at certain blocks and skip others, say, on Monday, Wednesday and Friday of each week, and on Tuesday and Thursday reserve the right to stop where they will, running according to schedule only on Saturday. It probably never has happened that a motorman, contented to stop at certain blocks on his outbound trip, has become morose with the monotony of it all, and stopped at a different set of blocks on his incoming trip. But to the absenver the thought of this as a possibility appears always to be lurking in the car rider's subconscious mind.

As might be expected in the circumstances, sundry orders have been issued to the local railways by the police, the local board of public utility commissioners, and the State Railroad Commission. At one stage of the game a rider who is statistically inclined thought he had made some headway in regard to his interpretation of official pronunciamentos. He checked the first car that passed, but before the next one arrived the public utilities board had heard that another mountain stream had dried up in the last hour, and the next car skipped the charted point, stopped three blocks down the street, shooting the theory into a cocked hat.

Power conservation is as sensitive to rumors like that as the stock exchange is to a storm in Nebraska. But nobody seems to mind it all. It's probably Los Angeles pride. Why, late one night the writer had to walk home because the cars had stopped running, though it was a fairly decent hour for movie stars and night newspaper workers to be up and doing. The distance was nearly twice as far as one would have to walk for a Camel. But people don't complain.

Walking at night, after certain hours, is not however, entirely a thing of joy. The streets are dark, for all lights are turned off, with exception of one lamp at each corner of street intersections. The city, in fact, seems not unlike a medieval town. No gigantic displays flare against the sky. Automobile dealers must depend on the sales ability alone; a dyspeptic public is left to grope in the dark for its after-dinner chewing gum, unguided by the wriggling antics of electric arrow midgets; hostelries sit in dignified darkness, no longer welcoming the stranger with a flaunting sign flirting at the sky; service stations dispense oil and gasoline in a subdued glow where once was blatant light. Theater sign boards are lighted only from sundown to 9.30 p.m. and then with low-power lamps.

A dash of the ridiculous saves the situation from becoming morbidly serious. Shop windows are allowed to use sufficient, though not full, power to display the latest fall importations. M'lady's vanity won out, and window shopping is still an allowable pastime. Ten chances to one the president of the local board of public utilities, went to the meeting primed by his wife. One can see him rise, with all the dignity of the Governor of North Carolina when he spoke to the Governor of South Carolina, as he says, bowing to the ladies: "Gentlemen, it's a long time between showers."

Virginia Commission Refuses to Lift Paving Amendment

The State Corporation Commission of Virginia has refused to amend the charter of the Norfolk Railway & Light Company so as to relieve the company of the obligation of paving between tracks imposed in the original charter granted by the Legislature.

In a brief sustaining its petition the railway argued that the commission has no right to refuse to grant an amendment to a charter when it is drawn in the form prescribed by law. The company held that this duty is ministerial only and that the commission has no discretionary powers beyond seeing that the law is complied with.

In refusing to grant the amendment the commission took the position that it has the power to refuse any application for a charter or an amendment to a charter when it is clearly shown that such application is contrary to public policy. The application in question, it was held, is contrary to public policy.

In a case decided in Portsmouth the commission has shown that the question of relieving electric railways of the obligation of paving between car tracks is one which may properly be considered and decided on its merits. In the Portsmouth case the commission granted the petition of the Virginia Railway & Power Company to be relieved from this duty. The case just decided is said to be entirely different, however, the Norfolk company demanding the charter amendment as a matter of right and denying the right of the commission to refuse it.

The petition was filed on July 24. Both the city and the company were quick to file briefs.

Transit Measure to Voters

Charter Amendment Proposed at Detroit to Permit City to Carry Out Rapid Transit Program

A proposed amendment to the Detroit City Charter has been introduced into the City Council. It provides alternate means of financing the construction of a rapid transit system and establishing a commission to supervise the work. In the Council there was a long drawn-out discussion, particularly regarding the question of control of the rapid transit system when completed. It was then voted to introduce the bill carrying the amendment. In consequence the measure will lie on the table twenty days before final vote is taken to determine whether the amendment will go into the ballot at the primaries on Sept. 9. It is expected that the amendment will receive a favorable vote. According to Sidney D. Waldon, chairman of the temporary commission appointed by former Mayor James Couzens to make plans for rapid transit, the commission will have a plan of routes ready for a vote at the spring election next year if the amendment carries this fall.

OPERATION BY COMMISSION SUGGESTED

The recommendations of the Transit Commission include operation of the system by the commission during the construction period. While the commission believes in unified control of all transportation units of the city, operation by the commission was included to guard against the possibility of no control in case the city failed to name an operating organization.

It is cited that it would probably be five years before any part of the rapid transit system can be placed in operation. Before then the city may take over the operation of a bus system, or agreement may be reached on a metropolitan area covering transportation for the entire district surrounding Detroit. In either case the city might decide to do away with both the Rapid Transit Commission and the Street Railway Commission and place the transportation systems under one body. It has been suggested by Ross Schram, general manager of the D.S.R., that many economies could be effected during construction if it were understood that the D. S. R. was to have final control. Mr. Schram pointed out that by 1931, provided present progress is maintained, the D.S.R. will own an unencumbered system.

Relieved of the burden of making periodical payments for the lines which it is taking over from the Detroit United Railway the city will then have $3,000,000 to $4,000,000 which might be used to provide rapid transit equipment.

CONTROL WITH COMMISSION

As indicated previously the commission is to supervise, manage and control all the routes approved by the people in respect to construction, maintenance and operation during the construction period. The routes or any part of them are to be placed in service as soon as practicable and operated by the commission or by such other authority as may be designated by the city authorities.

Decision Authorizing Competitive Bus Service Will Be Appealed

The Washington-Virginia Railway will appeal from the decision of the State Corporation Commission of Virginia in awarding a certificate to the Alexandria Motorbus Company to operate its line from Alexandria to Washington in competition with the railway. The commission had the matter before it for more than a year. It appears that some time ago a permit was issued to operate the bus line. The bus company, however, did not receive it and, under the impression that authority had been denied to it, the company abandoned the line temporarily. Later, on discovering that the certificate had been awarded, the bus line asked for a hearing in the matter, and this was granted. In the meantime, the bus line, acquired by private parties, was being operated. The electric railway contended that the commission had exceeded its authority after the line had been abandoned in allowing a resumption of business. In the opinion in the case, the commission held that the bus line is a common carrier, that it has the usual rights to sell, buy, lease or operate, that private persons have the right to acquire such common carriers, and that the owner of the line is well within his rights to operate the line so long as he complies with the law pertaining to common carriers.

Toledo Headed for Ten-Cent Fare

Toledo now faces the prospect of a 10-cent cash fare. On Sunday, Aug. 17, the fare became 8 cents cash with five tickets for 40 cents. This was the second increase by the Community Traction Company in the last few weeks. Another increase to 9 cents cash and three tickets for 25 cents will be effective on Aug. 31. Then in ten days it is expected the next higher rate of fare will be enforced. According to Commissioner Graumlich this will be 10 cents cash and three tickets for 25 cents. A transfer rate of 1 cent is set by the Milner ordinance.

Under the present 8-cent fare the receipts per revenue passenger are about 6.6 cents owing to the large proportion of transfer passengers.

The stabilizing fund is now in "red" figures about $30,000, and the company is finding it difficult to obtain capital necessary for extensions and betterments.

It is estimated that the 10-cent cash fare with three tickets for a quarter will save the company $700 in the item of counting pennies and aid the one-man car operations greatly. More one-man cars are expected to be in operation within a few weeks.

Donational Bus Line Seeks Permit in Southern California

The Culver City-Palms Community Donational Bus Lines, now operating between Los Angeles and Venice has applied to the State Railroad Commission for a permit to act as a common carrier. It is said that this action is based on the complaint of the Pacific Electric Railway in filing complaint with the State Railroad Commission against the Community Bus Line operating between Los Angeles and Venice.

For some time the Culver City-Palms buses have been running on the "honor system," whereby passengers paid a fare if they felt so inclined and as much as they liked. A contribution box is opposite each seat in the buses. The community bus line asks the Commission to authorize it to operate in competition with the Pacific Electric interurban trains. The fares to be charged are as follows:

From the end of Los Angeles Railway car line in Los Angeles to Culver City and Palms, 10 cents each way.

From Culver City and Palms to the beach at Venice, 15 cents each way.

From end of Los Angeles Railway line in Los Angeles to Venice, 25 cents one way, 40 cents round trip.

Santa Monica Bus in Operation

The Pacific Electric Railway, Los Angeles, Calif., placed a new bus line in operation on Aug. 4 in territory heretofore unserved. The new line is known as the Pico Boulevard line. It extends from the terminus of the company's local line in Los Angeles at Vineyard Junction to the company's station at Utah Avenue in Santa Monica. The distance of the new bus line between Los Angeles and the beach city of Santa Monica is 10.7 miles. The city of Santa Monica is also served by the company's electric interurban lines, but over two other separate routes.

Twenty-nine passenger coaches of the latest improved design were entered in the new service. An adjunct to this service was also established in the nature of motor coach shuttle service between the Pico Boulevard route and Sawtelle. Transfers are issued from the buses to the railway in local service in the Santa Monica Bay District.

The Pacific Electric Railway now has 140 motor coaches in operation. Thirty-six are used on lines of the Los Angeles Motorbus Company, of which it is joint owner with the Los Angeles Railway, and 104 are in local and interurban service.

President Barnes Says Buses in Louisville Are Unprofitable

Operation of regular bus routes in Louisville by the Kentucky Carriers, a subsidiary of the Louisville Railway, has not proved profitable. J. P. Barnes, president of both companies, announced a few days ago that the company was losing about $3,000 a month with its bus line. He said the company was figuring on plans to take the route out of the East end, and run it into the West end, a more thickly settled territory. There have been times when the company could have placed its buses in service to the race track, ball park, or other amusement feature, but it has kept the vehicles on regular routes at all times and apparently worked diligently to build profitable business. It is hoped that a line can be established to the West End that will at least break even. There is a 10-cent fare on the buses, without transfers, compared with a 6-cent cash fare, with transfers on the street cars.

Rules Ottawa Electric Company Must Have Bus License

The Ottawa Electric Railway, Ottawa, Can., was recently found guilty of operating buses without having obtained a license in the town of Eastview, and taking on and discharging passengers within the limits of the municipality. The town of Eastview had passed a by-law licensing and regulating bus traffic in the city limits. The court ruled that the town had authority to do this. After the decision of the court the railway applied to the Eastview police chief for a license to operate its bus line. F. D. Burpee, general manager of the Ottawa Electric Railway, announced that pending the granting of the license the company had withdrawn its buses from passenger service.

Some time ago the Ottawa Electric Railway had the Ottawa Council pass a by-law forbidding any bus lines from picking up and discharging passengers on the same trip within the city of Ottawa. However, the town of Eastview got behind the bus company operating for a 5-cent fare from post office in Ottawa out through the town of Eastview to Notre Dame Cemetery, ½ mile east of the town's limits, and has obtained a franchise from the Ontario government covering this route. This stopped the Ottawa Electric Railway buses, which operated from the eastern limits of Ottawa, from running further than the eastern limits of Eastview.

The town of Eastview, in the first place, wanted the Ottawa Electric Railway to extend its rails through its municipality, but the railway wanted a straight 5-cent fare, while the town demanded a 5-cent fare throughout the railway system to and in Ottawa. The railway's activities in Eastwood have been referred to previously.

Jitneys Quit in Akron After Six Months' Struggle

Abandonment of all city jitney lines which have operated in Akron, Ohio, for the last six years takes place this week. Following the re-routing of the jitneys so as to take them off the streets over which the Northern Ohio Traction & Light Company operates railway lines, the jitneys failed to make a living. At a meeting of the Jitney Association members with city officials on Aug. 18, the jitney men asked to be permitted to compete along the lines of the street railway's electric and bus routes. The city refused and the jitney men voted to give up the struggle and divide a $23,000 fund which they had accumulated under the city jitney ordinance for bonding purposes. Jitney men were informed by the city they must comply with all terms of the city ordinances or get out of business within forty-eight hours. They immediately decided to get out.

Bus Line Suggested for Greenville.—Instead of extending its railway lines, the Southern Public Utilities Company, Greenville, S. C., is seeking the co-operation of that city in a move to start bus lines.

Wants Estimate of Income on Eight-cent Fare in Springfield

Opponents of the proposed fare increase from 7 to 10 cents on the lines of the Springfield Street Railway, Springfield, Mass., at hearings conducted by the State Public Utilities Commission in Springfield, on Aug. 18, succeeded in having the commission ask the company for estimates of its annual income based on an 8-cent fare for the six months' period from January to June, 1924, instead of on the patronage for the year 1923. The commission also declined to permit the use of an independent audit of the company's finances, made at the direction of the Springfield Chamber of Commerce and paid for by the railway.

Opponents of the fare increase lost their appeal for a six months' delay of the hearing to permit further audit of the company's finances. The commission directed that the 8-cent fare income estimates be presented at a further hearing in the State House in Boston, on Aug. 20. The operating expenses of the company have been greatly increased recently by an arbitration decision granting increased wages to its employees. This is one of the principal reasons for the application for a fare raise.

Senator Lacey Pardoned

Robert C. Lacey of Buffalo, former State Senator, who pleaded guilty in Federal Court to perjury in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line interurban train on the International Railway in the 1922 strike of platform employees, has been pardoned by President Coolidge. The pardon restores Lacey's citizenship rights, the privilege to vote and hold public office. He is a candidate for re-election this fall. Lacey was fined $500 and sentenced to one day in jail.

Buffalo newspapers express amazement that the President granted a pardon to Lacey after his alleged participation in the dynamite conspiracy outrage. The *Evening News*, after reviewing the case and pointing out that Lacey is a confessed perjurer, says:

> Now, seeking election and vindication, he (Lacey) will be able to point to the President's action as giving him a clean bill of health. Neither politically nor morally does the President's action appear to be justified.

The *Express* says editorially:

> It is not Lacey's time for reappearing. Let him go away back and sit down until his offense has been outlived.

Subway Program of New York City Administration Revealed

John H. Delaney, head of Mayor Hylan's new Board of Transportation in New York City, made public for the first time in an interview on Aug. 16 the city's plans for new subway construction to help bring about a solution of the transit problem. The three outstanding conclusions that appear to dominate the policies of the Hylan regime have been summarized as follows:

1. There is no intention to sanction an increase over the present 5-cent fare, at least for seven or eight years.

2. It is the purpose of the Board of Transportation, reflecting the fixed views of the Mayor, while pressing subway construction on the limited funds available, to continue to center its efforts on obtaining a constitutional amendment authorizing the issuance of $275,000,000 in subway bonds to replace the new self-sustaining water bonds.

3. The program is to complete as speedily as possible the Fourteenth Street-Eastern District line, to defer work on the Nassau Street line, and to begin construction of the city's independent system, which later may or may not be linked with existing subways under municipal operation.

Mr. Delaney expects the study of the route to be followed by the projected independent system will be well advanced within about two months. The new system, roughly speaking, is expected to comprise:

A line from Washington Heights, or 173d Street, to the lower part of the city, running under Central Park West and through Sixth or Eighth Avenue from Fifty-ninth Street south.

A line from near the Brooklyn end of the Brooklyn Bridge through the central part of Brooklyn and over to Greenpoint or, perhaps, Long Island City, Queens.

A line from Jamaica, L. I., to connect with the Manhattan-Bronx trunk line.

A suitable connection with the passenger and freight tunnel now being built to connect Staten Island with South Brooklyn with a line through Brooklyn to Manhattan.

G. M. Dahl, chairman of the executive committee of the Brooklyn-Manhattan Transit Corporation, has taken issue with Mr. Delaney over the need for the Nassau Street line.

Municipal Road an Object of Charity

The butcher, the baker and the candlestick maker of the town of Lincoln, Ill., have set aside a day to devote to the municipal railway, which is now nearing the rocks.

At least $2,000 is needed for repairs to the system, and public-spirited citizens are to devote one day to selling tickets on the cars. The merchants have promised to man the cars, collect fares and endeavor to sell a supply of tickets to the riders. The fund accumulated during the course of the day, it is hoped, will be sufficient for the repairs.

The fare, which has been a nickel, will also be boosted to a dime for the one day. Contributions will also be asked to supplement the fund being raised for the street-car lines.

Bus Service Starts in Decatur

Bus service was started in Decatur, Ill., on Aug. 1 by the Illinois Power & Light Corporation, following a period of great stress and subsequent effort to install a bus-railway service. On the first day, 7,501 passengers were handled by the buses. On the five lines, with eleven buses in operation, 885 transfers were picked up by patrons who started their ride on the trolley cars. All told, more than 20,000 persons rode upon the trolley cars and buses during the first day.

The bus had its beginning in Decatur, about four years ago when the railway's request for an increase in fare was refused. At that time bus service was started by John Borden. Others were quick to enter the field. Duplication of service and confusion followed. As a result of surveys made by traffic experts, the railway decided to install a car-bus service. Following out this idea it bought up the competing bus lines, junked much of the old equipment and substituted a number of Mack cars. The fare on the trolleys and buses is 6 cents with transfers from one to another.

"Main Thoroughfares" in Youngstown to Be Observed

The new traffic code for Youngstown, Ohio will soon be put into force. Certain streets are designated as main thoroughfares. Over these streets traffic will have the right-of-way, while traffic in the intersecting streets will be required to come to a full stop before proceeding into the main thoroughfare. Under the law all streets in which railway cars operate are considered main thoroughfares. Other streets have also been designated main thoroughfares by the ordinance enacted by the City Council. The Pennsylvania-Ohio *Electric News*, the official pamphlet of the Youngstown Municipal Railway, says that the conferring of the right-of-way on vehicles in the main thoroughfares does not mean that these vehicles can disregard vehicles coming off of side streets; that there is still in the city ordinance a clause which says cars must operate under control while approaching intersections; further, Section 13 states that the cars must be provided with a signal bell or gong and that this must be sounded at least 100 ft. distance from all street intersections and continually while passing such intersections.

Wage Arbitration in Boston Under Way

Public arbitration hearings have been started at Boston to determine what the wages for the uniformed employees, the platform men, of the Boston Electric Railway shall be during the next twelve months. The special arbitration board has held three sessions, and has taken some evidence from Edward Dana, the general manager of the company, and has heard an opening statement from James H. Vahey in behalf of the men. Although a member of the arbitration board Mr. Vahey is conducting the men's case as their counsel. The counsel for the Boston Elevated is H. Ware Barnum.

It developed that it was the Elevated which first gave notice of a desire to change the present schedule of wages. That company asked the men to accept a reduction of 5 cents an hour, which would make the maximum rate 60 cents an hour. The Amalgamated then followed with demands much larger than had been generally supposed. In the matter of pay the union asked for an increase of 20 cents an hour. Besides this the new demands of the men are for free uniforms, free transportation at all times by means of ticket books to be issued to them; two weeks vacation with pay and double pay for all overtime. The men also want an increase in the allowance for meals when the trip takes them to some point from which they cannot get back to their usual places for luncheon. They are getting 65 cents under the old agreement and they want 85 cents. After the opening sessions the hearings were adjourned for a week. It will probably be several weeks before there is a decision.

Railways Advertise Their Own Bus Proposals

Both the Third Avenue Railway, New York, and the Brooklyn-Manhattan Transit Corporation, Brooklyn, are advertising in their cars the fact of their willingness to supplement service on their railway lines with bus feeders. The placard of the Third Avenue contrasts the proposal of that company with the one advanced by the Fifth Avenue Coach Company for operating rights on the Grand Concourse. No transfers are proposed in the offer of the coach company, while the railway proposes transfer from bus to bus and transfer from bus to railway.

The placard of the Brooklyn company illustrates at the top the type of double-deck bus which the company contemplates putting into service. The question that the company asks is: "Where do you need buses?" The placard then says:

"B.M.T. buses—ten double deck, seating sixty-seven each, and two single-deck, seating twenty-nine each, are ready for service. We have petitioned the Board of Estimate for bus franchises.' Write for copy of letter."

The letter referred to is the proposal made by Chairman Dahl to the city, in which he reviewed the situation at length.

News Notes

Athens to Quit the Pass.—The Athens Railway & Electric Company, Athens, Ga., at an early date will discontinue the pass system that has been in use for several months. The pass has been sold for $1.

Wants Jitneys Curbed.—Thirty employees of the Worcester Consolidated Street Railway, Worcester, Mass., recently appeared before the Selectmen of Clinton, Mass., and demanded that the board take some action to stop jitneys from sniping prospective railway passengers. They expressed the fear that if the tactics of the jitney men were not curbed the Consolidated would suspend operation of cars on the Leominster to Clinton and Hudson to Clinton lines. The Selectmen expressed the desire to have the cars continue in service.

Subway Hearing Postponed. — Hearings on the applications of the Highway Commission to construct subways in North Sacramento, Calif., under the tracks of the Sacramento Northern and the Western Pacific have been postponed to Sept. 16. They were set by the Railroad Commission to be held on Aug. 22.

Recommends Buses As Feeders.—The Public Utilities Bureau of Louisville, Ky., in a recommendation to the Board of Public Works, has suggested that bus lines be established as feeders, or extensions to some of the local railway lines. The recommendations favor the bus lines to be operated in conjunction with the street cars, and on the same fare rate, with transfers to cars at terminals, and from these cars to intersecting lines. The bureau agrees in part with the contention of the railway that costs of extension of rails is prohibitive.

Will Change to One-Man Operation.—The Linwood Street Railway, which operates between Whitinsville and Linwood, Mass., will operate each of its two cars with one man as soon as practicable. The line is about 2 miles long. It is owned by officials of the Whitins Machine Works. It is used also as a freight road.

Will Serve as Belt Line for Switching Freight.—The Tacoma Municipal Railway may become a belt line road for the switching of all freight cars to and from tideflat industrial plants. Contracts looking toward this end have been signed by each of the four transcontinental railroads and submitted to the City Council. The proposal will be examined by the city attorney. The contracts are the result of a year's work on the part of the secretary of the traffic and transportation bureau of the Chamber of Commerce. A digest of the prospective freight business of the municipal line shows that its use as a belt line will probably increase municipal carline earnings by $25,000 a year. This increase will go a long way toward making the road self-sustaining.

Trouble Caused by Jitneys. — Allen McReynolds, attorney for the Southwest Missouri Railroad, Joplin, Mo., recently told the Joplin City Commission that if jitneys were eliminated the railway could be operated at a profit. Losses of the company in operating its city lines in Joplin for the last ten-months' period exceeded $50,000. Four of the five city lines were operated at a total loss of $54,873. One line made $4,352.

Will Co-operate for Crossing Elimination.—The State Highway Commission of Kentucky has announced that plans have been started for the elimination of a double grade crossing near Simpsonville, Ky., on the Shelbyville-Frankfort-Lexington and Louisville pike. The intention is to put in either an underpass or overpass, carrying the Louisville & Nashville Railroad steam tracks and Louisville & Interurban traction lines.

Company Sues—Counter Suit Filed.—The Virginia Railway & Power Company is suing a woman patron for 14 cents for transportation fees in Norfolk for her son, who is alleged by the company to be six years old and not entitled to ride free. The boy's mother has countersued. She is asking for $10,000 because of humiliation caused by an "uncivil" conductor who claimed her son was more than four years and therefore not exempt from fare collection. In Civil Justice Court the company took a non-suit on Aug. 11. Motion for a continuance on the grounds that a material witness was out of the city was overruled. The attorney for the railway said his company would take a non-suit in order that another suit might be brought upon his witness' return.

Railway Man on Motor Vehicle Committee. — L. H. Palmer, vice-president and general manager of the United Railways & Electric Company, Baltimore, Md., has been appointed by Secretary of Commerce Herbert Hoover to serve on the committee on motor vehicles which will make an exhaustive study prior to the national conference on Street and Highway Safety, scheduled for some time in the fall. Mr. Palmer will work under the chairmanship of H. M. Crane, president of the Society of Automotive Engineers. Some time ago Secretary of Commerce Hoover was asked to lend his efforts toward organizing a national conference on the subject of street and highway safety. Mr. Hoover has suggested that the conference should be preceded by exhaustive investigation into the different phases of the problem and so various committees have been formed to deal with the particular issues.

Trackless Trolley Petition in September.—A hearing on the petition of the Capitol District Transportation Company for certificates to operate trackless trolleys in Cohoes and buses in Rensselaer, will take place at the office of the Public Service Commission Sept. 9. Ernest Murphy, general manager of the company, said recently that if the certificates are granted, work will go forward rapidly. The Capitol District Transportation Company is a subsidiary of the United Traction Company, Albany, N. Y.

Awards Announced.—For attaining a satisfactory record and having performed distinguished service, twelve trainmen of the Birmingham Electric Company, Birmingham, Ala., will receive the 2½-year gold buttons as the award for the first six months of 1924. Fifty-three men will receive the 1½-year silver buttons, ninety-nine men will receive one year silver buttons and 140 men will receive the six months' bronze buttons. The transportation department of the company announces that it appreciates the effort being put forth on the part of these men in handling passengers every day and in discharging the obligations and duties of the work with credit to themselves and the company.

Binghamton Railway to Supplement Service.—An application for permission to operate buses in Johnson City will soon be made to the Public Service Commission by the Binghamton Railway, Binghamton, N. Y. It is planned to operate under the name of the Binghamton Auto Bus Lines, Inc., with the same officers as the railway company. Service will commence on Sept. 1 with two Mack buses. A franchise has already been granted by the board of trustees of Johnson City.

New Franchise Granted at Laurel.—Electors of the city of Laurel, Miss., have approved a new franchise to the Laurel Light & Railway Company. The new grant will make it possible for the company to make a bond issue of $100,000. About $60,000 will be used to enlarge the power plant, doubling its present capacity, $20,000 will be spent on the distribution system and a like amount in improvements in the railway department. The period of the new franchise is twenty-five years.

Bus Purchase Bill Passed by Georgia Legislature.—By vote of 131 to 5 the Georgia House has passed a bill authorizing electric railways to acquire stock in bus lines. This bill passed the Senate and will go to the Governor for his signature. The measure permits railways to purchase stock in bus lines to enable the railways to extend service through the operation of the buses as feeders.

Denies Reports on Purchase.—A. H. Schoellkopf, vice-president of the Niagara Falls Power Company, Niagara Falls, N. Y., has denied reports that his company is seeking to purchase the franchise, right-of-way, equipment, etc., of the Niagara Gorge Railway. The railway operates a belt line route down the Canadian gorge and up through the lower American gorge of the Niagara River, the Canadian half of the trip being made over the Park & River division of the International Railway, Buffalo. The power company was said to be seeking control of the railway to secure power rights in the lower gorge owned by the railway.

Double Stops Eliminated in Mobile.—The Mobile Light & Railroad Company, Mobile, Ala., in co-operation with the officials of the police department in attempting to relieve traffic congestion in the downtown district, has abandoned all double street car stops.

Change Sought in Bus Regulatory Legislation.—Tentative regulatory legislation for approximately 1,000 buses in North Carolina, to be sought at the forthcoming special session of the General Assembly, will place the control of the buses—as common carriers—under the State Department of Revenue instead of the Corporation Commission. Two reasons are offered in support of the proposal that the control be given by the Legislature to the Commissioner of Revenue. One is that by not asking that they be placed under the jurisdiction of the Corporation Commission the objection of Governor Morrison will be removed. The other is that the embarrassment which might come to the commission, in passing upon controversies as to parallel railroad and bus lines, will be obviated by designation of the Commissioner of Revenue as the control.

Bravery of Starter Recognized.—Ethington B. Merritt, suburban car starter in the employ of the United Railways & Electric Company, Baltimore, has been presented with a gold watch by the company in recognition of his bravery in frustrating a bandit who attempted to hold up a car. The presentation was made by L. H. Palmer, vice-president and general manager of the company.

Interurban Division to Have One-Man Cars.—One-man cars, which now are being used on a large number of local lines of the International Railway in Buffalo and Niagara Falls, will be extended to the Kenmore-Tonawanda interurban division early in September, according to present plans of the company. This will be the first interurban division to operate with one-man cars in western New York. Crews are now being trained for the one-man operation of this division. These cars operate from the Buffalo-Kenmore city line through Delaware Avenue to the Tonawanda-North Tonawanda city line, a distance of about 7 miles.

Safety Conference in Indiana in September.—Laws requiring all motor traffic to stop at interurban and railway crossings and prohibiting more than two persons from riding in the front seat of an automobile are suggested by G. O. Nicolai, of the Terre Haute Traction & Terminal Company, to cut down the death toll from automobile accidents. These were made following announcement by the Public Service Commission of a conference in September to promote safety in Indiana.

New Orleans Public Service, Inc., Extends Bus Auxiliary Service.—The second line of buses to be established by the New Orleans Public Service, Inc., New Orleans, La., was started Aug. 4. It now operates along Frenchmen Street from Florida Walk, a section of the city as yet too thinly populated to make it profitable for the railway company to extend its lines, and at Decatur Street, its turning point, buses traverse a good portion of the lower part of New Orleans, to Canal Street. The rate of fare charged is the same as that on the street cars—namely 7 cents—with transfer privileges to all intersecting railway lines. In New Orleans, all car stops, both for boarding and discharging passengers, are made on the far side of the street, except on streets with intersecting street car lines. An innovation is now proposed in the plan to stop on the near side of the street.

"Weekly Pass" Time Extended.—Another lease of life for the $1 weekly pass on the lines of the Tacoma Railway & Power Company, Tacoma, Wash., has been granted by the State Department of Public Works. The date for discontinuing the use of the pass has been advanced to Sept. 14. This puts its operation past the time for the primary election at which the railway desires to submit its proposed new franchise to the people. The Tacoma property is asking citizens to petition the City Council to place the new franchise proposals on the primary ballot. The company is seeking to do away with paving, gross earnings tax and other requirements. As part of its franchise proposal the company has suggested that the use of the weekly pass be extended for at least a year. It would also agree to install service with buses at the request of the City Council.

Advertising Contracts Not Renewable.—The Public Service Transportation Company, a subsidiary of the Public Service Railway, won a victory in the Court of Chancery when Chancellor Walker refused to modify a decree of Vice Chancellor Foster respecting advertising in motor buses acquired by the company from independent operators. The Schindler Advertising Company has contracts with former jitney men for display advertising. Now that the Public Service is acquiring buses of independent operators the advertising contracts are good until the time limit for them expires. The contracts are not renewable.

Foreign News

Berlin Elevated & Underground Railways

A reminder of the fluctuations during 1923 of the German mark is shown in the annual report of the Berlin Elevated & Underground Railway, recently issued. Americans have had some difficulty in raising rates with a depreciated currency, but they have not been obliged to raise the fare per passenger from 5 cents to $130,000,000, which is practically at the rate of increase which was made on the Berlin Elevated & Underground Railway during 1923. Under such circumstances, figures on gross and net receipts do not mean much, so this article will be confined largely to statistics other than financial.

During the year two extensions were put in service on what is known as the North-South Railway operating approximately at right angles to the old line which ran East and West. Another section of the North-South line was opened April 19, 1924. The equipment of the company includes 440 cars, which during the year made 5,362,696 train-kilometers, with trains up to six cars each. Besides its elevated and underground lines, the company operates a short trolley extension to the East, with twelve motor cars and nine trail cars.

PASSENGERS CARRIED AND AVERAGE FARE CHARGED, BERLIN ELEVATED & UNDERGROUND RAILWAY, 1923

Month	Number of Passengers	Average Fare per Passenger in Marks
January	12,812,562	49
February	13,905,870	106
March	14,291,894	181
April	13,887,919	221
May	13,657,837	232
June	14,977,437	405
July	14,860,280	1,571
August	13,460,053	28,559
September	15,506,580	982,777
October	13,990,201	239,906,000
November	12,237,895	56,082,000,000
December	13,958,480	130,133,000,000

Mr. Dalrymple's Views on Tramway Situation

James Dalrymple, general manager Glasgow Corporation Tramways, presented a paper on municipal tramway administration at the annual meeting of the Institute of Public Administration in Oxford July 21. He outlined the Glasgow system of management, which had enabled repayment of the entire sinking fund in 1917, sixteen years after electrification of the tramways, and carry on through the difficult period following the war with little inconvenience. A number of smaller British municipal tramway undertakings were operating at a loss, he said, largely due to motor bus competition. The buses, unlike tramways, pay no rates to the cities and are not required to keep up a regular service, but simply take the cream of the traffic. It is Mr. Dalrymple's opinion however, that when normal trade in the country is restored the tramways will earn sufficient revenue to make both ends meet.

Financial and Corporate

Unfortunate Conditions in Mexico City Cause Slump in Earnings

The Mexico Tramways, Mexico City, Mexico, for the year ended Dec. 31, 1923, realized net earnings (Mexican currency) of $1,146,049 after allowing for taxes and depreciation. This compares with net earnings of $2,097,918 in the preceding year. The gross earnings in 1923 were $12,266,830, against $12,942,417 in 1922. The total number of passengers carried on the Mexico Tramways in 1923 was 103,083,773; in 1922 the number was 109,286,678. The total car-miles operated was 17,371,229 last year and 16,093,889 in 1922. In the report to the president and directors of the Mexico Tramways, G. R. G. Conway, managing director, states that the year's results proved very unsatisfactory due to labor difficulties in the months of January and February, jitney competition and the general business depression during the latter part of the year. The poor showing was also partially due to the uprising against the government in December.

For experimental purposes the company has established an omnibus service from the center of the city to a residential district and also a suburban service. The total number of single-deck type buses in daily operation is twelve during the week and thirteen on Sundays. Much opposition to this service was experienced from the owners of the jitneys and many difficulties arose in trying to obtain satisfactory routes for their operation. But in view of the fact that the buses, up to the present, have not been allowed to run into the downtown business district, they have not so far been able to compete with the jitneys.

During the year the company made certain changes in its rolling stock and tracks in order to adopt single-end operation of the cars so as to introduce fare boxes and the "pay-as-you-pass" system.

Lease of Interurban Company's Tracks Solves Indianapolis Problem

A tentative lease by the Indianapolis Street Railway of the tracks of the Union Traction Company of Indiana from Forty-sixth Street, Indianapolis, north on College Avenue to Broad Ripple has been signed. The lease will be submitted immediately to the Public Service Commission for approval. Until then the terms will not be made public. The Union Traction Company will continue to operate its interurban cars over the College Avenue tracks, but it is understood it will discontinue its service to Broad Ripple. Under the Public Service Commission order of April 18, the Indianapolis company was directed to extend its service to Broad Ripple by Sept. 1. The rate on the Union Traction cars from Broad Ripple to the city is 10 cents, with a 7-cent fare or a city street car ticket for a ride wholly south of Fifty-fourth Street; 5 cents between Fifty-fourth Street and the north limit of the line. Under the city company's service there will be a 7-cent fare from Broad Ripple to Indianapolis.

New Officers Elected for Indiana Interurban

The Indiana Service Corporation, Fort Wayne, Ind., will assume active operation of the Fort Wayne & Northwestern Railway, and a merger is expected to be completed within sixty days, according to announcement made by Robert M. Feustel, president of the Service corporation.

In preparation for the merger a number of changes have been made in the officers and directors of the Fort Wayne & Northwestern Railway. Resignations have become effective as follows:

President, C. J. Munton, Kendallville; first vice-president, William L. Taylor, Indianapolis; second vice-president, J. H. Rose, Fort Wayne; secretary-treasurer, V. R. Shick, Kendallville, and directors, Mr. Munton, Mr. Taylor, Mr. Rose, Raymond H. Smith, New York, and F. Leonard, Fort Wayne.

New officers have been announced as follows:

President, Mr. Feustel; vice-president, H. E. Vordermark, Fort Wayne; secretary-treasurer, F. H. Schmidt, Fort Wayne; general manager, Henry Bucher, Fort Wayne. The board of directors includes the officers and F. M. Tayte and James M. Barrett, Fort Wayne.

Seeks Abandonment in Wallkill

The Wallkill Transit Company, Middletown, N. Y., has petitioned the Public Service Commission for permission to abandon its rights and franchises in the towns of Wallkill, Goshen and village of Goshen, Orange County. The route proposed to be abandoned is being conducted at a loss of from $30 to $50 a day, the company stated.

The company on June 25 was permitted by the commission at the request of the city administration of Middletown to discontinue railway service in Middletown and substitute a bus service, operated by the Wallkill Public Service Corporation, a subsidiary concern. Since then, the petition sets forth, the company has continued the operation of the line from the city limits to Franklin Square, pending the filing of a petition by the Wallkill Public Service Corporation for consent to operate a bus line over the route from Franklin Square to the city limits and through the towns of Wallkill to Mechanictown and Phillipsburgh.

The petitioner claims that for the past year it has not earned in excess of the amount sufficient to pay the wages of its employees and the price of the coal consumed. Since April conditions have been growing worse.

Changes in Control and in Officials at Montreal

E. A. Robert resigned recently as president of the Montreal Tramways. Accepted at the same time as Mr. Robert's resignation were also the resignations of J. M. Wilson, George G. Foster and J. M. McIntyre. Elected to fill the vacancies thus created were: Julian C. Smith, Howard Murray, Gordon W. MacDougall, and George Montgomery. Julian C. Smith, vice-president of the Shawinigan Water & Power Company was elected president, replacing Mr. Robert. The board now consists of these four newly-elected directors together with Senator Lorne C. Webster, J. L. Perron, William C. Finley, W. G. Ross and P. J. McIntosh, who is a vice-president of the company.

Another important announcement is that the United Securities, Limited, has secured control of the Montreal Tramways & Power Company through the deposit with the Montreal Trust Company of more than 92,000 shares of the stock of Montreal Tramways & Power Company for exchange into the shares of the United Securities, Limited. It has also been announced that more than 33,000 shares of Quebec-New England Hydro Electric Corporation have been deposited in favor of United Securities, constituting share control of both companies.

The resignation of Mr. Robert after a term of fourteen years as head of Montreal's traction system is the culmination of events which started to come to a head less than three years ago, and resulted in his dropping out of company after company which comprised part of Montreal Tramways & Power Company, the holding company of Montreal Tramways.

Line Discontinues in Gardner

Directors of the Gardner-Templeton Street Railway, Gardner, Mass., have announced the retirement of Charles Mulhado as president of the road and Ralph Kelly as clerk and treasurer. The company has also announced discontinuance of the Main and South Main Street line and the tracks and overhead equipment will be removed.

The line has been operating only two days a week, Tuesday and Saturday, and the decision to discontinue it entirely was due to lack of patronage. Superintendent Louis Starkey is in charge temporarily with headquarters at the East Templeton carhouse. The company operates in Templeton, East Templeton, Otter River and Baldwinville.

Organization of the company by Mr. Mulhado followed the receiver's sale of the Northern Massachusetts Street Railway properties on Jan. 1.

Abandonment Allowed on Trenton Line—Buses to Be Substituted

The Board of Public Utility Commissioners has granted the application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to abandon railway service between Pennington and Hopewell and to substitute buses between these points. Approval was also granted to the company for a through service of buses between Hopewell and Trenton in conjunction with railway service between Trenton and Pennington. The trolley route to be abandoned is a part of the line operated between Trenton and Hopewell. The board also required that the overhead line should be removed from Pennington to Hopewell within three months from Aug. 1 and that within a year from that date the tracks be removed.

The company has pointed out to the New Jersey Board of Public Utility Commissioners that to continue trolley service between the two towns would entail an expenditure of more than $50,000 within the next two years. In ruling on the bus operation, the board required that the bus line be run on a reasonable schedule and that a rate of fare be passed upon after the presentation for approval of local permits.

Petition to operate the proposed bus line from Trenton to Hopewell was later filed with the Trenton City Commission by Rankin Johnson, president of the Central Transportation Company. If the permit is granted bus service will begin on Sept. 1.

Preferred Stock Offered.—Beyer & Small, Maynard S. Bird & Company and Charles H. Gilman & Company, Portland, Me., are offering at 86 and dividends to yield about 7 per cent $1,000,000 of the 6 per cent cumulative preferred stock of the Cumberland County Power & Light Company, Portland, Me. The company is the largest public utility in the State. It supplies railway service in Portland and vicinity. The proceeds of this issue, as well as the proceeds of the sale of 3,032 shares of common stock will be used to reimburse the company for a portion of the cost of the new addition to the steam plant at Portland.

Line Ceases to Operate.—The Montoursville Passenger Railway, Williamsport, Pa., running for twenty-seven years, has ceased to operate, being abandoned by the Williamsport Passenger Railway. Traffic over the route will be handled by the Lycoming Auto Transit Company, which operates between Williamsport and Montoursville. The line was 5.5 miles long.

Cheyenne to Give Up Railway.—Abandonment and dismantling are now under way in Cheyenne, Wyo., by the Cheyenne Electric Railway. Bus operation was started by W. E. Deneen at the request of the railway on Aug. 16 under a special permit from the city authorities until the hearing before the Public Utilities Commission on Aug. 29. He is operating one Reo bus and two more are en route. The company has been operating at a heavy loss for a number of years, due to many reasons, notably high taxes and a $10,000 paving improvement which the company could not finance. Moreover, the earnings were effected because the line was blocked from running cars downtown while sewer and roadway improvements were under way. The Cheyenne Electric Railway is 5.5 miles long.

Allowed to Abandon Lines.—Finding that operation by the Union Traction Company, Santa Cruz, Calif., of its Santa Cruz Laveaga Park and Santa Cruz-Seabright-Capitola lines is not justified by the present and prospective traffic, the California Railroad Commission recently authorized the company to suspend service on these lines and to abandon and remove the tracks. Authority to abandon, however, contains the provision that the traction company substitute bus service for the rail service. In accordance with this provision the commission has granted to the traction company a certificate of convenience and necessity to operate a stage line as a common carrier of passengers between Santa Cruz and Capitola and intermediate points and between Santa Cruz and Twin Lakes and intermediate points.

Lake Charles Property Sold.—It is reported that the Eastern Texas Electric Company of Wilmington, Del., has purchased the street railway, electric light, gas and water systems and plants in Lake Charles, La. The company has a capital of $2,500,000 and received authority to sell $1,100,000 of 7 per cent preferred stock. It is a holding company that controls public utilities in Beaumont and Port Arthur, Texas. The purchase is reported to have involved about $1,000,000.

Seeks to Abandon One Mile Line.—Permission to discontinue railway service over the East Van Buren line from the Frisco station in Van Buren to the Smelter, has been asked in a petition filed with the City Council by the Fort Smith Light & Traction Company, Fort Smith, Ark. Loss in operation is the reason given. The company asks the right to take up the track.

Service Resumed by Long Island Line.—Service on that portion of the lines of the New York & Long Island Traction Company on the south side of Queens County, which was abandoned last Winter, was resumed on Aug. 17 as far west as New York Avenue, otherwise known as Jamaica Junction. This is at the point where the line formerly running between Rosedale and Grant Avenue, Brooklyn, intersected with the line running from Jamaica to Far Rockaway. Service has been given on the south side between Freeport and Rosedale. With the resumption of service from Rosedale to New York Avenue transportation by electric railway from Freeport, Rockville Centre, Lynbrook, Valley Stream and Rosedale, to Jamaica on a regular 30-minute headway is in vogue.

Augusta Notes Extended.—Directors of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., have declared operative the plan for an extension to Dec. 1, 1935, of the five-year notes that were due on June 1 of this year. In view of the bondholders' acceptance of the plan interest on the extended notes will be at the annual rate of 6 per cent instead of 5 per cent as previously. Interest payment in cash on the 5 per cent notes also has been resumed. Disbursements in cash on this issue were deferred five years ago by funding the coupons for five years up to and including the Dec. 1, 1923, coupons into interest-bearing notes, all of which came due on June 1, 1924. By extending the maturity of these notes to 1935 they will fall due on the same date as the bonds.

Report on Abandonment Effected.—The Alabama Public Service Commission has taken under advisement the evidence presented to it at the recent hearing on the petition of the Alabama Traction Company for permission to discontinue service in Albany and Decatur. It was brought out that the company was making no money in the operation of cars in the Twin Cities.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	Aug. 1924 **6.99**	July 1924 **6.98**	Aug. 1923 **6.92**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	July 1924 **155**	June 1924 **158**	July 1923 **169**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Aug. 1924 **221**	July 1924 **221**	Aug. 1923 **214**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	July 31 1924 **3.19**	June 30 1924 **3.26**	July 31 1923 **5.91**	July 31 1920 **11.12**	July 31 1924 **3.19**
U.S. Bank Clearings Outside N. Y. City (Billions)	July 1924 **16.24**	June 1924 **15.26**	July 1923 **15.40**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
	July 1924	June 1924	July 1923	Jan. 1924	Sept. 1923
Business Failures Number	**1,533**	**1,561**	**1,405**	**2,258**	**1,279**
Liabilities (millions)	**49.18**	**38.05**	**40.22**	**109.1**	**30.83**

Conspectus
of
Indexes
for
August, 1924
Compiled for Publication in this Paper
by
Albert S. Richey
Electric Railway
Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Eng. News-Record Construction costs 1913 = 100	Aug. 1924 **213.2**	July 1924 **214.4**	Aug. 1923 **221.5**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	July 1924 **147.0**	June 1924 **144.6**	July 1923 **150.6**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Aug. 1 1924 **12.62**	July 1 1924 **12.23**	Aug. 1 1923 **12.82**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	Aug. 1 1924 **188.0**	July 1 1924 **185.5**	Aug. 1 1923 **186.7**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	July 1924 **143**	June 1924 **142**	July 1923 **147**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	July 1924 **161.7**	June 1924 **161.7**	July 1923 **161.9**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Authority Sought to Abandon Some Riverside Lines.—In an application filed with the California Railroad Commission on Aug. 11, the Pacific Electric Railway, Los Angeles, asked for authority to abandon service and remove the tracks on certain streets in the city of Riverside. The company says that operation over the rails specified has been conducted at a loss for some time, and that continued operation will require the expenditure of large sums for reconstruction work which is not justified by the prospective patronage. The lines to which reference has just been made are located on Brockman Avenue, Fourteenth Street, Myrtle Avenue, Seventh Avenue and Houghton Avenue.

Joint Operating Agreement Reached.—An agreement has been reached between the Southern Pacific Company and the Key System Transit Company, Oakland, Cal., by which the electric trains of both companies will use joint tracks on Webster Street in Oakland, now used by the Key System. This means the abandonment of the tracks on Franklin Street and the old Franklin Street station, long an object of protest on the part of the city authorities. This station is located in the heart of Oakland's business section and its removal has been repeatedly demanded. The new terminal will be farther down town on Second Street. Several legal obstacles remain to be smoothed out before the new plan is put into operation, but the State Railroad Commission is expected to aid in hastening the change.

Line Abandoned.—The Interstate Public Service Company is taking up its Charlestown Avenue tracks in New Albany, Ind., rather than spend $25,000 for new rails in the rebuilding of the street. The company contended that financial conditions do not warrant the outlay.

Ready to Give Up Line.—The Worcester Consolidated Street Railway, Worcester, Mass., has virtually decided to abandon the Worcester to Spencer line according to Henry C. Page, general manager, who says that the line will quit just as soon as the legal steps necessary for abandonment can be taken. The competition of jitneys with the railway between the two places has hurt the earnings.

Railway Line Leased.—The Wellsburg, Bethany & Washington Railway, Wellsburg, W. Va., has been leased by the Buffalo Collieries Corporation, Scottdale and Monessen, Pa. The deal calls for the option of five years extension, a further option of purchase and a rental of $10,000 yearly, payable quarterly. Extensive repairs are to be made in accordance with the terms of the agreement under which the traction line is taken over. The leasing company is to expend $10,000 on improvements during the first year and $25,000 a year every year thereafter. The leasing corporation, known as the Buffalo Valley Railway, is a subsidiary of a large coal company, owning most of the rich coal deposits in the Buffalo Creek Section. The deal, it is believed, will eventually result in the opening of a coal field in the Buffalo Creek district near Wellsburg.

Personal Items

R. R. Lukens at Covington

Ralston R. Lukens, new superintendent of tracks and structures of the Cincinnati, Newport & Covington Railway, Covington, Ky., comes to that company with many years of practical experience with electric railways throughout the country. For the past five years Mr. Lukens was superintendent of ways and structures of the Pennsylvania-Ohio Electric Company, with headquarters at Youngstown, Ohio. Prior to that he was superintendent of maintenance of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for six years, and before that was connected with the Chicago City Railway, Chicago, Ill., for four years as assistant engineer. Mr. Lukens was born in Philadelphia. He is an engineering graduate of Lehigh University. Since leaving school he has been identified continuously with electric railway companies. As superintendent of tracks and structures of the Cincinnati, Newport, & Covington Railway, he has general supervision over properties scattered over half a dozen Northern Kentucky municipalities. Mr. Lukens succeeded W. T. Rossell, who has accepted the position of roadway engineer of the Pittsburgh Railways, Pittsburgh, Pa.

R. R. Lukens

Railway and Bus Personnel Separated

Grayson M.-P. Murphy, chairman of the executive committee of the Interborough Rapid Transit Company, New York, which operates subway and elevated lines, on Aug. 19 announced his withdrawal from the Interborough entirely and his acceptance of the chairmanship of the board of directors of the Fifth Avenue Coach Company.

Frank Hedley, president of the Interborough, resigned at the same time as a director of the coach company, as did W. Leon Pepperman, vice-president of the Interborough.

Mr. Murphy gave as the reason for his resignation the fact that he believes that the coach company and the Interborough might soon be in active competition. He held at the same time that the development of a comprehensive system of buses was essential to the solution of the present transit situation.

J. B. A. Forsburg, a member of Mr. Murphy's firm, Grayson M.-P. Murphy & Company, was elected a director of the coach company, as was John A. Ritchie, president of the Chicago Motor Coach Company, formerly president of the Fifth Avenue Coach Company.

Incidentally it should be mentioned that a proposal for the extensive operation of new bus lines in New York City was presented to the Board of Estimate on Aug. 20 by the Fifth Avenue Coach Company, now operating the Fifth Avenue buses. It provides for thirty-four new routes in three boroughs, adding 116 miles to the present system of the company. A feaure of the proposal will be provision for the recapture of the new lines by the city. The matter has been laid on the table by the Board of Estimate and probably will not be taken up for action until the meeting on Sept. 26, following the summer adjournment.

Edward Quincy Brown, superintendent of transportation of the Jacksonville Traction Company, Jacksonville, Fla., for several years, has been selected by J. P. Ingle, general manager, to fill a new position with the company synonymous with that of commercial manager in most light and power organizations. Mr. Brown's duties will all lead to the same end, that of increasing the business of the traction company by studying the needs and wants of the public and satisfying them as far as possible. His title has not been decided upon, but Mr. Brown will serve in the capacity of a "contact man" between the company and the public. In his new position Mr. Brown will handle all of the company's advertising, edit *Trollicar Topics*, hear complaints, and receive suggestions that are made in the interest of better service. He will also determine what special service the company shall give for the benefit of the public. Mr. Brown has been with the Jacksonville Traction Company since March, 1918. He is an alumnus of Georgia School of Technology. A successor to Mr. Brown as superintendent of transportation has not yet been named.

C. L. Lammers, for many years with the Broadhead companies, Jamestown, N. Y., has been appointed superintendent of the Jamestown Street Railway, Jamestown, Westfield & Northwestern Railway and the Chautauqua Traction Company in charge of traffic. He succeeds George L. Maltby, who resigned recently to enter the automobile business as referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 16, 1924.

George A. Mills, for the past six years general superintendent in charge of the Northern States Power Company property in Eau Claire, Wis., has resigned to become connected with the public service enterprises at Kewanee, Ill. These include the properties of the Consolidated Light & Power Company in Kewanee, Neponset, Sheffield and Galva, the municipal plant built by the city of Kewanee and the street and interurban properties.

Charles Mulhado has retired as president of the Gardner-Templeton Street Railway, Gardner, Mass. He plans to establish himself as an industrial engineer in Boston. Mr. Mulhado organized the company following receiver's sale of the Northern Massachusetts Street Railway on Jan. 1. Ralph Kelly has also retired as clerk and treasurer.

W. G. Strait, formerly of the Interborough Rapid Transit Company, New York, N. Y., has been promoted to the position of purchasing agent and general storekeeper of the New York Railways, New York City. Mr. Strait went to the Interborough on Dec. 1, 1903, as a stenographer in the office of J. S. Doyle, superintendent of car equipment. He was, in time, promoted to the positions of chief clerk, superintendent of economy and now he is assuming his new duties as purchasing agent and general storekeeper of the New York Railways.

S. A. Bishop, general claim agent of the Pacific Electric Railway, Los Angeles, Cal., was elected president of the Pacific Claim Agents' Association, at the convention held recently in Spokane, Wash.

C. E. Bell, who has been superintendent of the gas department of the Columbus Electric & Power Company, Columbus, Ga., and of the meter department of the lighting and power system, has been appointed to succeed to the duties relinquished by B. T. Longino as superintendent of the railway department of the company. Mr. Bell is a Kentucky man. He became connected with the local utilities at Columbus five years ago as manager of the gas department. He has already assumed his additional duties under a consolidation of the two departments as heretofore arranged.

Berryman T. Longino, for the past four and a half years superintendent of the railway department of the Columbus Electric & Power Company, Columbus, Ga., has been appointed general superintendent of the Eastern Texas Electric Company, Beaumont, Tex. Both companies are controlled by Stone & Webster. The Eastern Texas Electric Company, serves both Beaumont and Port Arthur with power and lighting service and operates an interurban service between the cities and the local railway service in them. Mr. Longino was graduated from the Georgia School of Technology in 1907. Following graduation he spent one year in the office of Stone & Webster. He was transferred to the Seattle Electric Company, Seattle, Wash., where he spent two years in the car shops and the transportation department. From 1909 to 1913 he was assistant superintendent of the Tacoma Railway & Power Company. He left the railway business to engage in banking, but in 1914 returned to the railway field with the Jacksonville Traction Company. Later he went with the Columbus Electric & Power Company.

L. R. Ross, former president of the New Brunswick Power Company, St. John, N. B., has been superannuated as terminal agent of the Canadian National Railways.

Homer Loring was elected chairman of the executive committee of the Boston & Maine Railroad on Aug. 19. Mr. Loring will assume charge of the road's finances and corporate matters at once, and by the end of the year will retire as chairman of the Massachusetts State Finance Commission. The Boston & Maine Railroad operates both the Portsmouth Electric Railway and the Concord Electric Railway. Mr. Loring is, perhaps, best know to electric railway executives as the former chairman of the trustees of the Eastern Massachusetts Street Railway. He it was who did most, perhaps, to secure the passage of the remedial legislation of 1918 under which the Bay State Street Railway was successfully reorganized.

Miss Lois M. Anderson, employed for the past year and a half in the Fowler, Ind., office of the Interstate Public Service Company, has accepted the position of assistant to the director of public relations in the company's office in Indianapolis. She will also assist Mrs. P. W. Evans in carrying out the program of the Women's Public Information Committee.

M. Graham Fulton, treasurer of the Mexico Tramways for a number of years, has resigned to accept a similar position in Brazil in connection with the companies controlled by the Brazilian Traction, Light & Power Company, Ltd. F. Wood, who has been for many years in the service of the Mexican Light & Power Company, Ltd., has been promoted to fill the position left vacant by Mr. Fulton's resignation. The headquarters of both the Brazil and Mexico companies are in Toronto, Canada.

Daniel E. Lenahan has been appointed superintendent of car equipment of the New York Railways, New York City. Mr. Lenahan began his railroad career on Dec. 22, 1902, as a foreman carcleaner with the Interborough Rapid Transit Company, New York. He was in turn promoted to assistant carhouse foreman, power house foreman, general foreman. Then he went to the New York Railways as assistant general foreman and superintendent of the electric department. He returned to the Interborough as superintendent of inspections, and has now been promoted to superintendent of car equipment of the New York Railways.

A. R. Frahm has been appointed general superintendent of the local properties of the Northern States Power Company at Eau Claire, Wis., to succeed George A. Mills. These properties include more than 30 miles of electric railway. Mr. Frahm was formerly engaged in utility work at Grand Forks, N. D.

Obituary

Daniel Anderson Tomlinson

Daniel Anderson Tomlinson, manager of the railways bureau of the Portland Cement Association, Chicago, died on Aug. 7 while playing tennis at Evanston, Ill. Mr. Tomlinson joined the staff of the Portland Cement Association in 1920. Two years later he was promoted to the position he held when he died.

Mr. Tomlinson was born in Detroit in 1890. After a year at Lake Forest College he went to Massachusetts Institute of Technology, from which he was graduated in 1912. Later he took a special course at Armour Institute. For five years thereafter he was with the Chicago & Western Indiana Railroad as assistant engineer engaged in track elevation work, yard construction, valuation and studies on terminal facilities. He served in the Illinois National Guard on the Mexican Border and during the World War he was adjutant to the constructing quartermaster at Camp Grant, instructor at the officers' training camp there and at the coast artillery school at Fort Monroe,Va. He was discharged in 1919 as a captain of Coast Artillery.

For a few months he was manager of the Central Zone, professional and special section of the U. S. Employment Service, helping engineers get back into civilian work. Then for a year he served as assistant secretary of the American Association of Engineers, in charge of railroad and employment work.

Richard Eick, purchasing agent for the Arkansas Central Power Company, the successor of the Little Rock Railway & Electric Company, Little Rock, Ark., died on Aug. 11, after a long illness. Mr. Eick has spent all his life since manhood in the service of public utilities. He was born on Nov. 2, 1873, at Califou, N. J., and entered railroad work with the Public Service Railway at Newark, N. J. in 1897. A year later he was promoted to be superintendent of the Elizabeth division. He resigned in 1904 to accept a position as superintendent of transportation with the United Railways, San Francisco, Cal. In 1906 he resigned to accept a position with the Little Rock Railway & Electric Company. In 1917 he was promoted to the position of purchasing agent. Mr. Eick is survived by his wife and six daughters.

James B. Peck, for many years attorney for the Kansas City Railways, died at his home in Kansas City on Aug. 12. Mr. Peck went to Kansas City from Kentucky twenty-four years ago. He enrolled in the Kansas City School of Law and after graduation remained there to practice law. He was fifty-one years old.

Thomas Wood, pioneer electric railway builder, died recently at his home in Sandusky. He had charge of the construction of the line from Sandusky to Lorain which was formerly called the Sandusky & Interurban and which is now a part of the Lake Shore Electric System.'

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Bus Heaters in Demand

Orders received by the N. A. Petry Company of Philadelphia for Petry heating valves to be installed on buses have been in such large volume that the company is now considering enlarging its manufacturing force in order to supply the demand. Among the users of this heating device are the Yellow Coach Manufacturing Company, the International Motor Company, the Fifth Avenue Coach Company, the Garford Motor Truck Company and the General Motors Truck Company.

Honors Long-Service Employees

The Taylor-Wharton Iron & Steel Company recently held a celebration in honor of its employees longest in the service. The company has at its plant in High Bridge, N. J., 221 employees who have been in service more than fifteen years; ninety-nine who have served a quarter of a century or more, thirty who have been there thirty-five years; thirteen with more than forty-five years service and eleven with more than fifty years service. Testimonials were presented to these men in recognition of their work.

Demand for Southern Yellow Pine on Increase

Many of the woods formerly used for poles are becoming scarce. The longer lengths are not only difficult to obtain but they are expensive. As it takes from 50 to 150 years to grow a pole-sized tree of these varieties compared with only 30 to 50 years to grow a southern yellow pine tree of suitable size, it is natural that the latter should gain in popularity. This wood is not only readily available, but it has physical properties which fit it well for use in poles.

Data concerning the strength of pine poles, correct methods of applying preservative treatment, and specifications describing desirable physical properties in a pole are given in a booklet recently published by the International Creosoting & Construction Company, Galveston, Texas. This 32-page booklet is attractive in form. It contains many illustrations, and much information of value to pole users. Charts are included which show a steadily increasing number of poles chemically treated. A supply of poles of standard sizes is carried on hand at all times by this company.

Metal, Coal and Material Prices

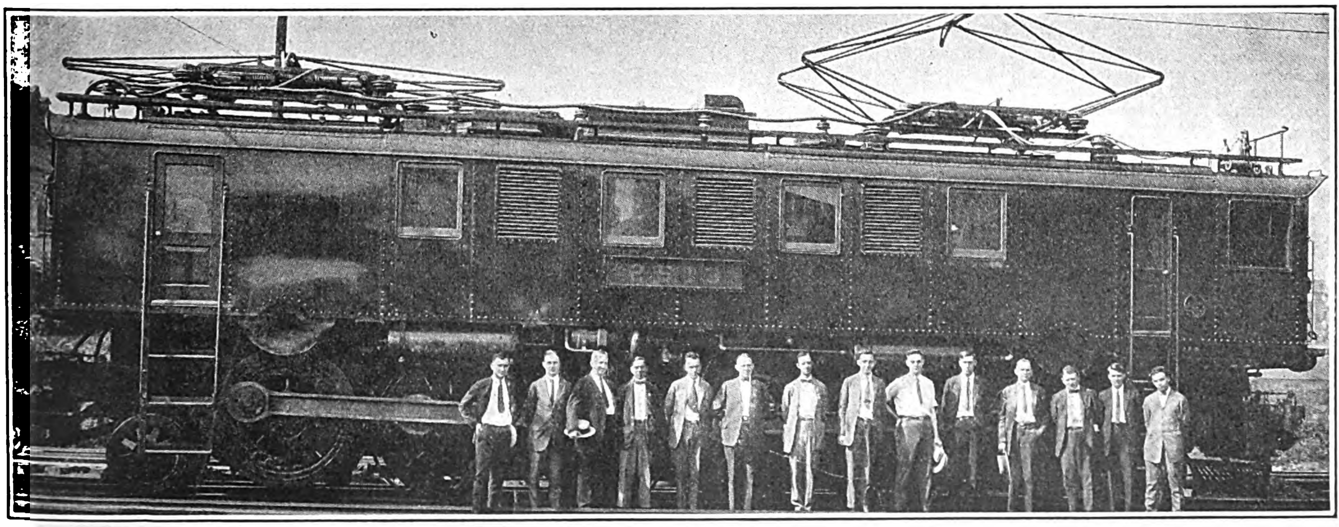
Metals—New York	Aug. 19, 1924
Copper, electrolytic, cents per lb.	13.562
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	8.05
Zinc, cents per lb.	6.60
Tin, Straits, cents per lb.	52.625
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.15
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.85
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.55
Weatherproof wire base, N.Y., cents per lb.	18.50
Cement, Chicago, net prices, without bags	2.20
Linseed oil (5-lb. lots), N.Y., per gal.	$1.07
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	10.12
Turpentine (bbl. lots), N. Y., per gal.	$0.91

Rolling Stock

Municipal Railway of St. Petersburg, St. Petersburg, Fla., has announced specifications for seven Birney cars and eight double-truck one-man safety cars recently ordered from the J. G. Brill Company. An interesting feature of these cars is that all the woodwork below the top sash will be treated by the G. W. Saums wood preservative process. The specifications for the double-truck cars follow:

Date order was placed	July 14, 1924
Date of delivery	Nov. 15, 1924
Builder of car body	J. G. Brill
Type of car	Double truck safety
Seating capacity	48
Weight:	
Car body	12,780 lb.
Trucks	9,760 lb.
Equipment	6,900 lb.
Total	29,440 lb.
Bolster centers, length	18 ft.
Length over all	40 ft. 1 in.
Truck wheelbase	5 ft. 1½ in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	11 ft.
Body	Semi-steel
Interior trim	Mahogany
Roof	Arch
Air brakes	Three cars Westinghouse Four " G. E. Co.
Armature bearings	Sleeve
Axles	4-in. A.S.T.M. Spec. A-20-21
Bumpers	Brill reinforced channel
Car signal system	Faraday
Car trimmings	Bronze
Center and side bearings	Brill standard
Conduits	Sheraduct
Control	K-35
Couplers	Plain bar
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism,	National Pneumatic
Fare boxes	Johnson
Fenders	H. B. Lifeguard
Gears and pinions:	Three cars Westinghouse helical Four " G. E. spur
Hand brakes	Brill
Heater Equipment	None
Headlights	Golden Glow
Journal bearings	Bronze babbitted
Journal boxes	Brill standard
Lightning arresters:	Three cars Westinghouse K-3 Four " G. E. M. D.
Motors	Three cars Westinghouse 506 Four " G. E. 264
Motors	Inside hung
Paint	St. Petersburg grey

Educators Studying Electrical Industry at First Hand



The Westinghouse Electric & Manufacturing Company has just completed its fourteenth annual summer course for professors of electrical engineering. The group is here shown standing beside one of the new electric locomotives being built at East Pittsburgh, Pa., for the Norfolk & Western Railroad. This course is planned with a view to securing closer contact between teaching of electricity in schools and colleges, and the working of the electrical industry.

Sash fixtures	Brill Renitent
Seats	Brill Waylo
Seating material	Rattan
Slack adjuster	Gould
Springs	Half-elliptic and coil
Step treads	Feralun
Trolley catchers	Earl
Trolley base	Simplex No. 3
Trolley wheels	Ideal 4 in.
Trucks	Brill 77 E-1
Ventilators	Brill exhaust
Wheels	26-in. cast iron

Special devices:

Fish pole carriers on side of car; rotary gongs, trombone 13-in. whistle.

The single-truck cars will weigh only 16,000 lb. and will have an over-all length of 28 ft. ½ in.; the width over all will be 7 ft. 10⅝ in. and the height, from rail to trolley base, will be 10 ft. 9 in.

Worcester Consolidated Street Railway, Worcester Mass., is transforming its entire equipment into one-man cars. The work is being done in the company's own shops at something less than $100 for each car. The company has 287 cars and the number that can be operated as one-man cars is now 167. General Manager Page has stated that the cars will not necessarily be operated as one-man cars, but that they can be if that type of operation becomes desirable or necessary.

Union Traction Company of Indiana, Anderson, Ind., has announced specifications on the 15 new steel combination passenger and baggage cars referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 16. These cars are to be arranged for single end operation and will be equipped with stationary seats. The control equipment will be Westinghouse HL so that the units may be operated in trains if desired. Detailed specifications follow:

Date order was placed	July 28, 1924
Date of delivery	February, 1925
Builder of car body	St. Louis Car Company
Type of car	Passenger-baggage
Seating capacity	54
Weight:	
Car body	49,000 lb.
Trucks	24,000 lb.
Equipment	17,000 lb.
Total	90,000 lb.
Bolster centers, length	38 ft. 6 in.
Length over all	61 ft. 0 in.
Truck wheelbase	7 ft. 0 in.
Width over all	9 ft. 1 in.
Height, rail to trolley base	12 ft. 11 in.
Body	Steel
Interior trim	Mahogany
Headlining	Steel
Roof, arch	Steel, wood and canvas
Air brakes	Westinghouse
Armature bearings	Plain
Axles	Union Traction standard
Bumpers	12 in.
Car trimmings	Union Traction standard
Center and side bearings:	Standard Motor Truck Company
Control	Westinghouse HL
Couplers	Radial
Curtain material	Pantasote
Destination signs:	Union Traction standard
Fenders	Union Traction standard
Gears and pinions	Westinghouse helical
Hand brakes	St. Louis Car Company
Heater equipment	Hot water
Headlights	Golden Glow
Journal bearings	Plain 5 in. x 9 in.
Journal boxes	5 in. x 9 in.
Motors	Four Westinghouse 333 VVD, Inside hung
Seats	Stationary
Seating material	Plush and leather
Springs	Standard Motor Truck Company elliptic and coil
Step treads	Kass safety
Trolley retrievers	Ohio Brass
Trolley base	Westinghouse
Trucks	Standard Motor Truck Company
Ventilators	Utility
Wheels	Rolled steel Union Traction
Power saving device	Economy Meters

Chicago Rapid Transit Company, Chicago, Ill., has sent out inquiries for bids on the construction of 100 new steel elevated cars which are to be similar in construction to the last group of 100 cars recently put in service. Bids are due Sept. 10.

Track and Line

Toronto, Can.—At a special meeting of the Toronto Transportation Commission on Aug. 14 the agreement was executed between it and York Township for the construction and operation of car lines in the township by the Commission. The streets in the township which figure in the agreement are Oakwood Avenue, Eglinton Avenue, Rogers Road, and that section of Dundas Street between Runnymede Road and Lambton. Tenders for the construction work in connection with the agreement will be received by Aug. 25. Lines will be placed on Oakwood Avenue between St. Clair and Eglinton Avenues, a distance of 1¼ miles.

Warren Street Railway, Warren, Pa., now a part of the Penn Public Service Company, has placed an order with the Lorain Steel Company of several special pieces of track work which include switches, frogs, curves and branchoffs. Since the operation of the railway by the Penn Public Service, thousands of dollars have been spent in rehabilitating tracks, roadbed and rolling stock. In the last four months more than 8,000 cross ties have been replaced which, alone, cost in the neighborhood of $12,000.

New Brunswick Power Company, St. John, N. B., will relay 2 miles more of tracks before winter. Recently, the company relaid a half mile of track on what is known as the Fairville line. Orders have been placed for 80-lb. rail. It is estimated that the work will cost approximately $50,000. The new rails will be laid on the western side of St. John harbor.

Alabama Power Company, Montgomery, Ala., will complete a new paving project in Cloverdale about Sept 1. The work began some weeks ago and is of high grade concrete.

South Jacksonville Municipal Railway, South Jacksonville, Fla., has reported progress on the Fletcher Park extention. The rails will be laid on the parkway alongside Atlantic Boulevard.

Spokane United Railways, Spokane, Wash., is rebuilding the tracks on Thirteenth Avenue between Wall and Stevens Streets and for one block on Stevens. The job includes 885 ft. of rebuilding work. This will include the installation of 7-in., 70-lb. T-rail and 7-in., 108-lb. grooved girder rail on the three curves in this area and the installation of new 4½-in., 60-lb. T-rail straight track. This job was started July 7 and will soon be ready for paving.

New Incorporation

Seabrook Electric Railway, Houston, Tex., has been incorporated with a capital stock of $1,000,000 to construct an interurban line between Houston and Seabrook, via Harrisburg, Pasadena, San Jacinto Battle Park, Morgan's Point, along the south side of the Houston Ship Channel, thence along bay shore via Bay Ridge, La Porte and Red Bluff. The headquarters of the company are to be in Houston. The directors are John H. Kirby, J. M. West, W. C. Munn, Joseph Rice, John S. Bonner, J. A. Cottingham, John H. Thompson and Jacob F. Wolters, Houston, and D. C. Giddings, Brenham.

Power Houses, Shops and Buildings

Milwaukee Northern Railway, Sheboygan, Wis., has completed negotiations with the Wisconsin Power & Light Company for the joint use of the new $75,000 terminal in Sheboygan. As a future development to supplement its passenger station business, plans are under consideration to build a freight depot when this part of the business is sufficiently developed.

Los Angeles Railway, Los Angeles, Cal., has called for bids for an addition to the bus and automobile storage facilities. The entire ground floor space will be devoted to storage of motor vehicles. The building will be of brick construction throughout.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, is building a $15,000 addition to its plant in Findlay to provide for increased power business.

New Advertising Literature

Electric Railway Improvement Company, Cleveland, Ohio, has just issued a new descriptive circular picturing the full line of its well known "Erico" electric weld, brazed type, rail bonds. In addition to illustrations and data on the use of the various types of brazed bonds, many tables are given showing practically every dimension of each bond size.

Electric Railway Equipment Company, Cincinnati, Ohio, is distributing a folder whch shows in a convincing manner the improvement which has been effected in the appearance of the streets of Montgomery, Ala., by the instalaltion of "Elreco" poles. Twelve pictures are used, six taken before the change was made and six taken at the same points afterward. The installation in Montgomery was made during the early part of the present year and the inauguration of the new system of street lights on April 4 was the occasion of impressive ceremonies.

Electrical Alloy Company, Morristown, N. J., has issued a pamphlet describing its welding rods, wires and strips. Information is given in regard to the characteristics of nickelchrome wire and the advantages of using this in certain work.

New York, August 30, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 9

Modernization Features the Convention Program

MODERNIZATION, which has been the principal topic of discussion of the American Electric Railway Association throughout the present year, is given a prominent place in the program for the Atlantic City Convention, published in this week's issue. Such subjects as "Finance" and "Co-ordination," to which the first two sessions are devoted, are of great importance to all railway executives.

The outstanding feature of the American Association program, however, is the Friday morning session devoted to the topic of "Management." At this session will be presented the result of the extended investigations carried on by the committees on city operation and interurban operation, which have done much to disseminate information as to how modernization may be effected, and to instill in managements the need for and the good results of such modernization.

Then, too, there will be a report from the special committee on foreign operation, which is returning this week from abroad after a six weeks' study of practices which represent the best efforts of European operators. This report is looked forward to with great interest. The members of the committee are thoroughly familiar with the problem and undoubtedly will be able to give railway men many new thoughts that are applicable to American conditions.

The programs of the affiliated associations likewise show that the same care has been given to obtain features that will not only interest but will be of real value to those who attend the sessions.

The reports of the various committees, which take the major part of the time, deal with live subjects and in themselves indicate the progress being made in the industry. In addition, the individual papers cover a wide range of subjects that deal with the leading problems of the day.

Another innovation in the program is that Wednesday has been set aside entirely for the inspection of exhibits. It has long been felt that more time should be allotted for this purpose. This year, with far more space taken by exhibitors than ever before, and exhibits of new things not only by manufacturers who have exhibited before but by those new to the delegates, the need for this opportunity is even more apparent. How well it will work out depends largely on how conscientious the delegates are in their inspection. They can well afford to devote the entire day to the purpose.

With so much of interest to all classes of railway men, arrangements should be made by member companies and others so that as many individuals as possible can attend, and a wide range of departments can be represented. For while a verbal report from someone else who was there will give the stay-at-home some general idea of the convention, it is only by actual attendance that the full measure of enthusiasm can be obtained and the greatest impetus be given to the modernization program.

Reciprocity with Europe on Street Railway Practice

THE various reports on electric railway practice, presented at the international electric railway convention at Paris in June, and abstracted in recent issues of this paper, show that there is much that we can learn from Europe and, incidentally, considerable which Europe can learn from us.

In the first place, it is obvious that in car design and equipment there is much more going on in America than in Europe. This may be due in part to the broader and straighter streets in this country and consequently the greater latitude permitted in width and length of cars. But whatever the reason, Mr. Ricaud's report on car design, published this week, is based almost entirely on examples of recent American practice. Again, in track construction, including special trackwork, it is probable that our engineers have been able to do more in the way of standardization than has yet been possible abroad.

But while America may claim general pre-eminence in equipment, there is no doubt that such reports as those of Mr. Bacqueyrisse on the psychotechnical selection of car and bus operators and of Mr. Delavenne on the relation between transport and urban development represent studies which at least in the direction in which they have gone have progressed farther than anything yet here. In this country, undoubtedly much has been accomplished during the last decade in applying the principles of psychology to the selection of men for responsible positions, and the practice received great impetus during the war because of its use by the Army authorities in the selection of officers. There seem to be, however, two schools for thought in this direction; one, the use largely of written and oral tests, or the American system, and the other, the use of mechanism, or the Continental system. It was with the thought that companies in this country can derive some help from the Continental plan that so much space was given in the last issue of this paper to the report by Mr. Bacqueyrisse.

In the same way the report by Mr. Delavenne on the connection between the development of transportation systems in cities and the densities of their populations offers food for reflection in showing how astonishingly little has been the power of faster transport to diffuse metropolitan population, yet how close is the relation between city planning and the scientific development of a city's transportation system. Of course recognition of this relationship has formed the basis of the later franchises granted in the largest cities of this country, like New York, Chicago and Boston, where new lines are laid out according to a definite plan by a commission acting for the city. But this comparatively modern development applies to only a few cities except so far as the responsibility for such systematic development has been assumed by public service commissions. The tie between town planning and railway development in the future is bound to be much closer than in the past, and it is particularly interesting to note Mr. Delavenne's recommendation, as a municipal representative of the Paris plan of public ownership and private management, that this combination forms the best way of combining efficiency and true social progress.

"There Are No Secrets About This Business"

A PROMINENT electric railway executive said recently that the time is past for discussing the need for utility publicity; that a railway executive who hadn't yet been sold on that idea, is a drag on the industry and deserves to lose his job. Inasmuch as everyone should agree with him, the need for publicity is not a subject for discussion.

But the way to make publicity copy effective is another matter. In the mind of the average man on the street, there is still present, in varying degree to be sure, the general impression that there is something mysterious about this railway business—that any company which carries thousands and frequently millions of people on its cars, must be making enormous profits in some way. In spite of former country-wide receiverships, and in spite of increasing prices in other commodities while street railway fares remained constant for several years, this idea still seems to cling in the minds of a great many people.

In a business so closely regulated as the electric railway industry prosperity means the ability to earn operating costs and a reasonable return on a limited investment. Should a surplus above this amount appear, steps would be taken at once to reduce fares, impose new service standards, or otherwise limit the possible return to the owners. "Profits" as such are virtually unknown in electric railway operation. The only kind of advertising copy which will overcome false impressions and present this true picture is the kind that publishes facts—facts about the business—operating and financial statistics and any other matters which will give the average man an insight into what might be considered the secrets of the business.

Now, to collect the facts is one thing, and is a big job. But to get the public to read them and to become interested in them is a still more difficult matter. The facts must be made interesting, they must appeal to the imagination. The average man is primarily interested in the kind of service he is getting, and cares little how the result is accomplished. Nor is he interested in the problems with which the railway management contends. But the right kind of advertising will attract his attention. In Pittsburgh, for instance, the right kind of advertising awakened public interest to a point where it won the recent strike—and it was "facts advertising."

"There are no secrets about this business" represents a thought that can be effectively applied in making utility "facts advertising" of interest to the public and of value to the railway.

Giving as Much Information as Possible on Route Signs

IN THE laudable efforts to merchandise transportation being made by many companies, it is natural that greater attention is being paid to the display of route signs on cars. The feature in which the regular passenger is particularly interested is that the route sign can be identified at a distance. The less frequent patron and the stranger want the sign to give detailed information about the route traversed. To supply this twofold want many cars display conspicuous route numbers or letters in addition to the usual lettered signs. Such route numbers fulfill well the requirements of the regular rider, and they are useful to the stranger because he can easily learn by inquiry the number of the route to take to reach any particular destination.

Experience shows that the value of the route number sign can be increased if a list is published giving the routes indicated by the various numbers or letters and showing also what lines reach points of interest or other common objectives.

The fact that a number or letter is used for a route sign does not exhaust the capabilities of this kind of sign. A variation possible is to designate by the sign in some special way all routes which reach or pass the destination of a great many passengers. Thus, in Denver, all routes passing City Park have route numbers ending in a zero, like 20, 30, 50, while all routes passing Union Station have route signs of white numbers on a red background. Still another variation is to indicate short route cars by a red band across the route numeral, as in Philadelphia and Paris.

In horse-car days, when there were several railway companies in every large city, each company painted its cars a distinctive color, so they could be recognized a long distance away. Where there is only one company in a city, its cars are apt to be painted alike, and the route signs become the only distinguishing mark. It should not be written of the present generation that when they sought of the railway company a sign, no sign was given them. A safe rule is that it is better to over-sign rather than under-sign a car. Although many railways exercise commendable care in this respect, a few continue to be negligent. It would be worth their while to give the subject of route signs more attention.

Every Dead Body Deserves a Decent Burial

ALONGSIDE of the main line of one of the most heavily traveled railroads in this country lies the junk yard of an electric traction company. Old cars, no longer able to perform useful service, are allowed to stand there and rot away. The paint is gone from the outside of the car bodies, the glass is gone from the windows, the platforms sag and the window posts sway back and forth in the wind. A more complete picture of dejection could not exist. Yet this is the sight which is presented every day to thousands and thousands of travelers on this busy section of the steam railroad. It is largely by this picture that they remember the electric railway in that city. To a certain extent it cannot fail to affect the impression they have of electric railways in general. There is no necessity for flaunting a cheerless spectacle like this before the public. When an old car has done its duty it should be retired from service, all useful material removed, and the remaining shell entirely destroyed.

Modern Inspection Facilities for the Interborough System

Second Article

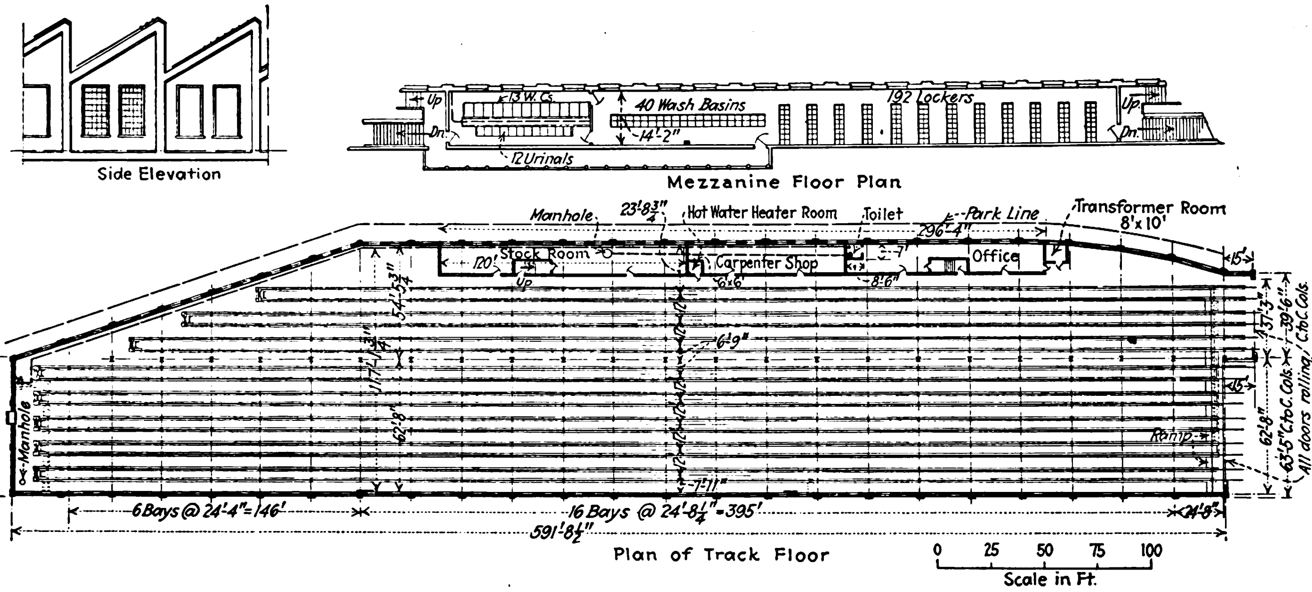
The City of New York Is Building Six Storage Yards and Inspection Buildings to Provide for 2,266 Cars of the Interborough Rapid Transit System—These Will Provide for the Full Capacity of Present Lines of the Subway Division—The Two Completed Are Described

TWO modern inspection buildings have recently been completed and placed in service by the subway division of the Interborough Rapid Transit Company, New York City. These buildings, which embody the latest practices for facilitating inspection of rapid transit cars, along with the adjoining storage yards, are part of a plan under which the city of New York, under the direction of the Transit Commission, is adding to the inspection and storage facilities of the Interborough. Altogether there are six projects of this sort, including the two which have just been finished. Under the contract between the company and the city, the latter is responsible for supplying to the company all necessary facilities of this kind.

The capacity of the new inspection facilities is intended to be adequate not only for the present rolling stock, but also for such increases as are anticipated within the early future. The locations of these inspection buildings are at the ends of the lines and adjoin the storage yards so as to reduce dead car mileage to a minimum. In all the work of design the engineers of the railway company naturally worked closely with those of the commission, so that the finished shops represent the ideas of both.

The work contracted for under the Transit Commission includes only the shell of the building, with whatever conduits, steam piping and plumbing are necessary as permanent features of the construction. The operating company supplies the conduits and wires for lighting and power, lighting fixtures, cranes, testing apparatus, storeroom bins and other similar equipment which is not considered a part of the actual building. The trackwork within the building, however, is classified along with that outside and it is installed by the city.

The locations of the six inspection buildings and yards were shown on a map published on page 238 of the issue of this paper for Aug. 16, 1924, of the six inspection sheds. The two which are completed are those at 180th Street, the Bronx Park terminus of the Lexington Avenue line, and at Livonia Avenue in Brooklyn, at the end of the Eastern Parkway line. There is a storage yard accompanying each of these shops. The other four projects are at the end of the Jerome Avenue line, 239th Street at the end of the White Plains Road line, Westchester at the end of the Pelham line, and Corona at the end of the Flushing extension of the Corona line in Queens. The total storage capacity for all six of these yards and buildings, including the space over the inspection pits, is 2,266 cars, divided as shown in the following table:


Side Elevation
Up
13 W.C.
40 Wash Basins
192 Lockers
Up
Dn.
14'-2"
12 Urinals
Dn.
Mezzanine Floor Plan
Manhole
23'-8¾"
Hot Water Heater Room
Toilet
Park Line
Transformer Room 8'x10'
296'-4"
120'
Stock Room
Up
Carpenter Shop
6'-6"
8'-6"
Office
15'
54'-5¾"
117'-4¾"
62'-8"
6'-9"
64'-3"
Manhole
7'-11"
Ramp
37'-3"
39'-6"
62'-8"
63'-5" C. to C. Cols.
All doors rolling type
C. to C. Cols.
6 Bays @ 24'-4" = 146'
16 Bays @ 24'-8¼" = 395'
24'-8"
591'-8¼"
Plan of Track Floor
0 25 50 75 100
Scale in Ft.

The 180th Street Building Has Eight Tracks Each Accommodating a Ten-Car Train

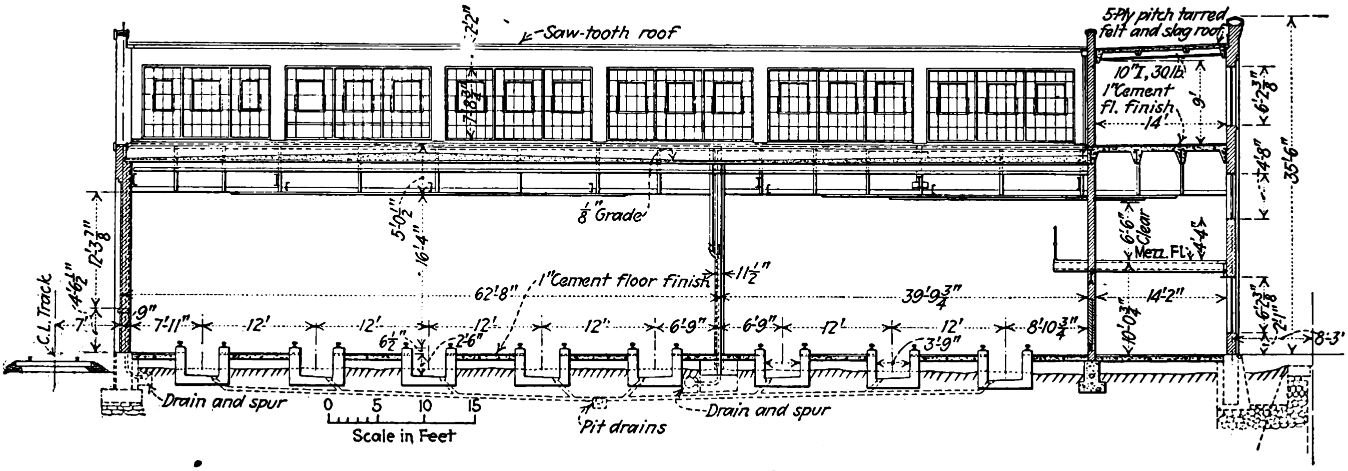
CAPACITY OF INSPECTION BUILDINGS AND YARDS, INTERBOROUGH RAPID TRANSIT COMPANY

Location	Total Storage Capacity, Cars In Yard	 In Inspection Pit	Probable Completion Date
180th Street	26[illegible]	80	Completed
Livonia Avenue	31[illegible]	40	Completed
Jerome Avenue	300	40	December, 1924
239th Street	546	80	December, 1925
Westchester	363	45	July 1926
Corona Avenue	165	40	December, 1926
	1,941	325	

The subway division of the Interborough at present comprises 222 miles of single track, and there are accommodations for storing approximately 2,000 cars in temporary sheds and on third track. On account of the operating demands the company has constantly been increasing the number of its cars, and this means that there should be corresponding increase in adequate storage space and inspection facilities. It is estimated that with 222 miles of track the maximum number of cars that can be operated is 3,000. Including the existing storage yard, the contemplated plans will only suffice to provide facilities until this number is reached.

THE PROJECT WILL COST $10,000,000

In the entire plan for shop and storage facilities for the Interborough Rapid Transit Railway approximately $10,000,000 is being spent, which averages a little more than $4,000 per car. This figure does not include the $5,000,000 required for the general overhaul and repair shops nearly completed at 148th Street on the Lenox Avenue branch of the Seventh Avenue line and which were described in ELECTRIC RAILWAY JOURNAL May 3, 1924, page 688.



Typical Cross-Section Through Pits Showing the Pits Under Each Track and the Saw-Tooth Roof Construction

Each of the inspection projects has its individual characteristics, on account of the varying physical layout and the number of cars to be handled, but the cost of the 180th Street development, which amounted to approximately $2,540 per car, including those in the yard and over pits, is considered most representative. This entire project, costing some $965,000, may be subdivided as follows:

Real estate for the inspection buildings	$160,000
Building, including pit construction	415,000
Trackwork, including that in yard and building	180,000
Real estate for storage yard	210,000
Total	$965,000

These figures do not include the cost of engineering, superintendence during construction, or interest on the investment during the construction period. The real estate was obtained by the city some years ago through condemnation proceedings, and when the value of property in the vicinity was somewhat lower than at present. The total construction cost is, therefore, somewhat less than the cost would be to duplicate the project today, although the building was only recently finished.

The conditions existing at the Livonia project, the other one which is completed, resulted in a considerably higher total cost, as follows:

Real estate	$160,000
Trackwork	225,000
Building, including foundation and special steelwork floor, with steel elevated structure for lead-in track	1,225,000
Total	$1,610,000

Including 310 cars in the yard and 40 over the pits, this cost averages $4,600 per car.

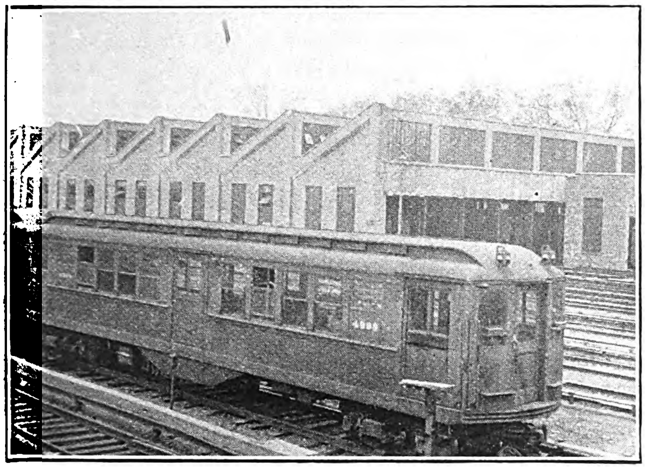
CONSTRUCTION OF THE 180TH STREET SHOP

The inspection building at 180th Street is typical, both as to cost and general appearance, of those contemplated for the four other locations. The building is classed as semi-fireproof, being constructed without wood, but not having the steel work encased in concrete. The building is one story in height without a basement, and is 592 ft. long by 120 ft. wide. Inspection tracks with pits, extending the full length of the building, provide accommodations for 80 cars.

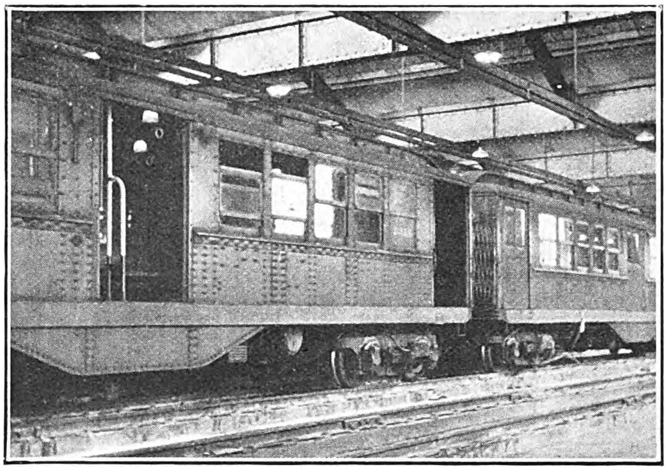
The foundation was placed on earth or piling where rock was not readily accessible. The walls are of concrete. About 50 per cent of the wall area, however, is taken up with windows having steel sash and wire glass. Due to the low roof, which has a clearance of only 4 ft. above the roofs of the cars, these windows are not depended on for lighting the entire floor area. The reinforced concrete roof has saw-teeth extending across the entire width of the building, although the steel trusses which support it do not run entirely across, but are supported at one end on a row of columns set up between two of the tracks. Pre-cast concrete slabs with wire mesh reinforcement cover the sloping sides of the roof, with a finish of roofing tile laid over roofing paper. The vertical faces of the saw-teeth are fitted with steel sash glazed with clear glass, the sections being arranged to swing open. Owing to the necessity of being economical of room because of the high value of real estate the clear spacing of the tracks is only 12 ft. between centers.

The stock room, carpenter shop, transformer room and office are located on the main floor along one wall of the building, while above these on the mezzanine floor are located the washroom, locker room and toilets, and a recreation room for the men has been provided on the second floor above the mezzanine, as these buildings are located in outlying districts of the city.

Each of the eight tracks in the building has a pit extending the entire length. These pits are 3 ft. deep below the base of the rail, and are 3 ft. 9 in. wide. The pit floors slope transversely for drainage. In each pit side wall are recesses for electric lamps and re-



A Portion of the 180th Street Inspection Building of the Interborough Rapid Transit Company, Showing Roof Construction



Interior of the 180th Street Building. The Tracks Are Raised About 1 Ft. Above the Floor to Facilitate the Inspection of Brakes and Journals

ceptacles for attaching extension cords. As the pits are not open on the sides, no attempt has been made to provide storage for parts and tools on the pit floor.

The floor and pits are constructed of reinforced concrete. The pit walls are flush with the floor and longitudinal stringers 6½ in. high are placed on top of them on which the track rails are laid. This makes a depression of the floor about 12 in. below the rail, but ramps are provided at each end of the building to bring the floor surface up level with the rail head. This arrangement was adopted to facilitate the work of the men who handle the lubrication of journals and side bearings.

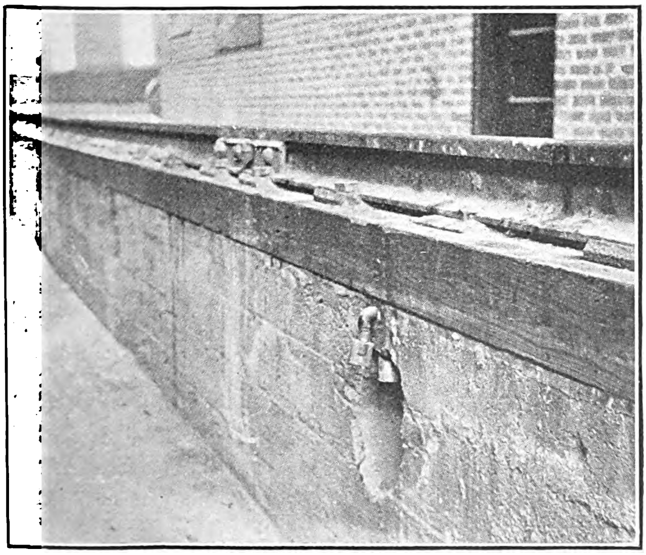
Entrance to the building is made at one end, eight tracks branching off from a ladder outside the structure. In the building at 180th Street a separate rolling steel door is provided for each track, 16 ft. high and 12 ft. wide.

Low-pressure steam for heating is supplied from a boiler located adjacent to the main building. In this room are coal storage facilities and a small repair shop for maintenance of the steam heating equipment. Radiators are placed along the side end walls of the main shop, and additional steam coils are suspended from the roof trusses. These provide a sufficiently high temperature so that the men may work in the shop during the winter time without requiring extra clothing.

General interior illumination is furnished by rows of fixtures placed approximately 25 ft. apart, with the fixtures in each row spaced 12 ft. apart so as to be directly over the aisles between tracks, thus making nine fixtures in each row. Every second row contains single fixtures, each holding a 200-watt, 125-volt lamp, supplied from the 125-volt a.c. service. The fixtures in the other rows each contain five 40-watt lamps, operated from the 600-volt d.c. railway power circuit. Each fixture has a dome type reflector to throw the light down to cover the floor with as little overlapping as possible. The alternating-current circuit may be supplied either from the Interborough's line or the New York Edison Company's service, both of which operate on 33,000 volts. With these three sources of light it is considered improbable that the building will at any time be in complete darkness.

LIVONIA INSPECTION BUILDING

A different construction was adopted at the Livonia inspection building, as the entire yard and structure were placed on a heavy fill. Although the yard tracks were very conveniently supported directly on the fill, it was considered inadvisable to place the building on such an unstable foundation as was offered by the filled ground. The building was, therefore, mounted on steel



One of the Pits at 180th Street, Showing Lamp Pocket and Track Construction

The Storeroom Has a Complete Stock, but by Carrying Small Quantities Its Size Is Reduced columns, with the main floor supported on steel girders to bring it level with the yard. In the space beneath are located the boiler room, coal bins and other storage space. The floor girders support the track rails, these in turn being supported by steel columns. The base is of reinforced concrete. The main inspection floor between the pits is of reinforced concrete, with the top 6½ in. below the base of the rail.

At Livonia Avenue the doors are hand operated and of the jack-knife type. They are hinged horizontally in two sections and when opened fold up against the roof.

Speeding Up Service in Memphis

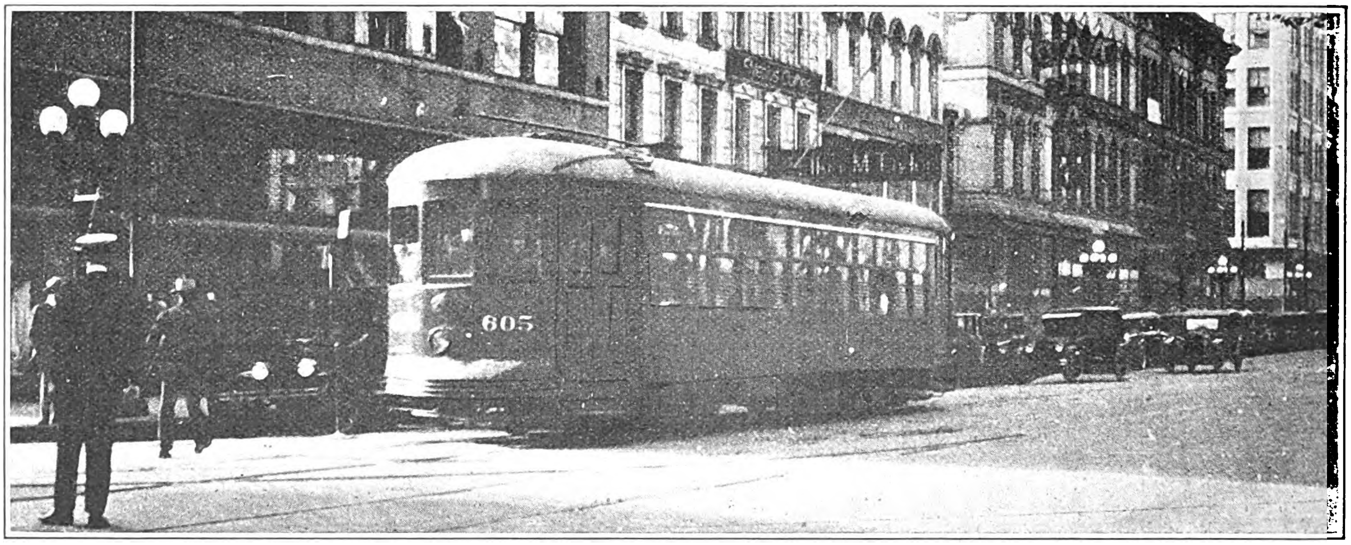
Rerouting, Revision of Time-Tables, New Rolling Stock and Scientific Analysis of Operating Statistics Have Increased Speed 5 per Cent in Four Years

NEW cars and revised schedules have enabled the Memphis Street Railway, Memphis, Tenn., to make important improvements in the schedule speed of operation. This subject has been in the forefront of the minds of the company officials for many years, and unremitting efforts have been made in that direction. Since 1907, the average schedule speed of cars has been increased about 12½ per cent. Of this increase 5 per cent has been within the last four years.

A system of skip stops was installed in 1918, resulting in an increase of system average speed from 9.20 m.p.h. in 1917 to 9.56 m.p.h. in 1921. Since that time many of the stops which were removed have been restored, but there are enough still skipped to be an important factor in rapid operation.

Rerouting of cars in the center of city in 1920 took approximately half the cars which formerly operated on Main Street off that thoroughfare and put them on Third Street. This resulted in an increase of the schedule speed from 9.56 m.p.h. in 1919, as already mentioned, to 9.85 m.p.h. in 1921.

Schedules were revised and the amount of time spent in layovers was reduced, bringing the system average schedule speed up to 10.09 m.p.h. in 1922. The following year, however, a large amount of track construction was carried out and the speed fell off slightly.



Type of New Car Which Has Helped to Speed Up Service

SYSTEM AVERAGE SCHEDULE SPEED BY YEARS IN MEMPHIS, TENN.

Year	Miles per Hour	Year	Miles per Hour
1907	8.75	1916	9.41
1908	8.38	1917	9.20
1909	8.17	1918	9.26
1910	8.07	1919	9.56
1911	8.42	1920	9.53
1912	8.38	1921	9.85
1913	8.56	1922	10.09
1914	8.73	1923	9.99
1915	9.42		

In the early part of the present year the company placed in service forty new cars, of the type shown in the accompanying illustration. These replaced a larger number of the old single-track, hand-brake cars, and have made possible an increase in the schedule speed. For the first three months of 1924 the average was 10 m.p.h., while for the month of March it was 10.03 m.p.h.

A factor which has been helpful in maintaining a high speed of operation is the good co-operation which has been received from the local police force. On the other hand the railway operates forty-two trailer trains during the rush hours and all day on Saturdays and Mondays. These, as might be expected, have tended to slow down the operation.

As a check on the efficiency of operation, the transportation department keeps a daily record of the number of turnbacks on the entire system. These are plotted day by day on a chart, showing also the number for the corresponding days of the previous month. In December, 1923, the turnbacks averaged 47.8 per day. For January, 1924, the average was reduced to 30. In February it was 23 and in March only 12.3. The company considers that the number of turnbacks per day gives an accurate indication of the quality of service for that day. The reduction which has been effected in the average number from 47.8 in December to only 12 in March shows that the efforts of the transportation department to improve the service have been successful.

The Department of Street Railways, city of Detroit, Mich., reports 17 per cent less accidents during the first four months of this year than were experienced during the same period of 1923. Liability types of accidents, over which the company has most control, showed a decrease during this period of 30 per cent, and non-liability types, over which the department has least control, showed a decrease of but 11 per cent.

Portable Substation with Telescopic Tower

Suitable Spacing for 33,000-Volt Outdoor Apparatus and Overhead Clearance When Station Is Moving Over the Right-of-Way Are Obtained by the Telescoping Arrangement Employed on Interstate 300-Kw. Portable

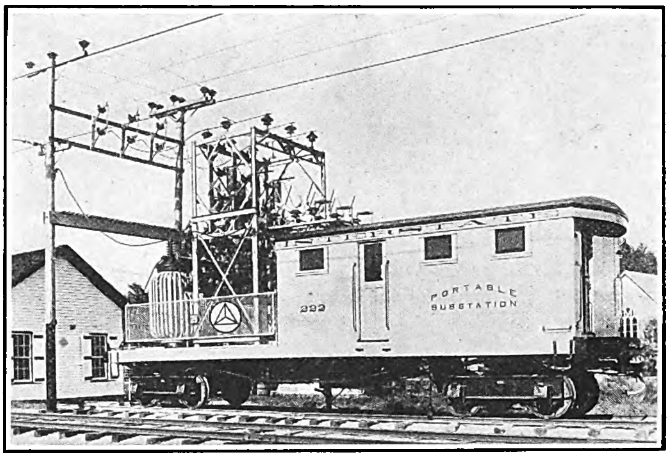
A NEW portable substation in service on the property of the Interstate Public Service Company includes a number of interesting design features which were worked out to provide sufficient spacing for 33,000-volt high-tension apparatus and at the same time allow the car to be moved about on the railway system with proper clearance under trolley wire, bridges and other permanent structures. The design employed has the advantage of holding the over-all length of the car to a minimum.

This substation and its equipment were developed by the engineers of the railway company, co-operating with the manufacturer of the switch tower and apparatus. The preliminary design was prepared under the direction of C. C. Argabrite, electrical engineer of the Interstate company, and J. M. Hedges. The engineers of the Delta-Star Electric Company of Chicago co-operated in this work and developed the structural details of the tower and other outdoor apparatus.

The station is of 300 kw. capacity with manual control. With the tower lowered for transporting the over-all height is 14 ft. 3 in. above the rail. When the tower is raised for operation the over-all height is 21 ft. The horn gap lightning arresters are carried on supports which are hinged from the tower structure so that in the operating position they extend over the roof of the converter room. These fold into the tower structure when the latter is lowered, so as to cut down the amount of overhead clearance required.

CONNECTIONS FACILITATE QUICK MOVEMENTS

The connections both to the high-tension lines and to the feeder are made in such a way as to facilitate the work of setting up or of moving the station. The transformer leads are connected by jack-knife connectors, and the feeder connection is made by bolted lugs. In bringing the feeder lead out of the body, specially designed supports are arranged on each side of the cab so that the cable can be connected to the overhead feeders on either side of the car. A special type of clamp is installed for making the negative connection to the rail, and turnbuckle rail clamps are provided for fastening and leveling the station.



Clearance for 33,000-Volt Outdoor Apparatus on the Interstate Portable Substation Is Obtained by Using a Telescoping Tower

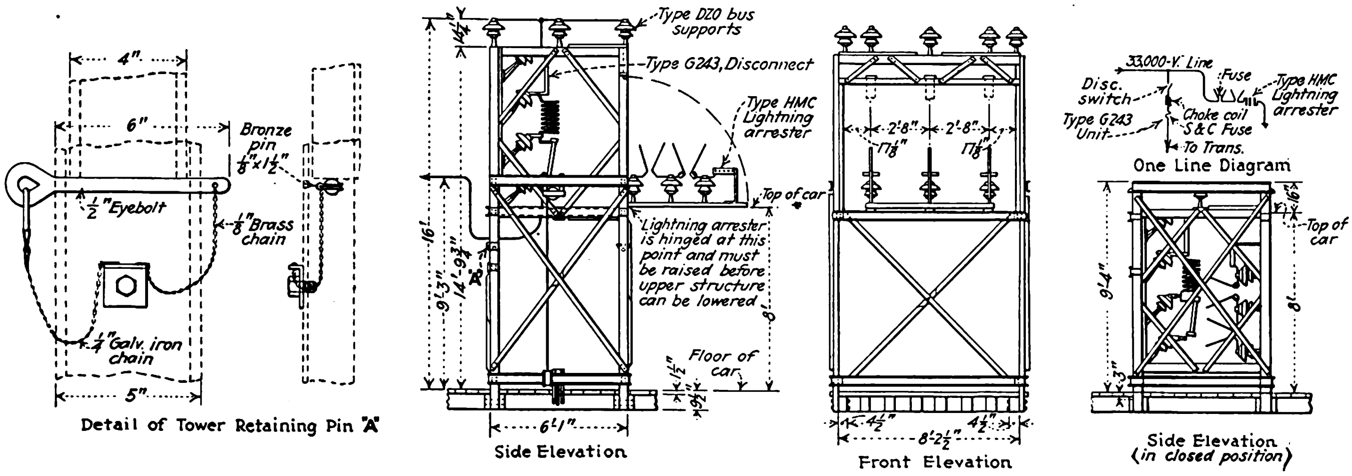
Overhead racks, with disconnecting switches, are located at various points on the system where side track facilities are available. Thus, the substation may be connected in at any of these locations without de-energizing the high-tension line.

Some of the more important dimensions and items of the equipment of the substation are as follows:

Length over coupler pulling faces	36 ft. 0 in.
Truck centers	23 ft. 8 in.
Extreme width over all	9 ft. 2½ in.
Length of body over all	18 ft. 0 in.
Size of outside sills	4½ in. 8 in.
Size of intermediate and center sills	4 in. 8 in.
Bolsters	Built up structural steel
Trucks	Buckeye freight car type
Journals	5 in. x 9 in.

The converter room is equipped with storage cabinets for carrying spare parts and miscellaneous supplies. These cabinets are built into the walls of the compartment. In addition a large storage cabinet is built underneath the body. The inclosed body of the car is covered with No. 16 gage sheet steel.

A duplicate lighting system is installed, so that the substation can be illuminated either from the transmission line or d.c. feeder system. When alternating current is used for the lights, current is taken from the low-tension side of the power transformer.



Detail of Tower Retaining Pin 'A'

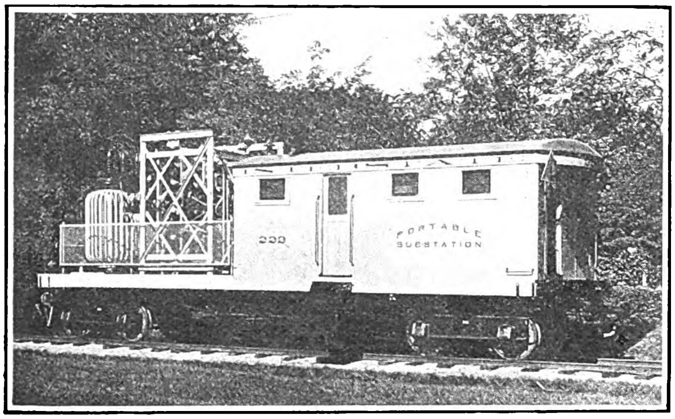
Side Elevation

Front Elevation

One Line Diagram

Side Elevation (in closed position)

The Lightning Arresters Are Carried on Supports Which Extend Out Over the Roof of the Closed Body When the Car Is in Service and Fold Up When the Tower Is Lowered



With the Tower Down, Clearance Is Obtained so that This Portable Can Pass Under Bridges and Other Permanent Structures

A small car type air compressor is mounted under the body to provide compressed air for blowing out the apparatus and thus keeping it clean. Standard telephone jack plug connections are provided, so that operators of this car can make connection with the company's regular telephone system. In this way they can reach the load dispatcher at any time for any instructions which he may wish to give.

The general appearance of the complete unit is shown in the accompanying illustrations. Some of the features of the tower design are shown in detail in the accompanying line drawings. A set of worms and gears, operated by hand cranks, is used to raise the tower into position through the medium of flexible cables and pulleys mounted on the lower section of the tower. After the tower has been raised, steel pins are inserted to maintain it in position. The method of folding the lightning arrester supports when the tower is lowered is also shown in the drawing.

Transit Conditions in Greater Berlin

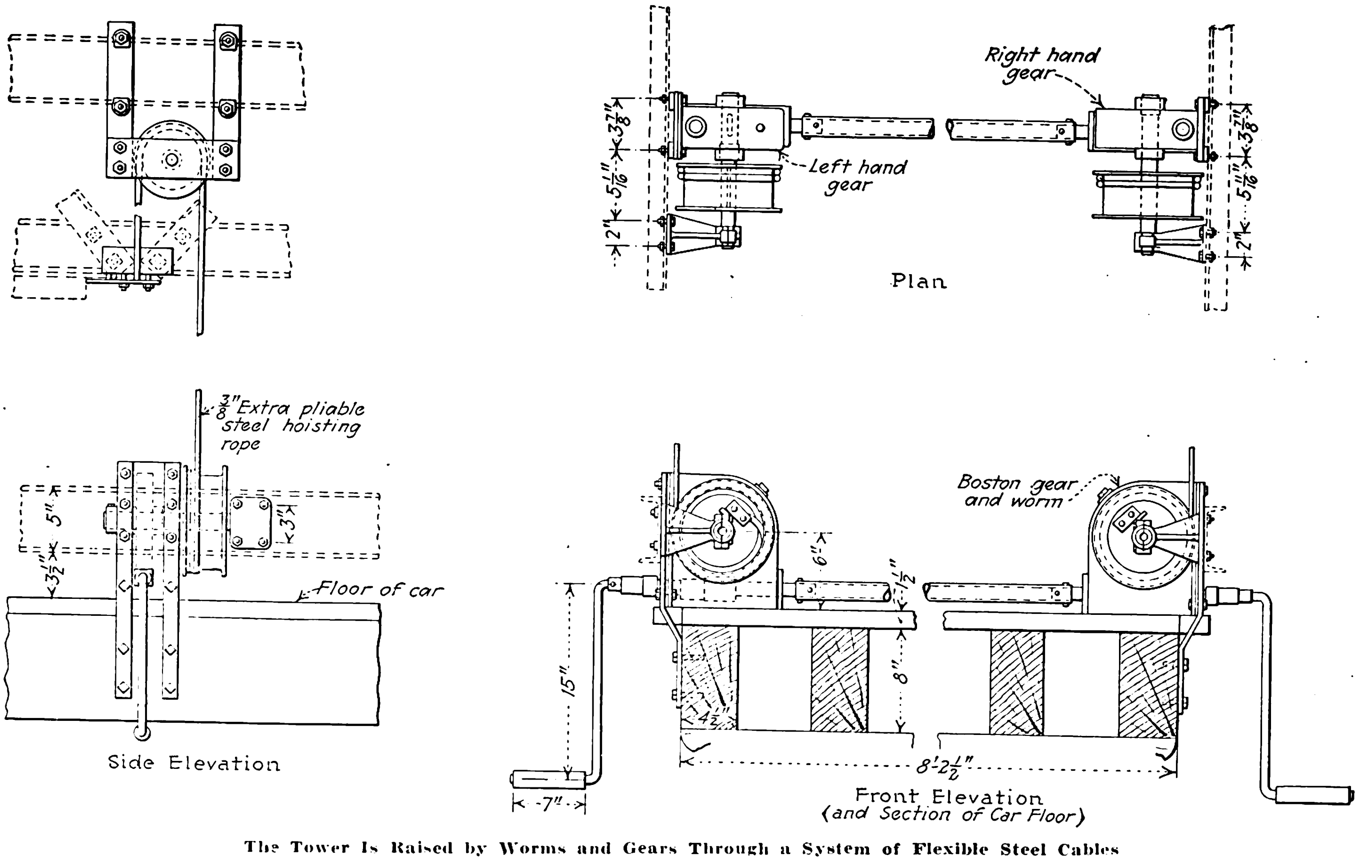
There Were Fewer Passengers on the Transportation Lines in Berlin in 1923 than in 1917 or 1913—Financial Conditions Prevent Further Development

By Dr. Ing Erwin Heisterbergk
Engineering Staff, German State Railways

BERLIN'S rapid increase in population during the few decades before the war and especially the growth in population of its suburbs made the need for rapid transit increasingly great. As in other large cities, with this increase in population and a still greater increase in railway traffic (see table) there came an increase in the length of ride and of the time required for the average trip. The surface line system became inadequate to care for this business, and the cars downtown actually showed a decrease in speed. During the evening rush hour actual timing showed that from 10 to 12 minutes was taken by these cars to go 1 mile within the congested area.

Berlin's rapid transit system began in 1902 with the construction of the Elevated & Underground Railway from Warschauer Bridge to Charlottenburg (see Map I). The system developed so rapidly that in 1913 there were 22 miles of route in operation and 12 miles under construction. During the war building stopped and only one line, a north and south line from Seestrasse to Gneisenaustrasse, has since been finished. It was opened in 1923.

Map I shows not only the present rapid transit lines of Greater Berlin, but also the most important Stadtbahn and the suburban steam railway lines (to be electrified as soon as possible). On these lines last year



The Tower Is Raised by Worms and Gears Through a System of Flexible Steel Cables

57 per cent of all passengers in Greater Berlin were carried, as shown in the table. The rapid transit lines are operated by a private corporation, though some of them were built by towns now forming part of Greater Berlin.

CREATION OF GREATER BERLIN

Progress in the solution of the rapid transit problem in Berlin was delayed many years because there was no authority whose powers extended beyond the city boundaries. The logical step was to incorporate the whole of metropolitan Berlin in one municipality, but the former Prussian government did not wish too large an increase in the power of Berlin, whose political tendency was not that of the royal government. Therefore, the government passed the Zweckverband act in 1911 authorizing a joint board made up of representatives of Berlin and the surrounding districts to study rapid transit, city planning, and other related problems but with limited powers of administration. This action was taken over the protest of the Mayor of Berlin, who did not believe the act went far enough.

The revolution of 1918 removed the obstacles against the consolidation of Old Berlin with the surrounding districts, and in 1920 an act was passed consolidating Berlin, Charlottenburg and other neighboring districts into a Greater Berlin which is one of the largest cities in the world. This accounts in large part for the increase in population shown in the table between 1917 and 1923. If future increases are in the same proportion as before the war, the population of Greater Berlin in 1950 will be about six millions of people.

Map III shows the city boundaries of old and Greater Berlin. While old Berlin covered an area of 25 square miles, the area of Greater Berlin is 339 square miles, or about as much as Greater New York territory, excluding water. Greater Berlin's area is approximately circular, with its principal dimension extending east and west for about 28.7 miles. North and south the distance is 23.5 miles.

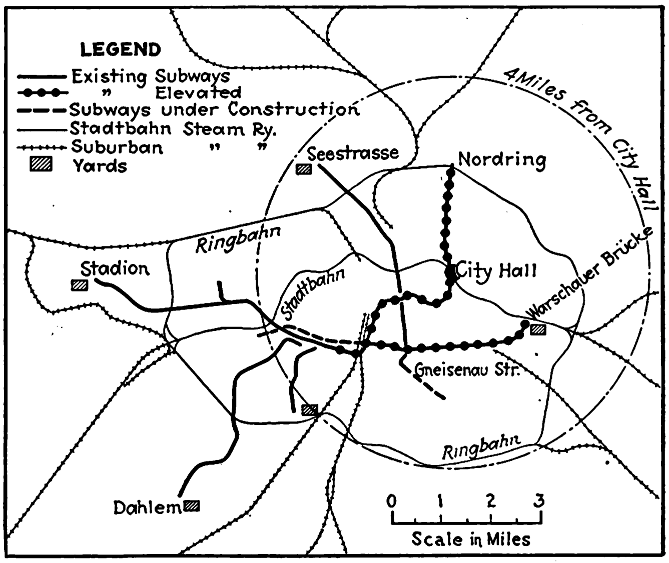
While the population has quadrupled in about fifty years, the traffic has increased 130 times, or from about 10,400,000 in 1870 to 234,000,000 in 1890 and 1,240,500,000 in 1923. However, there has been a decrease since 1913. This has been most noticeable on the autobus and surface lines, the reason being that their rates of fare were too high for an impoverished people. On the other hand, the government-owned Stadtbahn and suburban lines, through their low fares, doubled their traffic between 1917 and 1923, though this was done at the cost of all of the taxpayers.

PROPOSED RAPID TRANSIT LINES

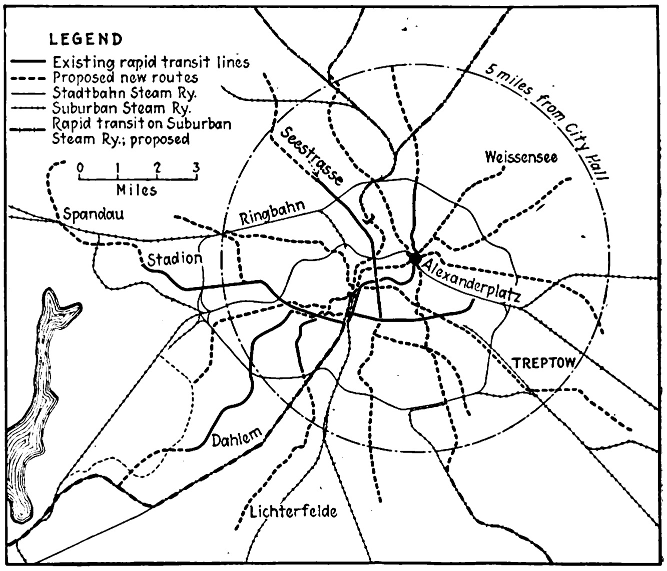
A most valuable service of the Metropolitan Board of Traffic and Town Planning in its period of existence from 1912 to 1920 was to recommend a comprehensive rapid transit plan as is shown in Maps II and III. On these maps existing rapid transit roads are represented by solid lines and proposed additions and extensions by broken lines.

All transit lines proposed are through-routed, that is, they traverse the center of the city, and they are so routed that they can interchange traffic. Excluding the Stadtbahn and suburban lines, the proposed system will have about 110 route-miles. Of this amount 63 miles will be subways, 25 miles elevated, 14 miles open cuts and 5 miles inclines. At pre-war prices it is estimated that the new lines and extensions would cost about $114,000,000 excluding power stations, yards and equipment.

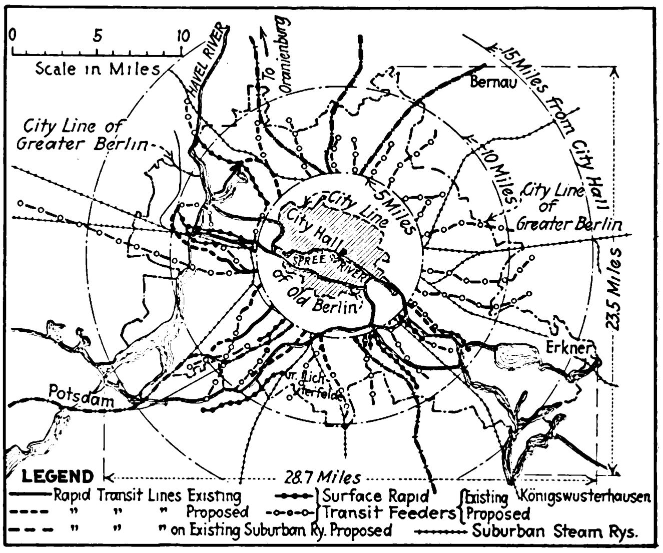
On the theory that every citizen within the center 5-mile zone should not live more than ½ mile away from


LEGEND
Existing Subways
" Elevated
Subways under Construction
Stadtbahn Steam Ry.
Suburban " "
▨ Yards
4 Miles from City Hall
Seestrasse
Nordring
Ringbahn
Stadion
Stadtbahn
City Hall
Warschauer Brücke
Gneisenau Str.
Ringbahn
Dahlem
0 1 2 3
Scale in Miles

Map I—Present Rapid Transit Lines in Berlin


LEGEND
Existing rapid transit lines
Proposed new routes
Stadtbahn Steam Ry.
Suburban Steam Ry.
Rapid transit on Suburban Steam Ry.; proposed
0 1 2 3
Miles
5 miles from City Hall
Seestrasse
Weissensee
Spandau
Ringbahn
Stadion
Alexanderplatz
TREPTOW
Dahlem
Lichterfelde

Map II—Proposed Comprehensive Rapid Transit Plan for Greater Berlin


0 5 10
Scale in Miles
HAVEL RIVER
To Oranienburg
Bernau
15 Miles from City Hall
City Line of Greater Berlin
10 Miles
5 Miles
City Line of City Hall of Old Berlin
SPREE RIVER
City Line of Greater Berlin
23.5 Miles
Erkner
Potsdam
Gr. Lichterfelde
28.7 Miles
Königswusterhausen
LEGEND
Rapid Transit Lines Existing
" " " Proposed
" " " on Existing Suburban Ry. Proposed
Surface Rapid Transit Feeders Existing
Surface Rapid Transit Feeders Proposed
Suburban Steam Rys.

Map III—City Boundaries of Old and New Berlin

TABLE SHOWING POPULATION AND PASSENGERS CARRIED IN THE PRESENT AREA OF GREATER BERLIN

Year	Population	Passengers Carried on Stadtbahn Steam Railways	Suburban Steam Railways	Rapid Transit Lines	Surface Lines	Motor Bus and Horse Bus Line	Total Passengers Carried	Rides per Capita
1890	1,929,000	40,000,000	23,400,000	....	143,000,000	27,800,000	234,200,000	121
1895	2,216,000	89,000,000	46,600,000	....	167,300,000	37,400,000	340,300,000	153
1900	2,660,000	115,000,000	69,600,000	....	280,600,000	80,600,000	545,800,000	205
1905	3,138,000	149,000,000	111,100,000	34,600,000	428,200,000	111,500,000	834,400,000	266
1910	3,621,000	190,000,000	163,000,000	56,900,000	568,900,000	146,000,000	1,124,800,000	311
1913	3,944,000	196,000,000	199,300,000	73,100,000	651,600,000	169,700,000	1,289,700,000	327
1917	3,390,000	163,000,000	148,000,000	111,500,000	96,500,000	33,200,000	1,352,200,000	399
1923	4,012,000	292,000,000	356,000,000	145,000,000	419,900,000	27,600,000	1,240,540,500	301

a rapid transit line, this 5-mile zone of Greater Berlin would require 140 route-miles. The proposed plan (including the electrified Stadtbahn and suburban lines) provides for about 125 route-miles. In the zone between the 5 and 10-mile circles, a distance of 1½ miles between two routes is supposed to be sufficient. Theoretically this would require 118 route-miles of rapid transit or feeder lines. The proposed system provides for about 140 route-miles. Unfortunately it is not expected that the rapid transit facilities of Greater Berlin will develop rapidly during the next few years, because of adverse financial conditions. Moreover the city does not yet have the power to assess the cost of construction of rapid transit lines against the owners of the benefited property.

Brisbane System to Be Rehabilitated

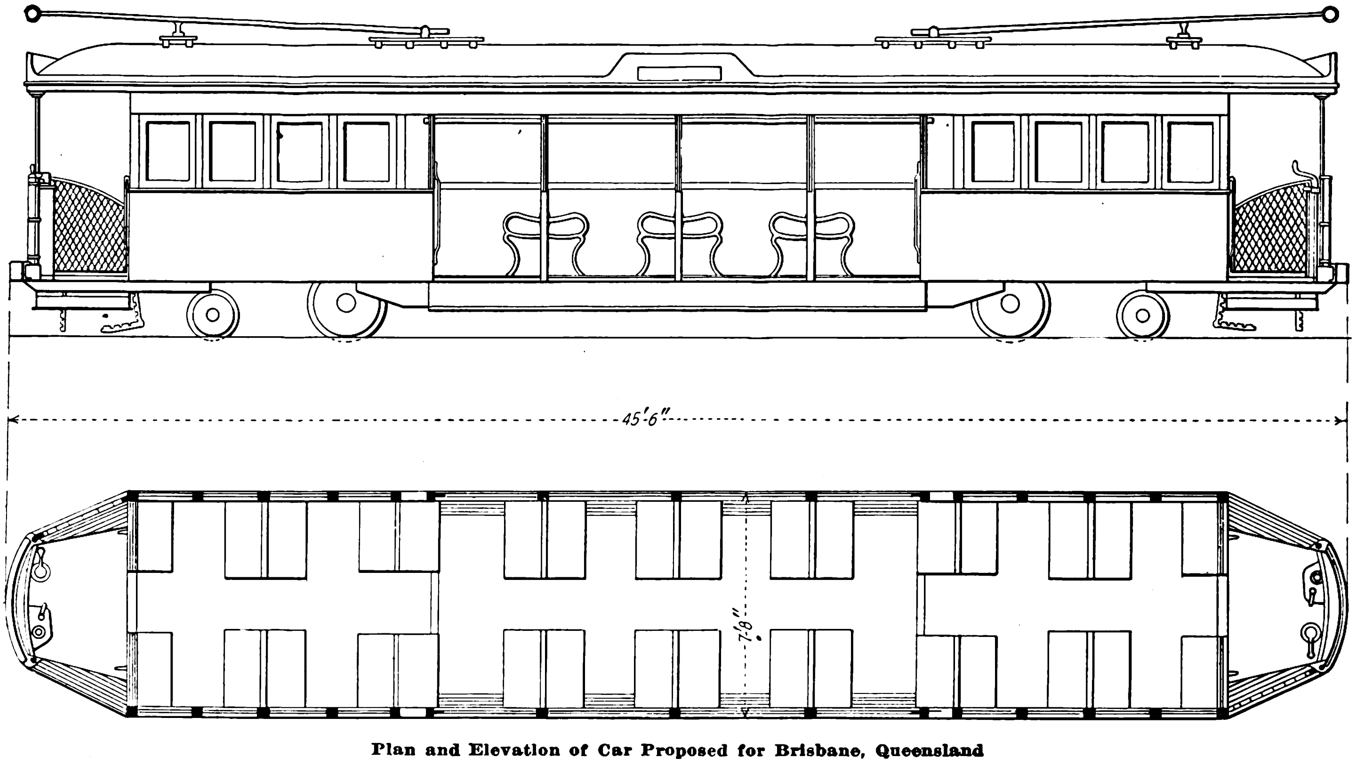
THE Privy Council in London has decided that the state of Queensland is to pay the Brisbane Tramways £1,500,000 for its property which has been taken over by the government, and is now being administered by a board. This board consists of two members appointed by the government and six representing various councils. The tramways property was formally taken over on Jan. 1, 1923, but the compensation to be paid for it has only recently been determined. The case first came up before the Full Court of Queensland, which on March 28, 1923, directed that the compensation should be paid on the basis of the physical valuation as of Jan. 1, 1923, with allowances to the company to cover the unexpired statutory rights in the case of certain extensions, also that the Land Court of Queensland should be the tribunal to fix the amount. Against this judgment the company appealed to the Privy Council with the result mentioned. The company asked for £1,738,257.

The tramway system in Brisbane consists of 70.54 miles of track and 182 cars. During 1923 the car mileage was 5,211,971; the number of passengers carried was 74,721,594, and the revenue received was £636,258. There are 1,386 employees.

While the definite plan for rehabilitation naturally has had to be delayed until there was a decision as to the amount to be paid for the property, the new owners have practically decided to rebuild the office building, carhouses and repair shops, and add considerable new equipment. The replacement of fifty old cars will be the first step.

The design of car shown in the accompanying elevation and plan is the one being considered. As will be seen, it is a combination open and closed car, with the closed compartments at the ends. The seats follow the back to back plan which has proved to be so popular in Australia.

This car will have a total of 64 seats or a greater seating capacity than any of the present cars, six exits on each side instead of two as at present, better protection against the weather, steps which will be 8 in. lower than on the existing cars, and the conductor will have free access to all passengers through the center aisle without using the running board.



Plan and Elevation of Car Proposed for Brisbane, Queensland

Light-Weight Cars for Racine and Kenosha

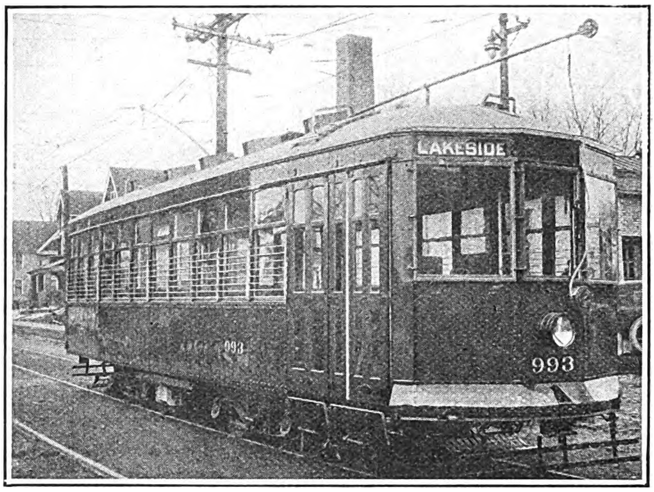
This New One-Man Equipment of the Milwaukee Electric Railway & Light Company Is Designed to Meet the Needs of Smaller Cities and at the Same Time Give the Desirable Riding Qualities of Double Trucks

TEN new double-truck one-man cars recently put in service in the cities of Racine and Kenosha, Wis., by the Milwaukee Electric Railway & Light Company, which operates the railway properties in these two communities, represent an interesting type of small double-truck unit for use in this type of service. The improved riding quality of the double-truck design was felt to offer a material advantage over the single-truck cars which had been operated in these cities for some time. These new cars, however, were made as short as was consistent with obtaining the necessary room under the floor for mounting electrical and air-brake equipment.

In their general structural design the new cars, which were built by the St. Louis Car Company, follow closely the construction used in the one-man, two-man cars put into service in Milwaukee in 1920 and 1921 and described in ELECTRIC RAILWAY JOURNAL Nov. 21, 1921. They are arranged for double-end operation, are of the arch-roof type and have platform floors carried level with the body floor except for slight ramps from the bolsters to the door openings.

DOUBLE DOORS AT FRONT END PROVIDE SEPARATE ENTRANCE AND EXIT

Separate doorways at the front end in each direction of operation allow simultaneous interchange of boarding and alighting passengers. Full Safety Car Devices Company equipment is installed and separate folding steps are connected with each door. The letterboard and side sill are carried across to the end framing, above and below the door openings, and there is no horizontal offset at the body corner post. Consequently, in order to keep the overhang of the doors at a minimum when they are folded open the panels are made as narrow as practicable. This is accomplished by dividing the exit door into two panels and the entrance door into three. The accompanying illustrations show the arrangement.

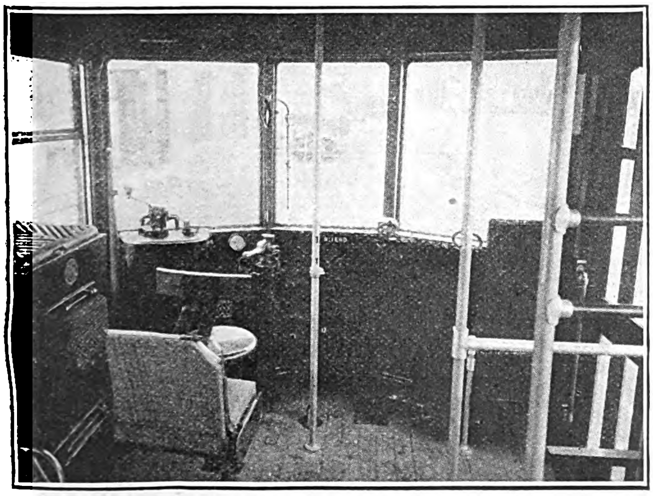


These Double-Truck One-Man Cars Are Popular in Racine and Kenosha Due to Improved Riding Qualities and Wide Entrance and Exit

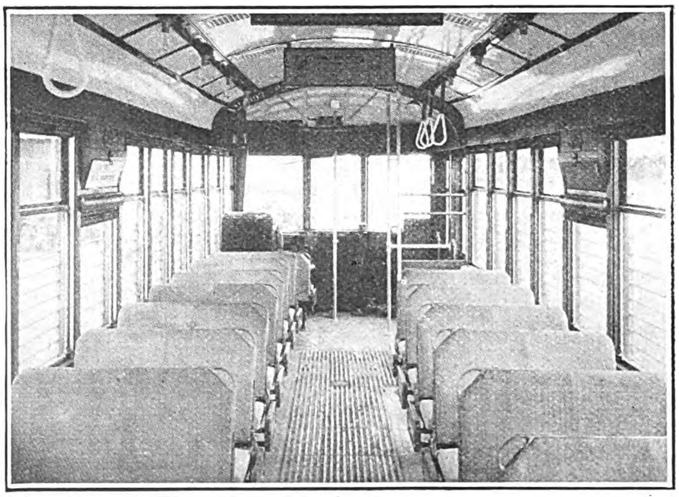
Seating capacity for 44 passengers is obtained with a total over-all length of 36 ft. 8¾ in. Cross-seats are used throughout with the exception of one longitudinal seat at each of the corners, adjacent to the door openings. Folding seats provide accommodations for 4 seated passengers in front of the doors when they are not in use at the rear end.

WIDE AISLE TO FACILITATE MOVEMENT IN CAR

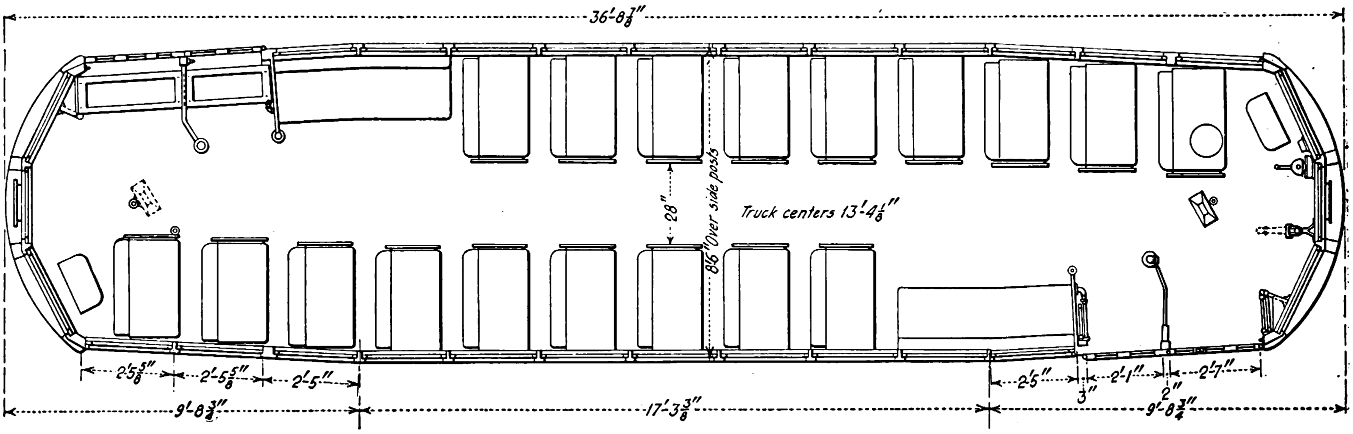
Since all passenger interchange takes place at the front end of the car, the maximum practicable aisle width was considered desirable for facilitating the passenger movement. For this reason the inside body lining below the arm rest is set in close to the side girder plate, with only enough space between to assure proper insulation in cold weather. The wall plate ends of the cross-seats are thereby carried inside of the arm rest line, so as to give hip room below the arm rest for a passenger sitting next to the window. With an over-all width of 8 ft. 7⅝ in. over the drip rails, 8 ft.



The Vestibule Windows Are Protected by Storm Sash in Winter. The Center Sash Is Equipped with a Window Wiper.



Liberal Aisle Space Is Provided to Facilitate the Movement of Passengers Within the Car



The Over-All Length of the Car Is 36 Ft. 8⅞ In. and Seating Accommodations for 44 Passengers Are Provided

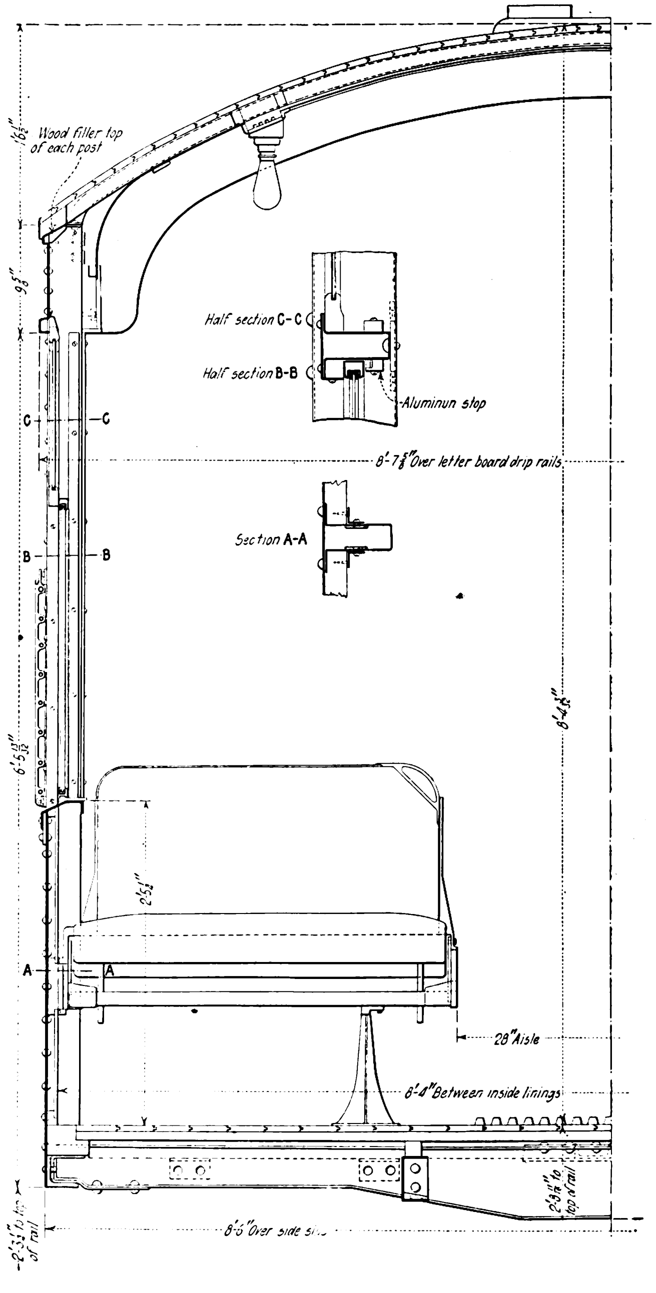
6 in. over the side posts and an inside width of 8 ft. 4 in. between body lining, an aisle width of 28 in. is obtained. The cross-seats are 36 in. wide over all.

Pressed steel side posts, which have been used extensively in Milwaukee on previous groups of cars, form the main vertical members in the body side structure. As shown in the accompanying cross-section, the posts consist of a flanged U-shaped member, installed with the open end of the U toward the exterior, and covered outside with a plate riveted to the flanges and extending between the letterboard and the belt rail so as to form an inclosed box column. The sheet steel letterboard and the side girder plate are also riveted to the side post flanges.

At the upper end of the posts flanges are provided to form a support for the bar steel carlines that are set on edge at each side post. The steel letterboard extends across the top of the side posts and is riveted between the carlines and the side post flanges. A light

SPECIFICATIONS OF DOUBLE-TRUCK ONE-MAN CARS FOR RACINE AND KENOSHA

Number of cars ordered	10
Date order was placed	June, 1923
Date of delivery	February, 1924
Builder of car body	St. Louis Car Company
Type of car	Semi-convertible, passenger
Seating capacity	44
Weight:	
Car body	16,420 lb.
Trucks	9,080 lb.
Equipment	4,000 lb.
Total	29,500 lb.
Bolster centers, length	13 ft. 4⅛ in.
Length over all	36 ft. 8⅞ in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 7⅝ in.
Height, rail to trolley base	11 ft. 2⅝ in.
Body	Semi-steel
Interior trim	Cherry
Headlining	Haskelite
Roof	Arch
Air brakes	Safety
Axles	Heat-treated carbon steel
Bumpers	Rolled channel
Car signal system	Consolidated
Car trimmings	Bronze
Center and side bearings	T. M. E. R. & L., lubricated
Control	Westinghouse K-6
Curtain fixtures	National Lock Washer
Curtain material	Pantasote, double-faced
Destination signs	St. Louis
Door operating mechanism	T. M. E. R. & L., air-operated
Fare boxes	T. M. E. R. & L.
Wheelguards	T. M. E. R. & L.
Gears and pinions	G. E. grade M
Hand brakes	St. Louis, drop brake handle
Heater equipment	T. M. E. R. & L., hot air
Headlights	Ohio Brass
Journal boxes	Symington
Lightning arresters	Westinghouse MP
Motors	Two G. E. 247, inside hung
Finish	Varnish
Sanders	Safety, air-operated
Sash fixtures	Edwards
Seats	St. Louis, rattan
Slack adjuster	Anderson
Springs	Fort Pitt
Step treads	Kass
Trolley catchers	Ideal
Trolley base	U. S. No. 13-E
Trolley wheels	6 in.
Trucks	T. M. E. R. & L. arch bar
Ventilators	Peerless
Wheels	Steel, 26 in.


Wood filler top of each post
Half section C-C
Half section B-B
Aluminun stop
8'-7⅝" Over letter board drip rails
Section A-A
C
C
B
B
A
A
28" Aisle
8'-4" Between inside linings
8'-6" Over side sills
2'-3⅞" to top of rail
2'-3 11/16" to top of rail

Standard Milwaukee Side Framing Construction Is Used with the Upper Sash Set Between the Side Posts and the Lower Metal Sash Arranged to Raise

wood top plate serves as a screwing strip for the tongue and groove poplar roofing and also for the roof molding.

Metal lower side sash, arranged to raise, are used in the body. The upper sash, however, are of wood, set individually between the side posts for each window opening. The parting strips installed between the lower side sash and the curtain groove are made of aluminum.

VESTIBULE WINDOW WIPERS ARE AN INNOVATION

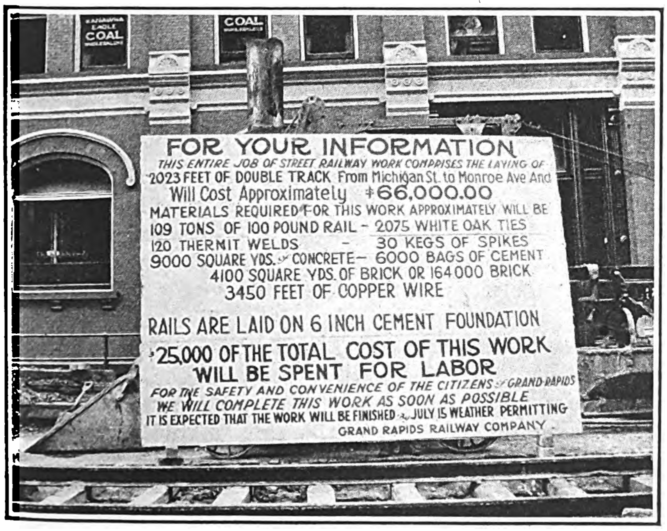
The vestibule sash are also of metal, arranged to drop into pockets in the dash. In winter the vestibule windows are protected by metal storm sash set on the outside of the posts and held by clips. A novel type of window wiper, designed and built in the Cold Spring shops of the company, is installed in the center vestibule window opening, as shown in the two views of the front of the car. The operating handle of this wiper extends through one of the vestibule posts and is arranged so as to be used by the motorman with storm sash in place.

Double thickness flooring insures warmth in cold weather. This is covered with the customary type of floor strips in the aisle.

Some years ago the Milwaukee company designed and built a light-weight type of truck which has since been standard on the property and is used under the new cars. The trucks are spaced on 13-ft. $4\frac{1}{8}$-in. centers. With 26-in. diameter wheels, the floor height at the bolsters is 2 ft. $8\frac{11}{16}$ in. above the rail. No end sill step is used, but a total of $3\frac{11}{16}$ in. of ramp between the bolster and the end sill and between the center of the car and the door opening reduces the height of the floor at the door to 29 in. above the rail, permitting step heights of 14 in. and 15 in. respectively from street to platform.

Telling the Public What Track Costs

WHEN the Grand Rapids Railway, Grand Rapids, Mich., recently relaid track in the downtown section of the city, it made use of several advertising signs to inform the public what was going on. The signs were large enough to be read easily at a distance and told the quantity of rail, ties, cement, brick, etc., required for the work, as well as its total cost.



FOR YOUR INFORMATION
THIS ENTIRE JOB OF STREET RAILWAY WORK COMPRISES THE LAYING OF
2023 FEET OF DOUBLE TRACK From Michigan St. to Monroe Ave And
Will Cost Approximately $66,000.00
MATERIALS REQUIRED FOR THIS WORK APPROXIMATELY WILL BE
109 TONS OF 100 POUND RAIL – 2075 WHITE OAK TIES
120 THERMIT WELDS – 30 KEGS OF SPIKES
9000 SQUARE YDS. of CONCRETE – 6000 BAGS OF CEMENT
4100 SQUARE YDS. OF BRICK OR 164000 BRICK
3450 FEET OF COPPER WIRE

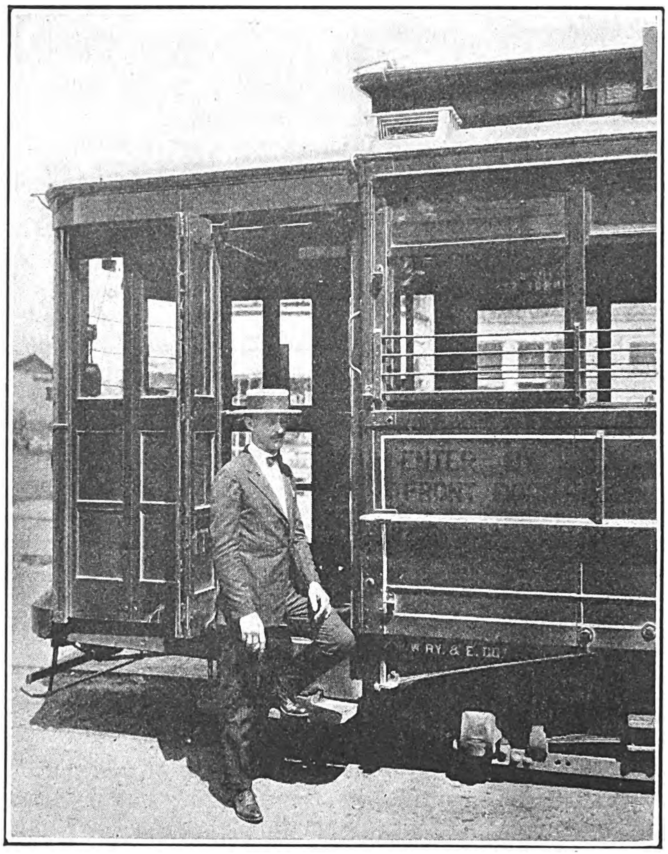
RAILS ARE LAID ON 6 INCH CEMENT FOUNDATION

$25,000 OF THE TOTAL COST OF THIS WORK
WILL BE SPENT FOR LABOR
FOR THE SAFETY AND CONVENIENCE OF THE CITIZENS of GRAND RAPIDS
WE WILL COMPLETE THIS WORK AS SOON AS POSSIBLE
IT IS EXPECTED THAT THE WORK WILL BE FINISHED in JULY 15 WEATHER PERMITTING
GRAND RAPIDS RAILWAY COMPANY

Example of the Advertising Used by the Grand Rapids Railway

Automatic Rear Exit Door Tried in Washington

IN ORDER to facilitate passenger movement in one-man cars, the Washington Railway & Electric Company, Washington, D. C., has equipped its cars of this type with automatically controlled rear exit doors and steps. The idea originated with J. H. Stephens, superintendent of railways, and work was done in the company's shop under the direction of R. D. Voshall, superintendent of equipment and structures. National Pneumatic devices are used in much the same way as on the cars of the Chicago Surface Lines, described in ELECTRIC RAILWAY JOURNAL for Sept. 30, 1922, except that the apparatus is used for the rear door in Washington instead of for the front door as in Chicago.



Passenger Alighting from the Automatically Controlled Rear Exit Door on the One-Man Cars of the Washington Railway & Electric Company

To enable the motorman to see when passengers wished to get off by the rear door, a large mirror 15 in. square has been mounted at each end of the car. A smaller mirror has been mounted outside of the front door so that the operator can see when the last passenger has alighted from the rear step. Moreover, the rear door is connected with a signal light in front of the motorman, which tells him as long as it is burning that the rear door is open.

Since the first of these cars was put in operation, the latter part of June, the apparatus has functioned perfectly without breakdown, jam or other mishap. There has been no accident or confusion occasioned by its use. The passengers appear to like the idea, and the company believes that the only legitimate complaints against the use of one-man cars have been eliminated by this means.

Dual Accident-Prevention Plan

Monthly Bonus Awards and "Distinguished Service Buttons" for the Trainmen Have Resulted in More Careful Operation and Fewer Accidents

ON THE railway lines of the Birmingham Electric Company, Birmingham, Ala., a dual plan for the prevention of accidents is in vogue. This scheme has produced excellent results in securing reports of all accidents and at the same time has relieved operating officials of the difficult task of differentiating between avoidable and unavoidable accidents.

Some time ago it was decided to use a bonus distribution as a means to secure a reduction in the number of accidents. The actual expenditure of the claim department for personal injuries and property damage during the past 3 years was taken as a basis of calculation. Each month was averaged separately. The bonus paid is the difference between the figure for the current month of the current year and the average for that month during the previous 3 years. This sum is divided equally between the company and the trainmen and shopmen without regard to individual records.

The fact that the individual trainman or shopman is not deprived of his share of the bonus because he may have had an accident during the month has not been found conducive to carelessness. On the contrary, there is a disposition on the part of the more careful men to observe the performance of the less careful ones, and to admonish and remonstrate with them when it is seen that they are becoming negligent. Moreover, the fact that the individual man is not penalized for an accident has had a tendency to insure a report being made of every incident that might result in a claim. To encourage the reporting of all accidents, an allowance is made of 45 minutes time for each report. The fact that the award of the bonus is dependent upon the actual expenditures of the claim department has made the trainmen diligent to aid the work of that department by furnishing full information.

In case the claims expenditure for a particular month is more than the average figure the balance is carried forward and subtracted the following month. No bonus is paid until the deficit has been made up. For the first five months of 1924 slightly more than $3,000 was distributed in bonuses.

In order that there might be greater incentive for the individual men to do as well as possible, the superintendent of transportation originated a plan of awarding so-called "distinguished service buttons." These are issued when no charge has been made against a trainman's record or expenditure of money by the claim department on an accident in which he was involved. No attempt is made to place the responsibility for the accident, it being assumed that if the claim department expended money there was some liability. General observation of rules is taken into consideration in connection with a conductor's record. Because it was thought that a short period would stimulate more interest than if the period were made a year, the record is made up every six months.

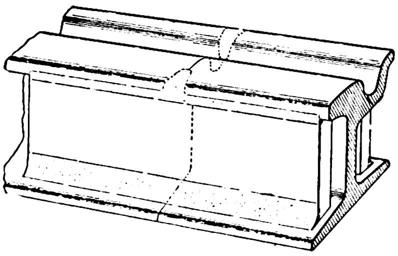
The buttons are about the size of a 10-cent piece and have the letters B. E. Co. in the center in black enamel. Around the outside appear the words "Distinguished Service, Transportation Department." Bronze buttons are awarded for 6 months without an accident, silver buttons for 1 year and gold buttons for 2 years. In case a trainman is in the 18-month or 2½-year class a stripe appears at the bottom of the button with the words "One and a Half" or "Two and a Half."

The plan was started on Jan. 1, 1923, and 34 men were awarded buttons for the year 1922. For the first 6 months of 1923 the awards constituted 135 bronze and 19 silver buttons. For the last half of 1923 there were awarded 14 gold buttons, 81 silver and 184 bronze buttons. At the end of the first 6 months of 1924 12 gold, 152 silver and 140 bronze buttons were awarded, making a total of 304. Inasmuch as the total number of trainmen averages only about 670 this constitutes approximately one-half of the number. Since the adoption of this dual plan it has been noted that there has been more careful observation of the rules, more courteous treatment of passengers, and a reduction in the number of accidents of approximately 400 for the first 6 months of the year as compared with the same period the preceding year.

Notched Welds in Rail Head

This Design Is Intended to Prevent Failure of Seam-Welded Joints on Account of Shear and Impact Strain

IN THE USUAL method of seam welding rail joints, the rails are each separately welded to a joint plate so that all strains are transmitted from one rail to the other entirely through the plates. No provision is made for the shear and impact strain, due to the weight of the blow from the rolling wheels, with the result that the seam under the head of the rail on the receiving end of the joint often cracks just at the rail end. This crack may then extend progressively along the joint for its entire length and after the failure of this seam the other seams fail and the entire structure becomes disrupted and worthless. In most cases, however, where the initial cracking above described does not occur, the joint remains sound and useful.



Notch in Rail Head Is Filled with Welding Metal to Strengthen the Joint

In order to overcome this difficulty a joint has been designed by E. M. T. Ryder, way engineer Third Avenue Railway, New York City, wherein a notch as shown in the accompanying drawing is made in the head of the rail directly above the joint. This notch is of a depth equal to the thickness of the fish plate, and is filled with metal welded to the facing ends of the two rails and to the top of the joint plate. The metal within the recess is thus integral with the metal forming the weld between the joint plate and the two rails. With the grooved girder rail a second recess is formed on the other, or lip side, of the rail, but with tee rails it is thought to be undesirable to cut a notch and weld on the gage side.

The shape of the recess may be varied, depending upon the width and shape of the rail head, but it is not generally desirable to carry it entirely across the head, as not less than one half of the surface of the rail head which comes in contact with the wheel should be of the original metal in order to preserve an adequate supporting surface of uniform composition and to prevent the wear or cupping which might otherwise occur.

The continuity of metal between the two rail heads prevents the receiving rail from sinking below the level of the run-off rail under the weight of the car wheels, thus avoiding impact strains which are likely to crack the seam weld. The necessary longitudinal tensile and bending strength is provided by the seam weld throughout the length of the joint plate.

This joint is applicable to rails of any type. A patent has been granted Mr. Ryder for this joint.

Roller Bearings for Electric Cars in Germany

ROLLER bearings are being used with success on the electric cars in the city of Hagen, Germany, according to an article in *Verkehrstechnik* for June 27, 1924. These cars are of a single-truck type with 9-ft. 2-in. wheelbase and are equipped with two motors. When roller bearings were first used with this equipment, a smooth roller bearing running upon hardened and ground sleeves was used. Difficulty was experienced, however, as this type of bearing would not take lateral thrust such as occurs at the armature and axle bearings. In order to take this lateral thrust it was found necessary to arrange the bearing either with a pressure disk at the end, or with one ball bearing.

The difficulty was overcome by using roller bearings with collars. These collar-roller bearings are installed on the commutator end of the armature shaft, but a smooth roller bearing is used on the pinion end. The axle bearings of the motor, however, are both of the collar-roller-bearing type.

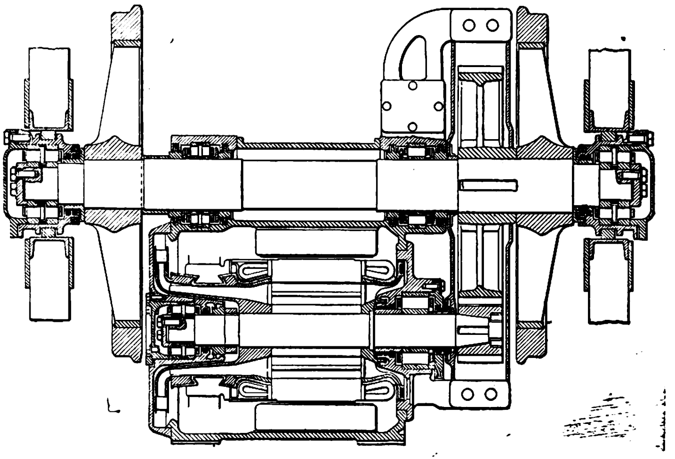
In the manufacture of these roller bearings particular attention is given to making them interchangeable, and all parts are drilled and machined in jigs. The inner race ring is pressed upon the end of the shaft, and held there with a cap and three chromium-nickel-steel bolts. The outer race is also pressed into the bearing housing, and is retained by a large cap which completely closes the bearing so as to make it dust and water tight. The smooth roller bearing, located on the gear end of the armature, is held firmly to the shaft by a shrink fit.

The roller bearings are lubricated with a high-grade grease, which has a melting point of 93 deg. C. Particular attention has been given to making the bearing tight so that the grease will not run out. To accomplish this an oil-throw ring, ¼ in. wide, has been placed next to the roller bearing with its periphery shaped so as to throw any melted grease back into the bearings. An annular cavity is also provided to receive any grease that might escape, and this cavity is formed so as to direct its contents toward the bearings. An additional provision employed to insure tightness consists of steel rings with cast-iron grooves which have very small clearance. The commutator end bearing has only a throw ring and a grease chamber.

Tests show that the use of roller bearings has reduced the energy consumption approximately 10 per cent. Also, there is less bearing wear so that the gear and pinion are kept accurately in mesh with less variation in the distance between the centers. There is also less side swaying of the motor. A further advantage has resulted from the increased period for lubrication.

The use of roller axle bearings was at first considered inadvisable, on account of the necessity to press off the wheels in order to install the bearings. Experience shows that the life of these bearings is as long as that of the wheels, so that it is seldom necessary to replace a bearing before the wheels are worn out.

Since 1922 all bearings on electric cars in Hagen have been equipped with roller bearings, and the first inspection was made 13 months afterward. At this time everything was found to be in satisfactory condition, and much of the original lubricant was still in the bearings.



Types of Roller Bearings Used for the Armature and Axles of Cars in Germany

Pins Indicate Accident Locations

INFORMATION concerning the accidents on the lines of the Worcester Consolidated Street Railway is readily available to the general manager from a map which hangs on the wall of his office. This shows on a comparatively large scale the track layout of the entire railway system. A pin is stuck into the map at the proper location whenever an accident happens. Five different color pins are used to denote different kinds of accidents, such as automobile collisions, boarding and alighting accidents, car collisions, etc. When an accumulation of pins occurs at some point the attention of the management is drawn to the number of accidents occurring there and investigations are made with a view to remedying the situation.

The Readers' Forum

Carbon Limit Is 0.7 per Cent

BRUSSELS, BELGIUM, Aug. 12, 1924.

To the Editors:

I notice in your issue of July 19, 1924, in which you give an abstract of my report at the recent International Congress in Paris, under the heading "Latest Development in Track Material," you make me say "For carbon content, 0.7 to 0.9 point is considered desirable." Actually, my report says: "Generally, the carbon content is limited to 0.7 per cent, and practically it is difficult to obtain even this figure, except in open hearth furnaces." I will appreciate publication of this correction in your pages.

E. D'HOOP,
Chief Engineer Brussels Tramways.

Association News & Discussions

Improvement in Car Equipment*

Ventilated Motors, Field Control, Regeneration, Gearing, Controllers, Resistors, Cars and Miscellaneous Equipment Are Considered—Much Credit Is Given to American Practice

By L. Ricaud
Manager of the Marseilles Lines of the French General Tramways Company

THE maximum admissible heating in railway motors is limited by the resistance to charring of the cotton covering used for insulation. The use of mica and asbestos in place of cotton has raised the permissible motor temperature at the one-hour rating from 75 deg. C. to 120 deg. C. by thermometer as guaranteed by the French Thomson-Houston Company.

Results on impregnation of field coils in varnish, compound or Bakelite to the degree of "mummification" were obtainable only from American sources, all of which praised the idea highly. The Americans admit that repairs of such coils are very difficult, but they say: "What is the difference if impregnation avoids the need for repairs?" a reply which indicates that complete impregnation is of no value for old motors.

From R. E. Hellmund's articles in the May 1, 1915; May 15, 1915, and March 16, 1918, issues of the ELECTRIC RAILWAY JOURNAL, devoted to a discussion of ventilated motors, the following conclusions may be drawn as to the advantages accompanying the use of ventilated motors:

1. The ventilated motor is lighter than the non-ventilated motor for the same hourly rating.
2. A ventilated motor will have a continuous rating on stand test 25 per cent to 100 per cent greater than the same motor without ventilation. In service, however, the relative gain will be less on account of the outside ventilation.
3. Since the effectiveness of self-ventilation is determined by the motor speed, this feature is particularly valuable with high-speed armatures and for high-speed interurban service.
4. The worst condition for the self-ventilated motor is at starting. The air discharge through the fan is very small with the motor turning slowly, while at the same time it is carrying an overload and receiving an excessive quantity of heat.
5. The use of a separate motor-driven blower obviates the disadvantage just cited, but it appears suitable for locomotives only. With this arrangement the full length within the motor case may be used for the armature conductors, while with self-ventilation this is reduced.
6. The accidental entrance of water in small quantity is less harmful in a ventilated motor than in a non-ventilated motor, since it is evaporated and discharged by the current of air.

In the selection of ventilated motors, there are two dangers to be guarded against. If, in order to economize on weight, the equipment is calculated just sufficient to cover ordinary operation, there may be difficulty with abnormal service, such as operation with one motor cut out, pulling a damaged train or a snow plow. The mass of the motor being insufficient for storing the heat produced, it will reach an abnormal temperature. On the other hand, if the motor is calculated too large, it will operate too cool to evaporate the moisture which may penetrate within the case. It is very important to be certain that, during the wet season, the motors will attain a temperature in service of 50 to 60 deg. C. above the surrounding air, unless the motor can be run closed at such times. In all cases it is recommended that the ventilating openings in the case be closed during snow storms. If this is not done it is important to watch the discharge orifices to be sure they do not get clogged with dirt or ice.

America's experience with ventilated motors is most convincing. In Europe they are still in the experimental period, but the reports are satisfactory. Among European users are London, Leeds, Glasgow, The Hague, Amsterdam, Christiania, Copenhagen, Nice and Brussels. Barcelona has 188 equipments. Strasbourg is the only place which has given up self-ventilation, but the reason seems to be that the motors were of sufficient capacity without it.

Information furnished by all the motor builders shows that the adoption of ventilated motors permits the use of motors of the next smaller size. The economy in cost and in current from the lighter weight are quite important. In general, the large savings through the use of ventilated motors justify spending a portion in more careful maintenance, such as occasional blowing out of dirt, closure of orifices in snowy weather and periodical impregnation.

The advance of field control and interpole design has followed from the pioneer Pennsylvania Railroad locomotive motors down to the present day. Experiences with such motors were given in C. W. Squier's article in the Feb. 21, 1920, issue of ELECTRIC RAILWAY JOURNAL and the savings of the Chicago elevated lines were reported in the issue of the JOURNAL for June 24, 1916. Rotterdam, Paris, Berlin and Turin are among tramway users, and Nimes and Remoulins among trolley-bus users, of field-control motors.

With regard to regenerative control, the use of the motors as generators cannot be depended on as the sole source of braking; and regenerative control is too costly and too complex to be used outside of the locomotive.

HIGH-SPEED ARMATURES NECESSARY FOR LIGHT-WEIGHT MOTORS

There is a double economy in reducing the weight of a motor of given nominal rating, since for a given service a motor of smaller power may be used. The reduction in weight has been obtained principally on account of increased armature speed, which has been made possible through the use of commutating poles. In a few cases a reduction in weight has resulted from the use of rolled steel in place of cast steel, and also by the use of small diameter gearing.

IMPROVEMENTS IN CONTROL, GEARING, RESISTORS, ETC.

Master or remote control is still limited to locomotives and large suburban or interurban cars, including the self-propelled type.

With regard to gearing, it appears that helical types are on trial at Hâvre, while Antwerp is securing satisfactory results from the Citroën herringbone type. The Hague reports that the wear on its Cincinnati Tool Steel pinions is inappreciable. In fact, Americans report that such pinions show a life of 250,000 instead of 25,000 miles. Paris, Lille, Marseilles, Naples, Liége and Bucharest are among users of gear rims which are shrunk instead of being keyed on. As the quality of these gears is improving, the desirability of using harder pinions increases.

Maag gears, noted for their exceptional cut and high polish, are on trial at Bordeaux, Marseilles, Turin, Warsaw and Brussels.

Non-rusting light-weight resistors are being tried by Paris and Warsaw despite the disadvantages of high cost, asserted greater fragility and less resistance to overloads.

A 4½-in. diameter, 3-lb. trolley wheel with graphite bushings is favored except, of course, by the many operators who prefer pantograph or bow collectors.

A trend is noted toward air-brakes, not for reasons of economy but rather of safety, particularly in high-speed train service. The Paris system has recently built a compressor operating at the motor speed, viz., 900 r.p.m. In comparison with the CP-27 type in use, there is asserted a weight saving of 30 per cent and an energy saving of 12 per cent. Compressors of this type are to be standard on the Type L cars.

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*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

[The second half of the paper was devoted to light-weight rolling stock of recent American types, and included descriptions of the Bangor double-truck safety car, the Brooklyn City pay-enter pay-leave car, the Western Ohio interurban car and others. The economies of such constructions are admitted, but caution is advised with regard to maintaining a good factor of safety against overloads and collisions.—EDS.]

Truck and Bearing Practice*

Radial Axle Trucks Are Claimed to Have Some Advantages in European Practice—Ball and Roller Bearings Reduce Train Resistance Materially and Are Being Tried by Many Roads

By CH. HARMEL
Manager of the East-West Tramways of Liége, Belgium

THE use of radial axle trucks has been attempted by only 12 companies out of a total of 35 that replied to the author's questionnaire. Of these 12, five have used them on motor cars only, three on trailers only, and the remaining four on both motor cars and trailers. Only one company, the Prague Tramways, makes general use of radial axles. Hence it is difficult to draw practical conclusions as to their merits.

Regarding the desirability of using radial axles as compared with rigid axles, four companies replying found other advantages than the increased length of wheelbase possible for a two-axle car. The Prague Tramways mentioned the simplicity of the running gear, the ease of making changes, and the reduced cost of maintenance. The Hague Tramways found an increase in life of wheels. The Antwerp Tramways stated that the entrance of the car onto curves is smooth and regular. Curves of more than 100 ft. radius can be approached at speeds of 11 m.p.h. and over, while for curves of less than 100 ft. radius the speed needs to be reduced to 8.8 m.p.h. The weight of the car can be reduced 5 to 7 per cent.

Apart from the lightness of the long wheelbase car, the Antwerp Tramways has found that it gives a very easy action, free from swaying or galloping, with decreased fatigue to the passengers. The car wheels have given service of 62,000 miles against 50,000 miles with rigid axles. As a result this company has obtained a reduction in maintenance cost.

The results obtained on the Avenue line in Antwerp show that the radial axle cars making the trip empty averaged 26 minutes 50 seconds with a current consumption of 4.2 amp.-hr., while the rigid-wheel-base cars averaged 28 minutes 37 seconds and 5.2 amp.-hr. With full load the radial-axle car took 24 minutes 54 seconds, using 5.3 amp.-hr., as compared with 27 minutes 30 seconds and 6.8 amp.-hr. for the rigid-axle car. Thus the saving in energy is some 24 to 28 per cent, combined with a gain in time of 7 to 11 per cent in favor of the radial axles.

ANTI-FRICTION BEARINGS FAVORED

In reply to a questionnaire sent out by the author, 10 companies stated that they are using ball bearings on the car journals. Car resistance has been found very much less with ball bearings than with friction bearings, the London County Council Tramways, for instance, finding it reduced 55 per cent.

As to economy of current, the Antwerp Tramways found a reduction of 21 per cent in energy required. The Paris system found, under like conditions, a saving of 9 per cent in energy, while a train composed of motor cars with friction bearings and a trailer with ball bearings used 8 per cent less energy than an ordinary train with friction bearings throughout. Tests made at Neufchatel, Rotterdam and Geneva failed to show any economy of current.

Other advantages cited in the replies were: Higher schedule speed with the same power; less starting resistance and more rapid acceleration; economy of oil.

The replies from the nine companies making a trial of roller bearings contained comparatively little information. Only one company stated that it had found proof of a reduction in energy, and another mentioned that initial tests indicated the same thing but that a more complete series of tests was under way.

As to the use of these types of bearings for armatures, ball bearings were reported as used in 1,828 motors and roller bearings in 86. These bearings have been in use for various periods from three months up to 15 years. Only one company uses ball bearings for all armatures.

The replies indicated a life of 25,000 to 30,000 miles for friction bearings, the lowest being 6,000 miles and the highest 60,000 miles, which was obtained by the use of phosphor bronze. For ball bearings one company has operated up to 360,000 miles, another 180,000 miles and a third 42,000 miles, in the latter case without showing signs of wear. As to roller bearings, one company stated that it had bearings that had made 72,000 miles and the test was being continued. The others were not ready to report results.

Some of the principal advantages found by the companies using ball or roller bearings for armatures were: (1) Less inspection of motors for clearance; (2) elimination of bearings replacements and the difficult manufacture of bearings; (3) uniform motor clearance, and reduction of the air tap to 0.02 in (½ mm.); (4) increased output of the motor; (5) perfect centering of the armature and constant distance between the armature and the axle, better meshing and less wear of the gears; (6) elimination of damage to armatures through excessive bearing wear; (7) economy of lubrication; (8) reduction of static resistance; (9) improvement of mechanical operation; (10) reduction of time cars are out of service.

As to the economy in energy and in cost of maintenance with ball or roller bearings for the armatures, one company placed this at 25 per cent.

Difficulties found with bearings of these types were: (1) The difficulty of mounting and dismounting of the bearings resulting from the necessity of loosening them when changing commutators; (2) breakage of the balls, while quite rare, this may be eliminated in many cases by replacing the bearings by others quickly, or by replacing the balls by rollers; (3) with roller bearings, one company had difficulty in keeping the rollers parallel.

Other causes that have resulted in trouble with bearings are: Breakage of the roller cage support; corrugation of balls or the ball race; breakage of balls from axial thrust; breakage of balls from lack of lubrication; breakage of the inner race following pressing it on an axle with a tapered fit.

BALL AND ROLLER BEARINGS FOR ARMATURES

The majority of the companies that have tested ball or roller bearings for the armatures were in favor of extending their use for this purpose, at least for new equipment. Almost all of them likewise aimed to apply bearings of these types to old motors where desirable, and where the cost of mounting is not too great.

None of the companies that replied has tested either balls or rollers for the motor axle bearings.

In general, the causes of failure of these types of bearings in service on journals, as mentioned in the replies received, are: (1) Direct shocks that the balls or rollers have to stand without the intervention of any elastic medium between the wheel-and-rail contact and the collar on the axle; (2) transverse force acting laterally against the balls or rollers. These forces frequently are considerable, particularly at switch points or at the entrance to a curve.

To remedy the first difficulty the bearings have been strengthened by increasing the size of the balls or the number of the bearings, or by using rollers instead of balls. The solutions used to obviate the difficulties caused by the transverse shocks are quite varied. These include special collars or muffs that move axially with a certain amount of friction and various forms of coned and tapered mountings for the races.

The results obtained with ball or roller bearings for journals are in general quite satisfactory. Among the several companies making tests the Antwerp Tramways investigated starting resistance. For a car with friction bearings both for the journals and for the armature, figures of 40.8 and 35.26 lb. per ton were obtained, while for a car with ball bearings at both points, the mean of the corresponding figures was 4.98 lb. per ton. During the test the saving of oil indicated was 77 per cent in favor of the ball bearings.

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*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

Tests on cars of the London County Council Tramways and the Wigan Corporation Tramways (described in ELECTRIC RAILWAY JOURNAL for April 21, 1923) show a reduction in energy consumption with roller bearings of 25.4 to 26 per cent below that with friction bearings, a reduction in running tractive effort of 19 to 54 per cent, and a reduction in starting resistance of 34 to 85 per cent.

Another study of bearings of these types was published by H. L. Whittemore and S. M. Petrenko in Technologic Paper No. 201 of the Bureau of Standards, Washington (1921).

Summing up the results obtained to the present time, certain companies have not obtained a reduction in motive force, and it appears that since others have proved that the energy consumption is reduced, the former are not obtaining the maximum results possible. Very few of the companies or of the manufacturers have attempted up to now to take care of lateral motion in the motor bearings or in the journals. The problem is not easy of solution, but without doubt the inventors will find an answer to overcome the difficulties.

At least one may conclude that from the results obtained up to the present time that the use of ball or roller bearings in both the armature and the journal bearings permits the following: (1) Reduction of tractive effort, both at starting and while in motion; (2) increase of the schedule speed, and reduction of the dead time, consequently a better coefficient of utilization for the equipment; (3) increased effective output of the motors, and reduction of the causes of failures; (4) reduction in cost of lubrication; (5) increased wear of the gears and pinions through better meshing, following exactness of the distance between centers.

The use of such bearings assures the parallelism of the armature shaft and the axle.

It may be mentioned that there is a marked tendency toward the use of rollers in preference to balls.

Finally, it is urged that not only those companies that have tested these new developments, but as many others as possible should obtain practical experience in a scientific manner and make available the results obtained.

Maintaining Electrical Equipment*

By HENRY CORDELL
Master Mechanic Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

ON WHAT do we base wear and tear? Usage, of course. Still we find railroad companies who base the inspection of cars on days or months, as the case may be. This is as much out of line as inspection based on kilowatt-hour consumption. You could easily take a car in either case and put it up for inspection, without any mileage, or at least with a very low mileage. On systems where more than one car is used in trains, both of the above methods are apparently wrong, the first named because it may not be necessary to use two or three cars on certain days, therefore no exact time could be obtained when certain cars were due; in the second case, a car may be used as a single car one day and pull trailers the next, and the increased current used surely does not effect the brake rigging, wheels, brakeshoes, oiling, etc., of any of the electrical equipment in direct proportion to the wear we get per mile operated. Therefore, inspect on the mileage basis.

Obtaining the mileage daily from the transportation department not only gives the mechanical department the basis for inspection but supplies data which both departments may desire to work up. Cars are ordered out of service every 1,000 miles for regular inspection. At the accrued mileage of 100,000 order car off the road for general overhauling.

It is generally conceded that to obtain maximum service from electrical equipment, it must be kept clean. Compressed air, if dry, provides efficient means of cleaning out motors, switch group and controllers. Of equal importance are the contacts. The safe current load depends on the width of contact surface and the pressure applied. It is well to provide inspectors with small spring balance scales, so that proper tension may be carried on controller fingers and motor brushes—one pound per ⅛ inch of contact width on controller fingers and from 5 to 7 lb. per square inch on carbon brushes. All connections should be carefully inspected and tightened, and if there is any indication of unsoldering at the terminal don't neglect it. Electricity is not like water, it doesn't "take up," as the old boilermaker says.

There is a condition that needs special mention in regard to controller fingers. In most of the controllers two or more fingers are designed to make and break at the same time. Due to wear this condition needs careful watching and should never be permitted to change, or the last finger leaving contact will have to carry and break all current, which soon means destruction to the finger as well as to the drum segment. This is also the case where group switches are used, and switches designed to come in or go out together should be adjusted so that this takes place. Generally, binding of the mechanism or residual magnetism is responsible for any sluggishness in the switch.

Large orders placed annually for resistance grids are the direct result of poor inspection. If instructions were given to inspectors to use an 18-in. wrench and use all their strength with one hand when tightening up grid rod nuts, they would soon learn that the excuse of broken grids was only an alibi when cars are pulled in dead or jumping. The gentlemen who discovered the open-end grid and the increase of mica insulation on the rods, thereby sacrificing the necessary strength of the rod to keep grids in good contact, had quick repairs in mind. I believe that a careful investigation of the trouble which led to the redesigning of the grid and rods would have shown that poor contact between grids was the cause of the failures.

In assembling grids, see that contact faces are clean and bright, and better still, use soft copper washers between grids; see that terminals are machined straight, and I venture to say that you need no storeroom full of grids.

As to the motors on inspection. After being cleaned out, the brushes should be changed if needed, and if holders require renewals on account of wear this should be done. A loose holder, I mean loose for the brush, causes excessive arcing and possible flashovers. And not only that, but brush consumption is increased and general poor commutation results. Clearance should be taken between armature and pole pieces every inspection to ascertain the condition of bearings which may have worn to a point where renewals are required. Use a strip of leatheroid about ¾ in. wide of suitable length and thickness for this gage.

Leads to the motors cannot be protected from mechanical injury by means of conduit, due to truck swings, and they are subject to extremely hard usage. Inspect carefully and tape up worn places. I find that long leads fare better than short ones, and we permit leads to rest on motor cases, the only protection being a No. 12 steel wire armor. Don't omit to securely cleat cables at connectors to main wiring. If permitted to swing at the connection, they will break.

In multiple-unit operation extraordinary care of inspection of train-line cables for the control is required. These cables sometimes terminate in a receptacle on the dash; at other times in a receptacle mounted on the draft rigging, in which case they swing with it. This, of course, subjects the cable to severe twisting and it has been found that cables had to be made up of very fine wire, that is, a large number of fine wires equivalent to the carrying capacity required. We use seven strands of 23 wires each of No. 36 B. & S. gage copper wire. The insulation consists of paper wrapping, 1/16-in. pure rubber, and a single braid of cotton. The separate cables are assembled in a rubber-lined hose, leaving them plenty of freedom. This has proved entirely satisfactory. However, we discard the cables when cars go through the general overhauling, after 100,000 miles, to prevent any possible chance of failure.

The cables or jumpers from car to car are subjected to hard usage. The inspection of these jumpers proved quite a problem and we adapted a monthly inspection of all jumpers. After inspection and testing we paint the heads a certain color. For instance; January black, February white, March green and April red. The next month we go back to black and continue the rotation. The transportation department co-operates and uses only jumpers with proper colors after the tenth of the month, and returns all others to the shops.

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*Abstract of a paper presented at the meeting of railway section of the Wisconsin Utilities Association held at Madison, Wis., Aug. 15, 1924.

Current-collecting devices should be closely inspected and proper tension should be checked every inspection. We find that sliding contacts give good service and few wire derailments. The cost is also lower than wheels. We electrically weld all inserts that become worn, using a very hard material. After grinding to contour we case-harden them. We use 35-lb. tension against the wire on both slides and wheels. Low tension is more destructive to overhead than high tension because it permits wheels to fill up with copper, deposited by the arcing.

Before leaving the subject of inspection I wish to call your attention to lubrication of controllers. Don't use lots of oil. Put a little on the end of your finger, rub over the segments, turn controller around two or three times and wipe off with a clean cloth. Too much oil gathers dust and makes the controller gummy, hard to work, and destroys good contact, thereby increases burning of segments and fingers.

In slotting a commutator there seems to be divided opinion as to the carefulness in which it should be done. All mica should be removed to a depth of $\frac{1}{16}$ in. Use a saw about 0.005 in. wider than the thickness of the mica, and after completing grooving inspect carefully to see that no part of the mica is left standing due to side slipping of the saw.

The string bands at the end of the commutator should receive several coats of baking varnish. For several years we have covered the string bonds with wide bias linen tape covered with several coats of varnish. This makes a very smooth, easily cleaned surface and is very satisfactory.

Fields should be removed from shells and repaired if needed, dipped and baked. Fields wound on brass spools sometimes become "tin-canned," that is, the winding has become loose through vibration, and if impregnation facilities are not available, dipping and baking will go a long way to restore them to useful service without rewinding.

Years ago we had lots of trouble with loose fields and we put an anchor clamp between the fields. The clamps rest on the field spools and the bolt goes through the shell with a nut on the outside. This stopped all loose field trouble.

In conclusion, let me say that irrespective of the amount of work done on the equipment on inspection or overhauling, test it before turning a car over to your transportation department. Nothing causes more friction than car failures, not only departmental but between the railway and the patrons. The success of a road depends on the class of service rendered, and the transportation department, no matter how good, cannot give fast and uninterrupted service unless the mechanical department hits the ball.

Growing Traffic and Ample Rates*

By B. C. Cobb

Vice-President Hodenpyl, Hardy & Company, Inc.

FINANCIAL success in any business is regulated by two factors: First, there must be a market for the product. Second, the price must be sufficient to pay all costs, plus a reasonable return on the capital invested. The electric railway business is no exception to this fundamental economic law. On these factors rests the permanency of the electric railway as a public servant.

It has gradually become apparent that neither the street car nor the motor bus by itself can give the public in most of our cities the combination of pleasure and utility it desires in all year round transportation facilities. Each form of transport has certain operating limitations and advantages over the other. Conditions vary of course with the character and size of the city served, but generally speaking it has been found that the electric railway can carry a larger number of people in a given time over more extended areas than any other form of surface transportation. It has also been found that street railway operating costs under traffic density conditions usually are lower than those of the motor bus.

Traffic density and congestion in many of our cities makes the electric railway the best and most economical form of mass transportation known. Outside of the rush hours, however, and in sparsely settled portions of a city the motor bus at present has an advantage, but this advantage cannot be considered permanent as the time surely will come when the motor bus will be obliged to pay a proper proportion of the cost of maintaining the roadbed provided by the public. Furthermore, the motor bus eventually will come under regulations as to schedules and routes similar to those that now apply to the electric railway. In other words, the bus cannot always expect to select the routes and time it desires to operate, but as a public utility it must be organized to give city-wide transportation service at regular intervals of the day or night whether or not any passengers are waiting on the corner to be picked up.

The electric railways under proper franchise restrictions and requirements, with their organization, equipment and years of experience—all of which represent the investment of between $5,000,000,000 and $6,000,000,000 — are preeminently the best qualified to, and should operate in the interests of the traveling public, such motor buses as may be required to round out and improve existing city transportation systems.

The mere combination of the electric railway and the motor bus, however, is not going to entirely solve the problem of city transportation. Both electric railways and motor buses are confronted with an exceedingly serious problem, and until it is solved or relief is granted from present conditions the matter of rendering quick, efficient and dependable transportation in cities is going to be increasingly difficult. I refer to the traffic congestion caused by privately owned automobiles.

When one considers the tremendous waste of time and money and the great personal inconvenience caused to a large portion of a city's population on account of traffic congestion it seems almost unbelievable that more and better organized steps have not been taken to remedy conditions. It has been proposed in some instances to widen the main streets of cities, but as a practical matter this cannot very well be done and if done would involve the expenditure of large sums of money which would have to be raised by taxation—and most people rightfully believe that the taxation business has about reached the limit of financial endurance. Much relief could easily be given, however, if city authorities would see to it that street cars, on account of their carrying such a large number of people, are given precedence over every other form of street traffic. This regulation should be enforced by making it a misdemeanor punishable by arrest and fine of anyone who unnecessarily interferes with the progress of a street car—a condition which exists today in Cleveland.

I do not fear that the motor bus will replace the electric railway in the larger cities for, contrary to the opinion of many people, the revenue passengers carried per capita in such cities last year showed material increases over 1910, and in some instances increases over 1922. This is of considerable significance when we remember that in 1910 there were only 468,000 motor vehicles of all sorts registered as compared with approximately 15,000,000 at the end of the year 1923. It also surely is of interest to know that in 1923 the electric railways of this country carried approximately 16,000,000,000 passengers, or in other words more passengers than in any other year in their history. This very clearly demonstrates the economic need and usefulness of the industry.

A better feeling of good will on the part of the public and the authorities has manifested itself through adjustment of fares to meet increased operating costs and taxes, the elimination of unfair motor bus and jitney competition, and relief from burdensome franchise restrictions. Thus the two old fundamentals of sufficient market and adequate rates have begun again to assert themselves. These things, together with a public more friendly than it has ever been before because of its better grasp of the electric railway situation, surely should make traction men face the future with renewed courage.

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*Abstract of a paper presented at the eleventh annual conference of the Babson Organization, Babson Park, Mass., Aug. 8, 1924.

Berlin Railroad Congress

A CONVENTION and exhibit of railway material is to be held in Berlin, Germany, Sept. 21 to Sept. 27, under the auspices of the Verein Deutscher Ingenieure. It is expected that there will be on exhibition more than

100 modern types of locomotives, including many electric locomotives and other types of rolling stock. The entire session one morning will be given up to the electric traction topics.

Set Your Own House in Order*

By A. E. Scott

Director of Public Relations, Interstate Public Service Company

IF A UTILITY company contemplating a plan for the improvement of relations with the public, proceeds with the idea that all the work necessary must be done with the public, then that company is making a great mistake. It is entirely wrong to assume all the fault for an adverse public sentiment lies with the public. No company will ever get anywhere on that theory. The management is not all of the company. It must not make the mistake of assuming that because it is doing its best to maintain proper relations with its public, every one else associated is doing the same thing. Too many executives are not sufficiently informed as to the every-day conduct of their employees. Too many do not know the shortcomings of their own organization. They are too close to see the inefficiencies and the internal causes of trouble.

If I were called upon to improve public relations for any public utility company I would begin with the company organization and not with the public. I would first set my own house in order. This is not only advantageous, it is necessary. Necessary because, if good public relations are to be had it must be through the active interest of everyone in the organization from the president down, and advantageous because much can be done with the entire force of employees back of any movement. Each man or woman has his or her influence and can add to the sum total of good results. It will not be difficult to create and maintain good public relations when every man working for the public utility company is constantly doing his part.

Enlisting the interest and assistance of each individual employee must be done in a systematic, organized way, under a definite plan, just as definite as are the other organized efforts for operation, stock selling, or new business. Committees and group meetings are of value in carrying on this work with employees. Committees to supervise and plan the work, group meetings as the means for getting in touch with each individual employee. Education is a most important force in public relations, and employees can best be educated by the machinery provided by committee and group meetings.

It is necessary first to establish within the organization of employees, a knowledge of the utility, the importance of good service and courtesy, and supplying the public with such information that they may have a better understanding of the utility business in general.

Having set our own house in order we are now faced with the second step in our activities and are confronted with this question: How shall we deal with the public in completing our job? Here again we must be honest and sincere and must have a definite, logical and practical plan.

The program for carrying on the work with the public should be designed to bring to the public information concerning public utility business and public utility problems, so that the people may understand these things and be made to appreciate more fully their own personal interest in them. For the presentation of this program, the company, having prepared its own organization, will have the whole body of employees properly equipped and anxious to perform their part. Thus, the responsibility will not rest entirely on the executives and those specially charged with the public relations work. Instead of having one or a dozen men working for better relations, the whole force will be interested and at work.

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*Abstract of a paper presented at the meeting of the Central Electric Railway Accountants' Association, Cleveland, Ohio, Aug. 15, 1924.

Traffic Safety Conference

INITIAL plans for a procedure to check highway and street accidents were discussed at a meeting of the committee on public relations of the Conference on Street and Highway Safety, held in Washington on Aug. 11. The chairman of the committee is George M. Graham, of the Chandler Motor Car Company. J. P. Barnes, president Louisville Railway, was present representing the American Electric Railway Association. Other members represented the steam railroads, taxicab interests, highway commission, casualty insurance companies, National Safety Council, etc. Col. A. B. Barber, director of the conference, was also present.

Discussion brought out the fact that there are many communities in the country today which are bewildered as to the best method of meeting the problem of accidents due to traffic. The conflicting laws of the different states on the subject add to the confusion.

American Association News

Foreign Operation Committee Returns

THE special committee on foreign operation appointed by the executive committee last June returned to New York on Aug. 29 on the steamship *Berengaria* after a trip of over seven weeks, having left this country on July 9. This committee consists of James W. Welsh, executive secretary American Electric Railway Association; Harley A. Johnson, assistant to general manager Chicago Rapid Transit Company and president of the American Electric Railway Engineering Association, and Harry L. Brown, editor ELECTRIC RAILWAY JOURNAL.

A study of electric railway conditions in a number of European cities has been made. Among the principal cities visited by the committee were London, Liverpool, Manchester, Glasgow, Edinburgh, Leeds, Paris and Bern. The British Empire Exposition at Wembley was also inspected. The committee is now preparing a report of its findings, which will be presented at the convention of the association next October.

Proposed Change in Constitution

AN IMPORTANT change in the membership clause of the Constitution of the American Association, and in the corresponding clause of the by-laws, has been proposed in order to permit the membership of subsidiaries of member companies operating buses or other forms of transportation and that are now not eligible to membership in the association.

The proposed constitutional amendment would change Article IV, Section (a), by the insertion of the words in italics so that it will read as follows:

IV. The membership of this Association shall consist of five classes as follows:

(a) Company members, consisting of American companies, operating urban and interurban railways, *and subsidiaries of such companies operating other forms of transport*, or lessees or individual owners of urban and interurban railways *and of such subsidiaries thereof*, or steam railways having electrified sections, and of companies, firms or individuals engaged in the business of manufacturing or selling materials for such electric railways or otherwise—subject to the approval of the Executive Committee—intimately related to electric railway operations.

(American, as here used, shall be understood to mean: Located inside the United States of America and its possessions, Canada and Mexico.)

Each company member shall be entitled to one vote, which shall be cast by its properly accredited delegate, and its representatives shall be entitled to hold office in the Association.

The proposed change in the by-laws would amend Article XVI, Section (c), to read as follows:

XVI. (c) Operating member companies shall pay in advance annual dues in accordance, except as to minimum and maximum, with the amount of their gross receipts from electric railway operation *and other forms of transportation service* during the preceding fiscal year of the respective members, as follows:

(Here follows present schedule of dues.)

Registration and Transportation Convention Plans

INFORMATION is being sent out from Association Headquarters to all members giving information regarding the Atlantic City convention to be held on Young's Million Dollar Pier Oct. 6 to 10. This includes advance registration cards, for the convenience of members, and identification railroad ticket certificates.

All of the trunk line passenger associations of the country have authorized the sale of round trip tickets to the convention at the rate of 1½ times the one-way fare on presentation of the certificate when the ticket is purchased at a local office. Tickets may be purchased for the going trip beginning Oct. 2 to 8 inclusive, and the return trip may be made leaving Atlantic City up to Oct. 16 inclusive, but must be by the same route as the going trip. The return ticket issued at the reduced fare will not be good on any limited train on which such reduced fare transportation is not honored. Stop-over privileges are provided in accordance with certain regulations which can be ascertained from the local agent.

Tickets will be validated at Atlantic City after arrival by agents of lines over which tickets read into Atlantic City.

Convention Programs of the American and Affiliated Associations

(Corrected by the Association up to Aug. 28)

Monday, Oct. 6, to Friday, Oct. 10

All Sessions to Be Held at Young's Million Dollar Pier, Atlantic City, N. J.
Registration Headquarters on the Pier Will Be Open Saturday, Oct. 4, and Sunday, Oct. 5.

AMERICAN ASSOCIATION

Monday Morning, Oct. 6.

9:30 A.M. to 12:30 P.M.

Registration.

Tuesday Morning, Oct. 7.

10 A.M. to 1 P.M.

Meeting Held in Greek Temple

Subject: FINANCE.

Address of the President.

Report of the Executive Committee.

Report of the Executive Secretary.

Report of the Treasurer.

Appointment of Committee on Resolutions.

Reports of Committees:

Finance—J. H. Pardee, president the J. G. White Management Corporation, New York City, chairman.

Policy—J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.

National Relations — C. L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis Ind., chairman.

Committee of One Hundred — Guy E. Tripp, chairman board of directors Westinghouse Electric & Manufacturing Company, New York City, chairman.

Special Taxes—W. H. Maltbie, special counsel The United Railways & Electric Company, Baltimore, Md., chairman.

National Council'or U. S. Chamber of Commerce—J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., representative.

Advisory Committee on Electric Railway Finance—A. L. Loomis, vice-president Bonbright & Company, Inc., New York City, chairman.

Paper—"Financing of Electric Railways," by Allen G. Hoyt, vice-president National City Company, New York City.

Paper—"Financing of Electric Railways," by J. P. Harris, vice-president Union Trust Company, Cleveland, Ohio.

Paper — "Customer and Employee Ownership of Electric Railways," by Prof. T. N. Carver, Harvard University, Cambridge, Mass.

Formal Discussion on "Customer Ownership"; C. W. Kellogg, Stone & Webster, Inc., Boston, Mass.; Fred Scheel, vice-president Utility Securities Company, Chicago, Ill.

Tuesday Evening, Oct. 7.

General Evening Session

Meeting He'd in Ball Room

Arrangements are being made for addresses by prominent speakers. It is planned to broadcast these addresses by radio.

Wednesday, Oct. 8.

Inspection of Exhibits

This entire day has been set aside by the officers of the association for the inspection of manufacturers' exhibits. No formal convention sessions of the American Association or the affiliated associations will be held.

The official business of the day is the inspection of exhibits and every delegate is urged to take advantage of the opportunity to visit the manufacturers' booths where the most modern equipment and latest appliances are on display.

Thursday Morning, Oct. 9.

10 A.M. to 1 P.M.

Meeting held in Greek Temple.

Subject: CO-ORDINATION.

Report of Committee on Nominations—C. D. Emmons, president The United Railways & Electric Company, Baltimore, Md., chairman.

Election of Officers.

Reports of Committees:

Valuation—F. W. Doolittle, vice-president The North American Company, New York City, chairman.

Discussion.

Unification and Co-ordination of All Forms of Local Transportation—G. A. Richardson, vice-president and general manager Chicago Surface Lines, Chicago, Ill., chairman.

Discussion.

Paper — "Co-ordination of Motor Vehicle and Electric Railway Service by Electric Railway Companies," by A. J. Brosseau, secretary and director National Automobile Chamber of Commerce; president Mack Trucks, Inc., New York City.

Paper — "Co-ordination of Motor Vehicle and Electric Railway Service by Electric Railway Companies," by Paul Shoup, president Pacific Electric Railway, San Francisco, Cal.

Address — "Relation of Municipal Officers to the Utility," by Mayor William A. Magee, Pittsburgh, Pa.

Address — "Necessity of Electric Railways to Communities," by L. F. Eppich, past president National Association of Real Estate Boards, Denver, Col.

Address — "Necessity of Electric Railways to Communities," by W. D. B. Ainey, chairman Public Service Commission of Pennsylvania, Harrisburg, Pa.

Address—"The Future of Electric Railways in Great Cities," by Gerhard M. Dahl, chairman board of directors Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

Paper—"Muscle Shoals," by Robert G. Gordon, Louisville, Ky.

Friday Morning, Oct. 10.

10 A.M. to 1 P.M.

Meeting held in Greek Temple.

Subject: MANAGEMENT.

Reports of Committees:

Community Section, Company Section and Individual Membership—C. E. Morgan, vice-president and general manager Brooklyn City Railroad, Brooklyn, N. Y., chairman.

Company and Associate Membership—R. P. Stevens, president Republic Railway & Light Company, New York City, chairman.

Co-operation with State and Sectional Association—J. P. Barnes, president Louisville Railway, Louisville, Ky., chairman.

Publicity—W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.

Publications—L. S. Storrs, president The Connecticut Company, New Haven, Conn., chairman.

Co-operation with Manufacturers — E. F. Wickwire, vice-president Ohio Brass Company, Mansfield, Ohio, chairman.

Education—Edward Dana, general manager Boston Elevated Railway, Boston, Mass., chairman.

Indeterminate Franchises — Edwin Gruhl, vice-president and general manager The North American Company, New York City, chairman.

Insurance—John T. Staub, treasurer United Railways & Electric Company, Baltimore, Md., chairman.

Mail Pay—L. H. Palmer, vice-president and general manager, United

Railways & Electric Company, Baltimore, Md., chairman.

Rapid Transit—William S. Menden, president Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., chairman.

Uniform Regulatory Laws—A. W. Brady, president Union Traction Company of Indiana, Anderson, Ind., chairman.

Coffin Prize Award—Britton I. Budd, president Chicago Rapid Transit Company and Chicago, North Shore & Milwaukee Railroad, Chicago, chairman.

City Operation — H. B. Flowers, president New Orleans Public Service, Inc., New Orleans, La., chairman.

Interurban Operation—Harry Reid, president Interstate Public Service Company, Indianapolis, Ind., chairman.

Foreign Practice—J. W. Welsh, executive secretary American Electric Railway Association, New York City, chairman.

CLAIMS ASSOCIATION

Meetings held in Claims Room

Monday Afternoon, Oct. 6.

2 to 5:30 P.M.

Address of the President.

Report of Executive Committee.

Report of Secretary-Treasurer.

Appointment of Committee on Nominations.

Report of Committee on Uniform Grade Crossings Law—William G. Fitzpatrick, general claims attorney Detroit United Railway, Detroit, Mich., chairman.

Discussion.

Report of Committee on Claims Department Aspects of Motor Bus Operation—G. T. Hellmuth, claims attorney Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.

Discussion.

Report of Committee on Accident Prevention—H. O. Allison, commercial manager Beaver Valley Traction Company, New Brighton, Pa., chairman.

Discussion.

Paper—"What Can the Claim Agent Do Toward Encouraging a Better Relationship with the Employees of the Company and with the Public," by Col. H. G. Winsor, superintendent of investigations and adjustments Tacoma Railway & Power Co., Tacoma, Wash.

General Discussion.

Tuesday Afternoon, Oct. 7.

2 to 5:30 P.M.

MEDICAL AND SURGICAL SESSION

Report of Committee on Medical and Surgical Work—Hart E. Fisher, chief surgeon Chicago Rapid Transit Company, Chicago, chairman.

Paper—"A Few Questions on Eye Hazards in Welding," by Hart E. Fisher chief surgeon Chicago Rapid Transit Company, Chicago, Ill.

Paper — "Problematical Industrial Hernia," by S. R. Benedict, chief surgeon Alabama Power Company, Birmingham, Ala.

Paper — "Malingering," by F. L. Mosser, surgeon Third Avenue Railway System, New York City.

Paper — "Organization of Medical Department," by J. J. Wymer, surgeon New Orleans Public Service, Inc., New Orleans, La.

Paper — "Medical Survey of Employees," by Alden Coffey, chief surgeon Northern Texas Traction Company, Fort Worth, Tex.

Paper—"Periodical Re-examination," by E. W. Miller, chief surgeon The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

Paper — "Hospital Association," by H. M. Bascom, chief surgeon Illinois Traction, Inc., Peoria, Ill.

Paper—"Pelvis Fractures," by J. A. Watts, chief surgeon San Antonio Public Service Company, San Antonio, Tex.

Paper — "Co-operative Hospitalization for Corporations," by F. S. Macy, physician-in-charge Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

Wednesday, Oct. 8.

Inspection of manufacturers' exhibits. See announcement in American Association program.

Thursday Afternoon, Oct. 9.

2 to 5:30 P.M.

Paper — "Automobile Hazard," by Charles B. Hardin, general claim agent United Railways of St. Louis, St. Louis, Mo., chairman.

Formal Discussion—H. K. Bennett, safety manager United Electric Railways, Providence, R. I.

General Discussion.

Paper — "Prevention of Highway Crossing Accidents," by H. A. Rowe, chairman committee on prevention of highway crossing accidents, American Railway Association, New York City.

General Discussion.

Report of Committee on Resolutions—William Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., chairman.

Report of Committee on Nominations.

Election of Officers.

Installation of Officers.

Presentation of Past-President's Badge.

ACCOUNTANTS' ASSOCIATION

Monday Morning, Oct. 6.

9:30 A.M. to 12:30 P.M.

Registration.

Afternoon

2 to 4:30 P.M.

Meeting held in Accountants' Room.

Address of the President.

Report of the Executive Committee:

Report of Secretary-Treasurer.

Appointment of Convention Committees:

(*a*) *Resolutions.*
(*b*) *Nominations.*

Presentation by I. A. May, Comptroller The Connecticut Company, of a proposed Code of Ethics for adoption by the American Electric Railway Accountants' Association.

Discussion.

Report of Committee Representing the Accountants' Association at the Annual Convention of the National Association of Railway and Utility Commissioners—W. L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa., chairman.

Discussion.

Report of Committee on Standard Classification of Accounts—Robert N. Wallis, treasurer Fitchburg & Leominster Street Railway, Fitchburg, Mass., chairman.

Discussion.

Report of Committee on Stores Accounting—R. A. Weston, special accountant The Connecticut Company, New Haven, Conn., chairman.

Discussion.

Tuesday Afternoon, Oct. 7.

2 to 4:30 P.M.

Meeting held in Engineering Room

Joint Session 2:00 P.M. to 2:30 P.M., Engineering and Accountants' Associations.

Report of Joint Committee on Engineering-Accounting — L. R. Brown, office and field engineer New York State Railways, Rochester, N. Y. and G. F. Dinneen, auditor Holyoke Street Railway, Holyoke, Mass., co-chairmen.

Discussion.

At the close of the discussion of the above report, the members of the Accountants' Association will adjourn to their meeting room where the Accountants' session will be continued.

Paper — "Suggestions on Segregations in Cost Accounting from the Viewpoint of the Manufacturer in Reference to Maintenance Accounts," by Henry S. Day, manager transportation division Westinghouse Electric & Manufacturing Company, Boston, Mass.

Discussion.

Paper—"Accounting as Related to Administration and Proprietorship," by Homer A. Dunn, Haskins & Sells, New York City.

Discussion.

Wednesday, Oct. 8.

Inspection of manufacturers' exhibits. See announcement in American Association program.

Thursday Afternoon, Oct. 9.

2 to 4:30 P.M.

Meeting Held in Accountants' Room

Paper—"Electric Railway Balance Sheets," by C. B. Couchman, Certified Public Accountant, New York City.

Report of Committee on Relations with Other Associations — M. W. Glover, general auditor West Penn Railways, Pittsburgh, Pa., chairman.

Reports of Convention Committees:

(*a*) *Resolutions.*
(*b*) *Nominations.*

Election of Officers.

Installation of Officers.

Presentation of Past-President's Badge.

ENGINEERING ASSOCIATION

Meetings Held in Engineering Room

Monday Afternoon, Oct. 6.

2 to 5:30 P.M.

Address of the President.

Report of the Executive Committee.

Report of Secretary-Treasurer.

Appointment of Convention Committee on Resolutions.

Reports of Committees:

Special Committee on Unit Basis of Voting on Standards—C. S. Kimball, engineer way and structures, Washington Railway & Electric Company, Washington, D. C., chairman.

Special Committee on Engineering Manual—R. C. Cram, engineer surface roadway Brooklyn-Manhattan Transit Corp., Brooklyn, chairman.

Special Committee on Engineering Symbols—W. F. Graves, chief engineer Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., chairman.

Discussion.

Special Committee on Air Reservoir Specifications—R. H. Dalgleish, chief engineer The Capital Traction Company, Washington, D. C., chairman.

Discussion.

Committee on Heavy Electric Traction—J. C. Davidson, engineer electric traction Norfolk & Western Railway, Bluefield, W. Va., chairman.

Discussion.

Committee on Wood Preservation—A. P. Way, electrical engineer American Electric Power Company, Philadelphia, Pa., chairman.

Discussion.

Committee on Building and Structures—N. E. Drexler, chief engineer Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.

Discussion.

Special Committee on Car and Carhouse Wiring—H. H. Adams, superintendent shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.

Discussion.

Tuesday Afternoon, Oct. 7.

2 to 5:30 P.M.

Joint Session 2:00 P.M. to 2:30 P.M., Engineering and Accountants' Association.

Report of Joint Committee on Engineering-Accounting — L. R. Brown, office and field engineer New York State Railways, Rochester, N. Y. and G. F. Dinneen, auditor Holyoke Street Railway, Holyoke, Mass., co-chairmen.

Discussion.

At the close of the discussion of the above report, the members of the Accountants' Association will adjourn to their meeting room and the session of the Engineering Association will be continued.

Report of the Committee on Unification of Car Design—H. H. Adams, superintendent shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.

Discussion.

Report of Committee on Equipment—F. H. Miller, vice-president Louisville Railway, Louisville, Ky., chairman.

Discussion.

Report of Committee on Way Matters—H. H. George, engineer maintenance of way Public Service Railway, Newark, N. J., chairman.

Discussion.

Report on Welded Rail Joint Research—W. W. Wysor, chief engineer United Railways & Electric Company, Baltimore, Md., chairman sub-committee No. 5, committee on way matters.

Discussion.

Tuesday Afternoon, Oct. 7.

PURCHASING AGENTS AND STOREKEEPERS

Session held under the auspices of the Committee on Purchases and Stores, Engineering Association.

2 to 4 P.M.

Address of Welcome—H. A. Johnson, president American Electric Railway Engineering Association; assistant to the general manager Chicago Elevated Railroads, Chicago, Ill.

Address—"What the Purchasing and Stores Departments Can Do in Building Up Good Will for the Company." Speaker to be announced later.

Discussion.

Report of the Committee on Purchases and Stores—Jackson P. Dick, assistant to the vice-president and general manager Georgia Railway & Power Co., Atlanta, Ga., chairman.

Discussion.

Paper—"The Economic Importance of a Well Regulated Supply Department in the Life of a Street Railway Company," by C. A. Harris, general storekeeper Pittsburgh Railways, Pittsburgh, Pa.

Discussion.

Paper — "Proper Co-operation Between the Purchasing and Stores Departments and the Operating Department — from the Engineer's Standpoint," by L. C. Datz, chief engineer Memphis Power & Light Company, Memphis, Tenn.

Paper — "Proper Co-operation Between the Purchasing and Stores Departments, and the Operating Department—from the Purchasing Agent's Standpoint," by Harry M. Lloyd, purchasing agent Indianapolis Street Railway, Indianapolis, Ind.

Discussion.

Wednesday, Oct. 8.

Inspection of manufacturers' exhibits. See announcement in American Association program.

Thursday Afternoon, Oct. 9.

2 to 5:30 P.M.

Reports of Committees:

Committee on Power Generation and Conversion—L. D. Bale, superintendent of substations Cleveland Railway, Cleveland, Ohio, chairman.

Discussion.

Committee on Power Transmission and Distribution—C. H. Jones, electrical engineer Chicago Rapid Transit Company, Chicago, Ill., chairman.

Special Committee on Automatic Substations—W. E. Bryan, superintendent of power United Railways of St. Louis, St. Louis, Mo., chairman.

Discussion.

Committee on Purchases and Stores—Jackson P. Dick, assistant to vice-president Georgia Railway & Power Company, Atlanta, Ga., chairman.

Discussion.

Committee on Resolutions.

Committee on Nominations.

Election of Officers.

Installation of Officers.

Presentation of Past-President's Badge.

Note: The action of the committee on standards will be presented immediately following each recommendation of a standing committee in which the Engineering Manual is involved.

TRANSPORTATION AND TRAFFIC ASSOCIATION

Meetings held in Transportation and Traffic Room

Monday Afternoon, Oct. 6.

2 to 5:30 P.M.

Address of the President.

Report of Executive Committee.

Report of the Secretary-Treasurer.

Appointment of Convention Committees:

(*a*) *Resolutions.*

(*b*) *Nominations.*

Report of Committee on Accident Prevention—Charles W. Chase, president Gary Street Railway, Gary, Ind., chairman.

Discussion.

Report of Committee on Development of New Business—F. W. Shappert, traffic manager Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., chairman.

Discussion.

Tuesday Afternoon, Oct. 7.

2 to 5:30 P.M.

ADVERTISING AND PUBLICITY SYMPOSIUM

A number of men who have been eminently successful will participate in this symposium. Their names will be announced later.

Report of Committee on Trackless Vehicle Operation—W. J. Flickinger, assistant to the president the Connecticut Company, New Haven, Conn., chairman.

Discussion.

Wednesday, Oct. 8.

Inspection of manufacturers' exhibits. See announcement in American Association program.

Thursday Afternoon, Oct. 9.

2 to 5:30 P.M.

Report of Committee on Relief of Traffic Congestion—Paul E. Wilson, secretary Cleveland Railway, Cleveland, Ohio, chairman.

Discussion.

General Business.

Reports of Committees:

(*a*) *Resolutions.*

(*b*) *Nominations.*

Election of Officers.

Installation of Officers.

Presentation of Past-President's Badge.

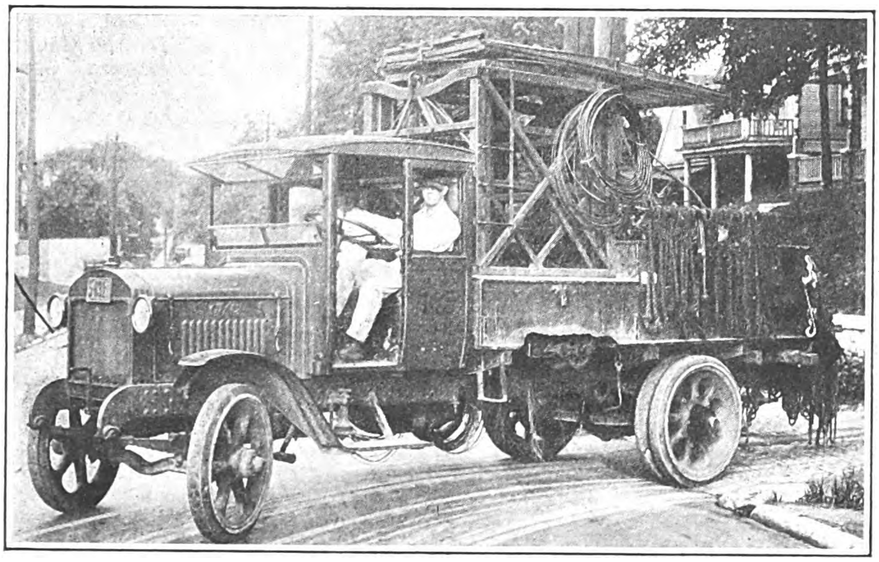
Maintenance of Equipment

Truck for Line Construction and Maintenance

A HEAVY-DUTY truck is giving satisfaction on line work on the Kansas City Railways, Kansas City, Mo. The truck illustrated is a General Motors Company 3½-ton chassis of 114-in. wheelbase motored to 51 hp., and capable of a speed of 40 m.p.h.

The truck, as equipped, has a capacity of 11 tons and several features were incorporated in the body construction for the convenience and comfort of the crew. It has a triple extension deck and ample compartment for a full complement of tools and materials. The tool boxes, being built longitudinally on the inside of the bed, serve also as seating space for the crew, which consists of from five to 12 men, depending on the class of work that is being done. Five men are used as a rule in maintenance work, while larger crews are usually employed in construction work.

A completely inclosed cab is also a feature of the truck, insuring comfort to the driver in severe weather. The deck elevation has a maximum of approximately 21 ft.; the platform is 4 ft. x 7½ ft. This particular truck has been in service since March of this year and has proved highly satisfactory. The big trucks are used exclusively in construction and maintenance work—that is, they are rarely called upon in emergency cases, lighter equipment being provided for such work.



Working Crews of from Five to Twelve Men Accompany This Heavy-Duty Line Truck Used in Kansas City for Construction and Maintenance Work

Aluminum Paint Used on Car Exterior

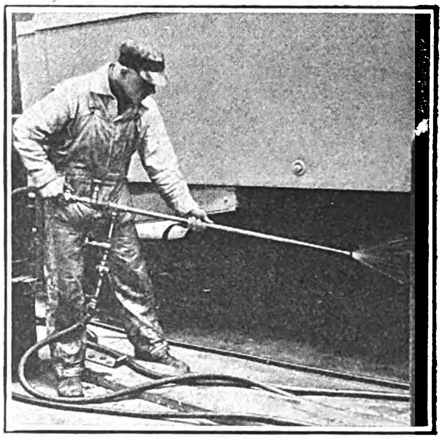
ALTHOUGH aluminum paint has been used for many years where it is protected from the elements, its application to outdoor service is of comparatively recent origin. During the early part of August the Pittsburgh Railways, Pittsburgh, Pa., placed in service on its Crosstown route a car painted in this manner.

Aluminum powder, the base of the paint, is made by stamping sheet aluminum into very fine and small flakes, the process being originated by the Aluminum Company of America. These flakes are carefully sized by a series of sieves to give a uniform product, and where a high luster is desired a special polishing process is then employed. When the powder, which is mixed with varnish, is applied these flakes form a continuous film of metallic aluminum, arranging themselves layer upon layer much like fish scales and giving the effect of leafing. As this layer of aluminum scale prevents water reaching the metal underneath, the car is well protected from the elements.

It is thought that cars given an exterior finish of aluminum paint will be cooler in summer than other cars, as the bright color will reflect the rays of the sun. A temperature test is being made on the car.

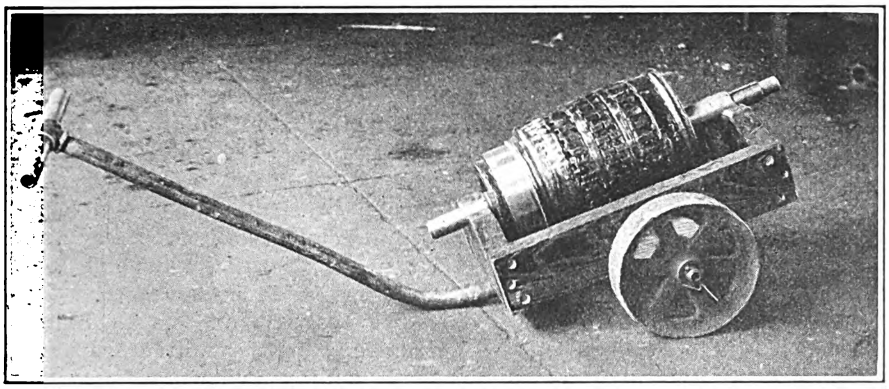
Air and Water Nozzle Cleans Trucks Before Painting

A PIECE of pipe about 4 ft. long to which are connected water and air hose with control valves, as shown in the accompanying illustration, has been found by the Department of Street Railways, city of Detroit, to make an efficient device for cleaning truck frames and parts preparatory to painting. Air is admitted at high pressure and the nozzle is held comparatively close to the part to be cleared. Dirt, sand, loose scale or other accumulated material are blown off readily and the truck parts are quickly put into condition for painting. This method has been found very much faster than the older method of using brushes or brooms for cleaning the truck side frame and parts.



Cleaning Trucks at Detroit by Air and Water Nozzle

A material advantage is obtained by the combination of water with the air. The parts are more thoroughly cleaned and the water tends to prevent the dust and dirt blown off by the compressed air from rising into the atmosphere of the paint shop.



Small Carriage for Transporting Compressor Armatures in the Decatur Shops of the Illinois Traction System

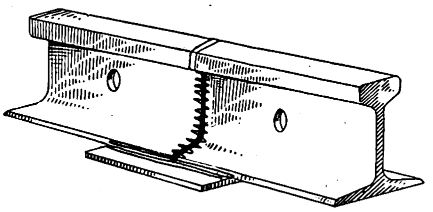
Small Carriage for Compressor Armatures

TRANSPORTING the air compressor armature from the pump room to the armature room at the Decatur shops of the Illinois Traction System is accomplished by the use of a two-wheeled carriage. Simplicity of construction is the outstanding feature of the wagon. A wood frame has 6-in. x 2-in. ends, 12 in. long, with the upper edges grooved out to receive the armature shaft. The sides are 4 in. x 2 in., long enough to extend over the ends, and allowing ample room between them to accommodate the armature. Counter-sunk screws hold the frame together.

The frame is mounted on an axle which has at each end a 10-in. iron wheel with 1½-in. tread. At the center of the axle is a tee connection to which the handle is fastened. This handle extends beyond the front of the frame and is there bent upward to a convenient height for a man to hold the short cross-member at its extremity. Pipe and pipe fittings are used in the construction of the metal framework.

Arc-Welded Joint Used Without Plates

A NOVEL method of repairing battered joints by arc welding without using plates has been tried by E. W. Jennison, engineer maintenance of way Bangor Railway & Electric Company, Bangor, Me. When it is decided to repair a joint in this way the paving is opened up and the old joint plates are removed. A small piece of steel, such as a tie plate, is then welded to the under side of the rail at the joint. By means of the electric arc weld the space between the rail ends is then filled up by zig-zagging the arc along the web of the rail, across the opening. This is carried up through the head of the rail where any depression is filled with welding metal. The joint is then ground down. No plates of any kind are used. The railway has found by experience that it takes about one hour to make a joint of this kind. Such joints are not considered superior to thermit welded joints, which are now extensively used by the Bangor Railway & Electric Company, but they are considered sufficiently good, and can be made more quickly and easily than thermit welds.



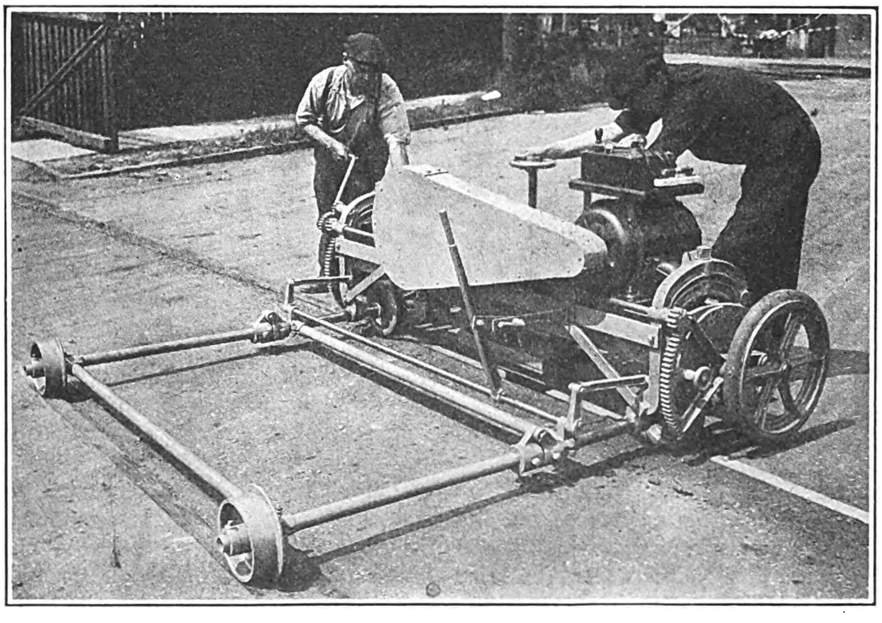
Rail Joint Made by Use of Arc Weld Without Plates

New Equipment Available

Reciprocating Rail Joint Grinder

A NEW rail joint grinder is being introduced by the Railway Track-work Company, Philadelphia, Pa. The new machine employs the reciprocating or planer method of grinding instead of using a rotating wheel. The abrasive is in the form of blocks 10 in. x 4 in. x 2½ in. with a steel pin inserted in one end. Two blocks are used in one setting of the machine, which provides a grinding surface 8½ in. x 2½ in. The blocks are placed endwise in the crosshead or holder which slides bodily in guides and is rubbed back and forth over the rail by means of a rocker arm movement. The normal speed of the machine is 340 strokes per minute. A constant-speed, 3-hp., 600-volt direct-current motor is used for driving the grinder.

As the abrasive blocks wear, the end wedge is slackened by turning a small handwheel over the wedge and the blocks are fed downward by means of a larger handwheel which operates the feed screws directly over the block. The machine may be derailed in order to allow cars to pass by turning the crankshaft at the right of the machine. This

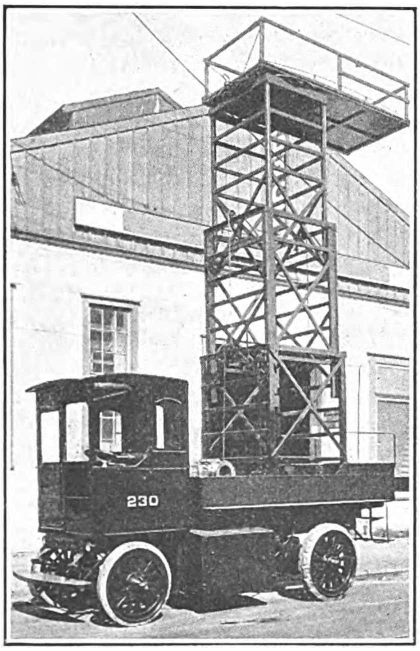


New Rail Joint Grinder

lowers the derailed wheel to the pavement and raises the grinder from the track. Ninety-five per cent of the weight of the machine is supported on the derail wheels. The outrigger is hinged so that it can be raised vertically. When this is raised, the machine can be readily pulled off the track.

A Higher Tower Wagon for Painting Poles

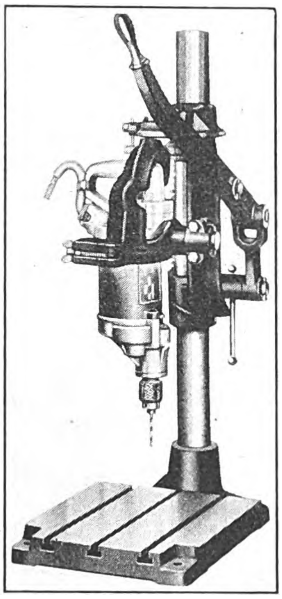
A THREE-SECTION tower wagon with a height of 22 ft. from the ground to the platform has been designed and put on the market by J. R. McCardell & Company, Trenton, N. J. This height is several feet in excess of previous types of tower wagon made by this company. When the tower is collapsed, the over-all height of the vehicle is approximately 11 ft. 6 in. The tower is raised and lowered by means of a Sprague 1-ton electric hoist mounted directly behind the cab. The control of the hoist is from the driver's seat. This direct control combined with the unusual height of the tower makes the vehicle particularly well adapted for painting poles. In this work it is conveniently handled by two men, a driver and a painter on the platform. The tower can be raised by means of the electric hoist in approximately 30 seconds and lowered in less than 10 seconds. The design is such that it could be mounted on a gasoline-driven truck chassis as well as on the electric truck shown in the illustration. In that case the raising and lowering of the tower would be accomplished by a power take-off.



An Unusually High Tower Which Is Operated from the Driver's Seat Makes This Vehicle Well Adapted for Painting Poles

Bench Drill for Small Work

A SMALL-SIZE bench drill stand suitable for ¼-in. and 5/16-in. hand drills has been added to the Hisey-Wolf Machine Company's line of bench drills. The small sizes of hand drills are held in position by using an adapter bracket. Without this bracket the drilling stand can be used with Hisey portable drills of ⅜-in., ½-in. and ⅝-in. capacity. This combination makes a portable sensitive drill press which can be operated from a lamp socket. The stand is fitted with an adjustable depth drilling stop which is a convenient feature when duplicating a considerable amount of work. The length of feed by lever is 4½ in. and the maximum distance from the top of the face to the drill chuck is 17 in. The net weight of the stand is 90 lb.


A Bench Drill Stand for Holding Electric Hand Drills

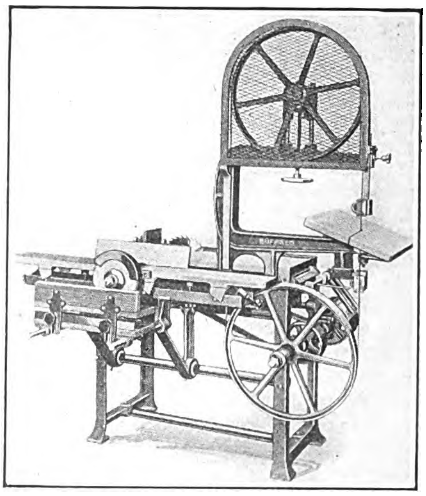
Improved Combination Woodworker

INCREASED planing capacity is a feature of the combination woodworker No. 2, manufactured by the Buffalo Forge Company, Buffalo, N. Y. This is the smallest of the woodworkers made by this company. The new planer head permits the planing of boards up to and including 8 in. wide, or 2 in. over the older design. The planer table is made in two parts, which fit into the channel on the main table and are adjustable on an inclined plane. One part of the table may be set at a lower level when planing to obtain the desired depth of cut. The planer guide used here consists of a hinged plate, ground to a high finish and locked with a single thumb nut. Any angle desired for beveling may be obtained with this guide arrangement.

The bandsaw on this machine is furnished with a cast-iron tilting table 17½ in. long and 14¼ in. wide. This table may be locked in position by means of a positive action cam and handle. The bandsaw wheels are turned and balanced. Slippage of the saw, and heat from the blade is reduced by an endless rubber band acting as a face cover.

The drive with this machine is of the pinion and gear pulley type. The gear ratio is approximately 2 to 1. The pulley pinion is cast in one piece, while the main shaft pinion is keyed to the shaft.

A feature of the machine is the handy belt shifter used. The driveshaft is 1 in. in diameter and runs in 4-in. babbitted and reamed bearings, split for adjustment. In addition the pulley for the jointer and the lower bandsaw wheel are also connected to this shaft by means of jaw clutches. This enables independent operation of each part, with resultant reduction in power and bearing wear.


This Motor-Driven Woodworker Combines Planer and Bandsaw

The driveshaft may be mounted to an electric motor or gas engine. The maximum power needed is about 1 to 2 hp. for the bandsaw and up to 3 hp. for the ripsaw, depending on the capacity and feed. The driveshaft should be run at about 700 r.p.m.

The News of the Industry

Important Boston Proposal

Metropolitan Planning Board Favors Rapid Transit Service Over Electrified Railroad Branches

In consultation with officials of the Boston Elevated Railway the Metropolitan Division of Planning, which is a State commission, has decided upon general outline plans for an extension of the rapid transit service out of Lechmere Square, Boston, to serve Somerville, North Cambridge, Arlington and the communities beyond on the northwestern side of Boston. Working details for the construction of such a rapid transit line will be developed by the commission, after which the proposition will be reported to the Legislature next January.

It is proposed to build a new roadbed out from Lechmere Square, parallel to the Boston & Maine Railroad for a short distance, and then cross over to the Lexington branch of the Boston & Maine and to take over that branch for a high-speed trolley service. It is understood that both the Elevated, which would have to operate the new service, and the Boston & Maine, which would have to give up one of its smaller branches, are favorably disposed toward the proposition.

The Planning Division, which advances the plan, was created by the Legislature of 1923. Some new specific duties were turned over to it by the Legislature of 1924, and its report to the Legislature of 1925 will be in the nature of official expert advice. The route which it is now suggesting is in line with the tendency for rapid transit development through Somerville and Cambridge and Arlington. The whole matter has a fair assurance of receiving favorable consideration from the Legislature. If the plan is adopted the service over the new line will be operated by the Boston Elevated. A large expenditure of money will have to be made in order to carry out the work. Some private land will have to be taken, several miles of new track will have to be laid, and the Lexington branch of the Boston & Maine will have to be electrified. Further details are not yet available for publication.

Helping Trainmen Understand Meaning of Service

In its untiring effort to serve its patrons and employees the Pittsburgh Railways, Pittsburgh, Pa., through its commercial department recently prepared in poster style some words of wisdom which if digested by the trainmen will result in more efficient operators and a more satisfied public. The company asks the trainmen if there is anything that should be said to the Police Department which may prove helpful to the trainmen and the policemen. It reads as follows:

> A friendly policeman ranks among the best assets a trainman can have. Co-operate with the police in making their work easier, especially at street intersections where traffic is heavy.
>
> Is there anything that we should say to the Police Department that may prove helpful to you and to them?

Another poster, entitled "Information," reads thus:

> Many passengers on your cars are strangers or residents of the city who ride infrequently and require information of various kinds.
>
> Try to be familiar with locations of streets, transfer points, parks, buildings, how to reach certain points by the cars, route designation of cars and other facts so they may be given in detail.
>
> The correct method of calling the names of all streets where stops are made is a great help to passengers.
>
> How may we help you to help the passenger who pays our wages, and in fact all expenses?

Denies Bus Permit Because of Railroad Facilities

The Public Service Commission of New York State gave consideration to existing railroad facilities and denied the application of Charles L. Wagner of Fonda, N. Y., for a certificate for the operation of a bus line between Amsterdam and Fonda and between Fonda and Fultonville. Mr. Wagner proposed to operate four trips a day and to charge passengers 50 cents a ride between Amsterdam and Fonda, a distance of 10.5 miles via the New York Central Railroad.

Evidence by the New York Central Railroad showed that there are nine passenger trains a day between Amsterdam and Fonda and six trains east from Fonda. There were 46,640 passengers so carried for the year ended March 1 last. The railroad showed that it operated trolley cars between Amsterdam and Fort Johnson and Tribes Hill, thence north to Sulphur Springs, where passengers can transfer to the trolley cars from Johnstown and Gloversville and go to Fonda. The trolley line fare between Amsterdam and Fonda is 48 cents.

The commission said it was true it might serve the convenience of some to have extra transportation between Fonda and Amsterdam, but considering the size of the places to be served, a schedule of nine trains in one direction and six in another would seem to be ample. The commission stated further that between Fonda and Fultonville there was necessity for some means of public transportation, but the applicant did not believe this route could be run profitably unless the line was extended to Amsterdam. Fonda and Amsterdam have two means of travel at the present time, and until a greater demand arises, the commission said, there was no public convenience to be served by the operation of the bus route.

Wage Matter in Court

Cleveland Controversy to Come Up Sept. 8 for Formal Hearing—Past Proceedings Scored

Depositions are now being taken in the court action brought by the union at Cleveland in an effort to compel the Cleveland Railway to pay a wage increase of 12 cents an hour awarded last May by an arbitration board from which the company had withdrawn its representatives. The suit itself is to be heard in court on Sept. 8. This action seeks to compel specific performance in accord with the findings of the arbitration board.

William Rea, secretary of the union, testified in his deposition that he had written a letter indorsing James W. Holcomb, the fifth and neutral member of the arbitration board, for the position of U. S. Customs Collector in Cleveland. This letter was written to Senator F. B. Willis under date of May 19, shortly after Mr. Holcomb was selected to be the fifth arbitrator. It was because John J. Stanley, president of the Cleveland Railway, contended that Mr. Holcomb was prejudiced in favor of the men that the railway company withdrew from the arbitration proceedings.

Mr. Rea testified that Mr. Holcomb had asked him to assist in securing labor indorsement of Mr. Holcomb's candidacy for the federal position as early as last January. John G. Owens, secretary of the Cleveland Federation of Labor, also wrote a letter indorsing Mr. Holcomb for the Customs Collectorship.

The Cleveland Railway contends that the letters of Messrs. Owens and Rea prove that Mr. Holcomb was prejudiced in favor of the car men's union.

Mr. Stanley, in his deposition, testified that he had been "framed" and "double-crossed" in the arbitration and it was for that reason he withdrew. He also said that two men purporting to come from Mr. Holcomb had approached him and asked him to tell them "what the company expected in the arbitration." He said he informed these two men that that wasn't the company's way of doing business.

Mr. Holcomb sent a bill to the Cleveland Railway for $1,250 as the company's half of his fee for acting as arbitrator, but the company has ignored the bill and invited Mr. Holcomb to sue to get it.

In Mr. Rea's letter to Senator Willis he makes the statement that Division 268 of the Amalgamated Association in Cleveland, representing 3,200 men, favored Mr. Holcomb for Customs Collector. In his testimony, however, Mr. Rea said that he hadn't discussed with the union executive committee or the union membership the indorsement of Mr. Holcomb.

Court Against Jitney Operators in Dover, N. J.

The Supreme Court of New Jersey recently sustained Judge Daly in the Morris Circuit Court in directing a nonsuit in the actions brought by Michael J. Kelly and Arthur J. Seldney, operators of buses between Morristown and Wharton, against the Morris County Traction Company and the officials of Dover, N. J.

The complaint in the case charged that the defendants carried on a campaign of libel, and conspiracy to destroy the plaintiffs' jitney business. It was also charged by the plaintiffs that the traction company and Otto G. Schultz, its treasurer, instituted several suits against them and sent a libelous communication concerning them to the Mayor and Board of Aldermen of Morristown.

The traction company, the court contended, owed to its stockholders the duty of affording them all legal protection against unjust or unlawful competition. It was therefore legitimate for it to apply to the court for any restraint upon the plaintiffs that seemed capable of affording protection in this respect.

The court ruled that there was nothing to show that the municipal authorities, in adopting the ordinances, or in the attempts to enforce them, were actuated by other than honest purpose to perform a public duty, and that a car line was only a means whereby the community could be transported from one point to another with convenience. The public was interested to see that this transportation was efficient, responsible and supplied at the lowest cost. Further, that a diversion of travel to other means naturally contracted the public patronage of the traction company and made probable added costs, in the way of higher fares to those who patronized its lines.

The court said that the public authorities were interested in the protection of the highways themselves against unreasonable use. Whether the ordinances were valid or invalid was of no consequence unless it appeared that the authorities were actuated by improper motives in their adoption and attempted enforcement. The court ruled that their actions were based upon an honest effort to preserve the public rights.

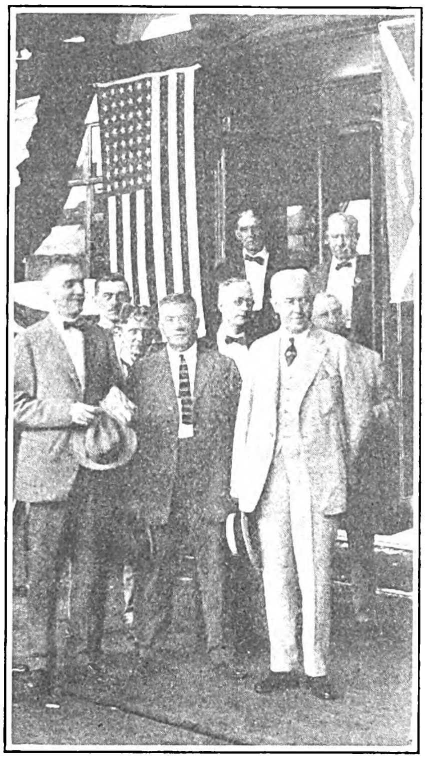
Railway in Competition for Michigan Bus Permits

The right of steam and electric railways to operate bus lines as common carriers is to be decided by the Michigan Public Utilities Commission. The question has been raised by the Northern Transit Company, which operates common carrier bus lines that connect Bay City, Saginaw and Flint.

The Northern Transit Company's state permit to operate buses expired on June 23 and it has applied for a new permit. The Michigan Railroad, an electric line, applied for a similar motor bus permit. The transit company contends the articles of incorporation for steam and electric roads provide that they are organized only to run steam and electric lines and if these articles do not specifically mention bus lines the electric railways should not be allowed to operate the latest form of transportation.

Railway's Tribute to Mr. Davis Is Fine Service—Candidate Acknowledges It

It is nothing uncommon for the great railway systems to be called upon to transport Presidential candidates, but the privilege falls seldom to an electric line. For this reason the honor of conveying the Democratic nominee, John W. Davis, from Clarksburg to Fairmont, W. Va., for a reception which was to precede his notification proved an important event for the employees and officials of the Monongahela-West Penn Public Service Company, which operates interurban service between these West Virginia cities.

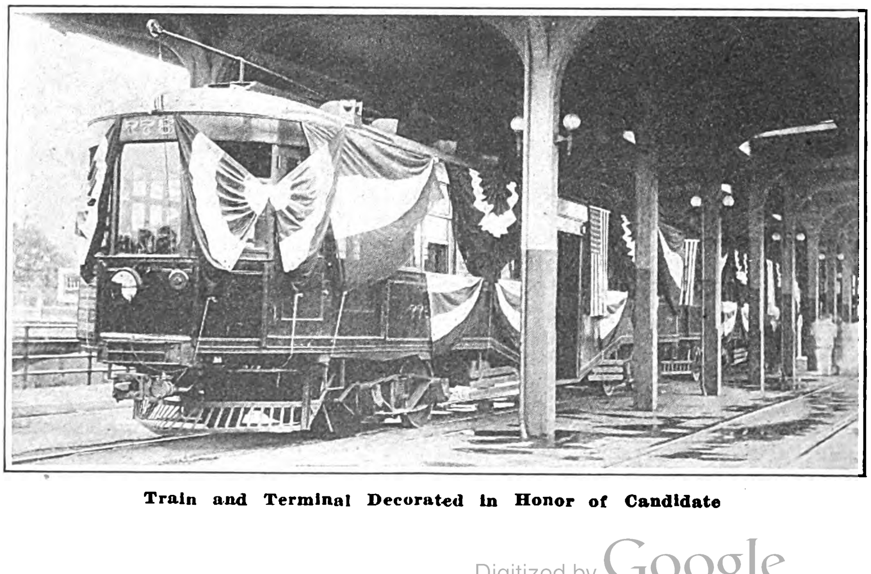


Democratic Presidential Candidate Transported by Trolley

The party numbered 60, including the candidate, his family, guests from his home town of Clarksburg, and representatives of daily papers. They were provided a car on the special, which was appropriately decorated for the occasion, as was the terminal at Clarksburg and the stations en route to Fairmont.

May stops were made to allow the candidate to leave the train and greet the people of the Upper Monongahela Valley who grew up with him. On one occasion the train was held while Mr. Davis made a short address.

After spending three hours with his friends in Fairmont, Mr. Davis and his party returned home on his special, after complimenting the officials of the company for the splendid transportation they had provided his friends and himself.



Train and Terminal Decorated in Honor of Candidate

Kansas City Railways Makes New Moves

The prospect of bus service in Kansas City, Mo., and in Kansas City, Kan., has precipitated action on the part of the railways of both cities. It will be recalled that the Federal Court at Kansas City pointed out that if buses are to be run, possibly the railways could best render that service. Fred W. Fleming, one of the receivers of the Kansas City Railways, concurs in the opinion that the railway should furnish bus service if the public desires such service.

In this connection it is of interest to note that an ordinance has been introduced before the City Council of Kansas City, Mo., through which the Kansas City Motor Transit Company, with Frank J. Dean, president, seeks a twenty-five-year bus franchise to operate about ninety buses over eight proposed routes. Mr. Dean is also president of the Yellow Taxicab Company, Kansas City. The City Council appears to be inclined to give opportunity for general discussion of the proposed ordinance, with every chance for the railway to put in bus service, if it desires to do so.

As to Kansas City, Kan., the railway has filed a petition before the Federal Court, asking permission to curtail service unless the City Commission retain the present anti-bus ordinance. This petition will be the basis of a hearing before Judge Stone on Aug. 30. The receivers had formerly agreed that new lines would be run as desired, if the commissioners retained the present anti-jitney ordinance. Members of the Chamber of Commerce and various civic organizations are urging the City Commissioners to meet the railway's request, in order to retain adequate service for the city.

Places of Subways and Buses Realized by St. Louis Interests

Stanley Clarke, counsel for the reorganization committee of the United Railways, St. Louis, Mo., speaking for J. K. Newman, active member of the committee, stated that he was favorably disposed toward the development of rapid transit for St. Louis through the building of a subway, as has been proposed by Mayor Henry W. Kiel and Charles E. Smith, consulting engineer for the city.

Mr. Newman announced that the reorganization committee would cooperate with the city in working out the subway plans and assist in the necessary preliminary studies, surveys and plans, etc. He holds that the public is entitled to the best service possible and feasible and that far-reaching plans for future developments should be worked out now.

In touching on the matter of bus service Mr. Newman stated that after careful investigation in the principal cities of the country in which such service has been installed the reorganization committee believes that at least for a long period from 85 to 90 per cent of the riding public will continue to depend on trolley cars for transportation. Mr. Newman and his associates feel, however, that the bus has an important place in the transportation system of a city.

The recently-organized St. Louis Bus Company will operate in co-operation with the United Railways under a reciprocal transfer arrangement, and all profits of the bus lines after a reasonable return on tho investment will be turned over to the railway.

Motor Vehicle Legislation Up for Consideration in Rochester

Assemblyman Lewis G. Stapley of Livingston County has been chosen chairman and Senator George R. Fearon of Syracuse vice-chairman of the special legislative committee created by the New York State Legislature last winter to propose legislation to strengthen the motor vehicle law. Mark Graves of the State Tax Commission addressed the committee and suggested that it take up an investigation of the inconsistencies in the present law that the committee thoroughly go into the proposition of compulsory insurance for all drivers of cars and that the feasibility and practicability of a gasoline tax receive consideration.

Other subjects to be considered by the committee will be a uniform motor vehicle law for all states and a uniform traffic ordinance for all cities of the state. The subject of headlights will also be taken up and it is quite likely that the committee will recommend the age limit at which an operator may receive a license to drive a car be reduced from 18 to 16 years, on account of the protest this provision of the law is creating among rural residents.

The committee will hold its first public hearing at Rochester shortly where it has accepted the invitation of the Rochester Automobile Club and will hold hearings throughout the state with the idea of getting the ideas of drivers of cars and officials of motor vehicle organizations.

Wants Lower Fare

The City Council of Montreal, Canada, has been petitioned recently by the Trades and Labor Council, asking the co-operation of the Alderman for the purpose of getting a reduction in fares on the Montreal Tramway System. The resolution declared that the price of tickets had been increased during the past few years, including the abolition of working men's tickets, and though the receipts of the company had considerably increased yet the company had made a reduction in the wages of its employees. Further, it was charged the company enjoys a monopoly of the streets of Montreal, and should supply the citizens with a transportation service as cheaply as possible. The petition said that the fares should be revised to the former tariff of six tickets for 25 cents, and eight laborer's tickets for the same price. In a letter following the resolution the Montreal Tramways Commission referred to the higher wages of the employees and the annual rental of $500,000 to be paid the city.

City Service Extended to Broad Ripple

The Public Service Commission has approved a contract between the Union Traction Company of Indiana and the Indianapolis Street Railway whereby the railway uses the Union Traction Company's tracks from Forty-sixth Street to Broad Ripple Park, extending city service as ordered several months ago by the commission. The lease is for one year and thereafter until ended upon six months' notice by either party. Rental is to be 7 per cent annually upon $85,478, fair value of Union Traction Company's track as appraised by the engineers of both parties. Service is scheduled to begin Aug. 31, when the Union Traction Company will discontinue its service and turn over the Broad Ripple cars, to be used until the railway supplies its own cars. The lease gives Broad Ripple city fares as 7 cents and four tickets for 25 cents. Heretofore the fare to Broad Ripple has been 10 cents. The railway, under the contract, will maintain the track over which the Union Traction will continue to run interurban cars. The railway will do any reconstruction necessary and pay taxes on the property. The conditions under which the commission increased fares in Indianapolis made it obligatory that the Broad Ripple service be started by Sept. 1.

Opposes Bus Speed in Chicago

Chicago's recently waged warfare against speeding vehicles is now entering the stage where different types of vehicles are coming in for criticism from the drivers of other vehicles who feel that thus far they have been shouldering the brunt of the drive against speeders. A "John Doe" warrant directed against the Chicago Motor Coach company, charging speeding, was issued recently by Judge George B. Holmes, at the instance of Attorney James T. Moore, a member of the legal department of the Illinois Automobile Club.

The object of the warrant, according to Mr. Moore, is to test the enforcement of the speed limits of the buses. While automobilists are confined to a rate of 15 m.p.h., Mr. Moore says, buses are permitted to operate at the rate of 20 and 23 m.p.h. The clause which the motor club will seek to have enforced makes it mandatory that a bus that has hard rubber tires shall not travel more than 12 m.p.h.

It's the Tenant that Pays in New York

Stewart Browne, president of the United Real Estate Owners' Association, New York, takes issue with a recent expression by Arthur S. Somers, president of the Brooklyn Chamber of Commerce and a public director of the Brooklyn-Manhattan Transit Corporation, on the need of increased fares in New York City. Mr. Browne says that an article by Mr. Somers printed in many of the local papers was nothing less than an appeal for an increased fare on the subways. Mr. Browne says he is not prepared to say whether or not an increase in fare is necessary, but he thinks Mr. Somers' comments are fallacious although they are made from an entirely new standpoint. Mr. Browne says:

> The $10,000,000 dual subway deficit. which is included in the city's tax levy. is more than paid for in increased taxes received by the city from increased realty assessed valuations, created solely by the subways. To deny this is splitting hairs.
>
> New subways could be built in Manhattan by local assessment on property benefited and the income from such increased values would more than pay the debt service on the local assessment bonds issued for construction.
>
> In Richmond and Queens subways could not be built by local assessment, but could be built by local assessment plus city bonds, and while the increased taxable values would not equal the debt service for the first ten years, subsequently they would. The present dual subway deficiency should not be used as an argument for future deficiencies. because the deficit is largely caused by the "contract differential."
>
> Mr. Somers says it is the tenant and not the realty owner who pays the "tax levy" $10,000,000 subway deficiency. He can't prove this. Suppose the tenant does pay. Why shouldn't he? The subways are built for him. He is chiefly benefited. His earning power is higher. His rent is lower.
>
> Mr. Somers says that non-city residents coming to New York use the subways and don't pay their share of such subway deficit. Visitors pay more than city residents, because they spend more per capita per day and are "short haul." Workers within the city, but living without, may pay less per capita. But what of that? They are part and parcel of the city and are necessary.
>
> Rapid transit at a low fare is necessary for the growth of New York. It is the growth of the Bronx, Brooklyn and Queens that has built up Manhattan's business and realty values. New York City couldn't be what it is without Long Island, New Jersey and "up-State" and all of the States. They all help its growth.

Railway Makes Bus Bid

New York Line Asks that Fifth Avenue Company's Plea Be Put Over Pending Its Own Application

The Third Avenue Railway, New York, has entered the competition for franchises to run bus lines. S. W. Huff, president of the company, on Aug. 22 sent to Mayor Hylan a letter requesting that no action be taken by the Board of Estimate on the application of the Fifth Avenue Coach Company for bus franchises until the plan of the Third Avenue had received consideration. Mr. Huff said his plan would be ready soon. He made known that his company contemplated establishing routes in many instances along the lines proposed by the Fifth Avenue Coach Company in the latter corporation's plan to establish thirty-four lines, 116 miles in all. Though the Fifth Avenue Coach Company proposes to operate in Manhattan, the Bronx and Queens, practically gridironing Manhattan, the Third Avenue plans to place the majority of its bus lines in the Bronx, entering Manhattan in only a few instances.

In presenting his application for consideration Mr. Huff said:

> I notice that you have before you an application from the Fifth Avenue Coach Company for franchises to operate buses in various sections of the city. A number of these lines not only parallel lines of the Third Avenue Railway system but in many cases actually operate throughout the greater part of their length upon identically the same streets. Such paralleling can only mean adding to the already congested condition of the streets and also render the service on both the trolley cars and buses less efficient than if the bus operation were in territory not now conveniently served.
>
> The Third Avenue Railway is at the present time operating approximately 300 miles of trackage in the territory sought to be covered by the Fifth Avenue Coach Company, is handling about 1,000,000 passengers a day and already has as many employees as the Fifth Avenue Coach Company estimates it will have if it is permitted to spread its operation over the city.
>
> The companies of the Third Avenue Railway system paid the City of New York in taxes and paving charges (exclusive of taxes paid to the State of New York) $1,413,000 during the year 1923, and will pay approximately that amount during the year 1924. It is furnishing in the Bronx the transportation for which you have so earnestly contended, namely, a 5-cent fare and universal free transfers, and, I may say, it is the only company that has covered an entire borough with a 5-cent fare and a universal free transfer. The Bronx is the only borough that enjoys this low fare.
>
> Although we may not agree with you fully as to the desirability of bus operation, we recognize that there is a field for such operation as feeders both to trolley lines and subways.
>
> As you probably know, we have been for some time working on a plan for co-ordinating bus operation with our 350 miles of street car operation. The plan is being worked out for the various communities that we are seeking to serve with transportation in co-operation with people who should be best acquainted with the needs of those communities.
>
> We believe that the best interests of these communities will be served and the best solution of their transportation problems will be offered by extending this bus operation into territory not at the present time conveniently served with transportation rather than to congest streets with both trolley and bus operation, and we propose to co-ordinate the bus system with the trolley system by free transfers from the buses to the trolleys. This will utilize to the best advantage the surface car transportation now in existence, which is carrying over 40 per cent of all passengers carried on transportation lines in the greater city.
>
> The system of bus operation that we are evolving finds its largest development in the Bronx, and will not be confined to communities already provided with transportation, but will serve all sections of the Bronx. We hope to have this plan ready for submission to the Board of Estimate and Apportionment at a very early date, and I am writing to ask that no action be taken in the matter of granting franchises for a general bus system until our plan has received consideration.

To have given these applications consideration at the special meeting of the board on Aug. 22 would have required unanimous consent. This was made impossible when the Mayor moved that all bus applications pending be referred to the committee of the whole, the franchise committee and the Board of Transportation, these bodies to report back to the Board of Estimate. At the same time the Mayor made known that his motion referring applications to committees included also the applications of the B.-M. T. and the Queens concern. Borough President Connolly of Queens suggested that other applications might be entered and asked that all such applications also be referred to the committees. This motion was adopted.

Railway Service in Sections of Morgantown Threatened

The Union Traction Company may suspend operations on its lines in the First and Second Wards of Morgantown, W. Va., as a result of a controversy with the city over street improvements.

City Manager Harry Bayles conferred informally with James McGrew, secretary of the railway, and was told that an investment of approximately $50,000 would be necessary to improve the streets within the company's lines and that the business through the territory mentioned would not warrant the continuance of service.

A 30-day notice as provided by statute was served on the company by the city during the latter part of July to improve the lines. In the event of no action in that period it is likely that the city will revoke the franchise, tear up the tracks, proceed with the improvement of Simpson Street and other streets and the Union Traction Company will cease as a public service agency so far as the city is concerned.

Disagreement on Franchise Provisions in Sioux City

Disagreement over the provisions of the twenty-five-year franchise for the Sioux City Service Company, Sioux City, Iowa, may result in the special franchise election being postponed until sometime in September. Mayor Stewart Gilman states that five or six matters are not covered by the franchise which should be included. He referred to the question of the 2 per cent tax on the gross earnings when the city has reached a population of 75,000. Second, there is the provision for extensions.

There is also a question, the Mayor said, as to how soon the city could take over the property of the company in case of failure to carry out the provisions of the franchise. The Mayor said that he thought a reading of the analysis of the franchise as made by him ought to inform the voter so that he could cast his ballot intelligently.

Increased Fare Suspended

Ten-Cent Fare on Springfield Street Railway Lines Deferred Until Further Study Is Made

The Massachusetts Department of Public Utilities recently suspended until Sept. 7 the operation of the new fare schedule which the Springfield Street Railway planned to put into effect on Aug. 24. Representatives of the company and of civic bodies which are opposing the proposed increase to 10 cents cash with three tickets for 25 cents from the 7-cent rate will appear before the commission at the State House on Sept. 3, to present arguments on the evidence placed before the department at the hearing in Springfield and at Boston. The session on Aug. 20 was devoted to the presentation of figures by Vice-President Howard R. Whitney and by Prof. Albert Richey of the Worcester Polytechnic Institute. Both were cross-examined by Attorney Raymond T. King, representing the federated civic bodies.

Bentley W. Warren, counsel for the company, offered a statement of the earnings for June, in which the financial results were segregated by lines. This statement indicated also those lines the receipts of which were less per car mile than the average operating expenses of the company.

Mr. Whitney was asked whether it might not be more profitable for the company to replace its local lines with buses. He replied in the negative, pointing out that while one bus may be operated at less cost than one trolley, nevertheless rush hour requirements would demand at least three buses, two of which would remain idle all day.

Professor Richey said he had made a computation of the company's receipts, if the suggested 8-cent fare had been in operation during the year 1923. Under the schedule he said that the passenger revenue, based on the 1923 business, would have been $3,524,800, or $273,564 more than the company actually collected. This figure, he contended, would be entirely inadequate, as the company's estimate is that its revenue must be increased $501,000 over its probable receipts this year.

Attorney Richard J. Talbot, counsel for the Busmen's Association, urged the adoption of the service-at-cost plan. He offered the suggestion that the commission request the railway to give up its non-paying bus lines and leave this development to independent operators with small, fast buses, and that the railway's petition for an increase in fares be continued until the directors of the company considered the plan provided for by the laws of the commonwealth, under which it is permitted to charge as part of the operating cost a 6 per cent dividend on the common stock and fix fares accordingly.

Commissioner Ellis asked if an 8-cent fare would take care of the company's expenses, including the increase in pay for the men, if riding had not fallen off. Professor Richey thought that this would be true, but that sight must not be lost of the further factor that the company must make up about six months' back pay for its employees.

Animated Correspondence

Traction Man Enlivens Life for New Yorkers by Crossing Pens with Mayor Hylan

Not since the late Frederick W. Whitridge as receiver of the Third Avenue Railway, New York, crossed pens with the Public Service Commission in the early days of commission rule have the readers of the New York dailies been treated to correspondence regarding transit matters so piquant as that which it now enjoys. The principal contestants in the race for letter writing honors are G. M. Dahl, the chairman of the Brooklyn-Manhattan Transit Corporation, and Mayor John F. Hylan.

SEVEN YEARS OF DELAY

While they are drinking their morning coffee, urbanites may chuckle over the Mayor's statement that he is in receipt of Mr. Dahl's "screed of even date," but that is nothing to the smile which is likely to spread over their faces when Mr. Dahl reminds them at the outset of his reply to the Mayor that "at last after seven years of delay we learn by today's newspapers that your Board of Transportation is actually to get busy (on subways) by advertising for bids," etc. Mr. Dahl congratulates the Mayor on signs of activity on the Mayor's part toward subway construction. It is not in the evidence yet that the Mayor has congratulated Mr. Dahl on his activity.

Seven years of delay. Think of it! Apparently the public does. Mr. Dahl takes care of that, but he is comparatively new to traction circles in New York, while the Mayor is practiced in the art of making faces. He has made faces before at the traction triplets, as the Mayor himself in an alliterative moment once put it in referring to certain local railway managements. The late but learned Mayor Gaynor used to refer to Epictetus and send people to the dictionary to learn the meaning of unusual words which he employed, but Mayor Hylan never forgets himself. Common language, very common language at times, is good enough for him. Listen to this: "This fellow Jerry Dahl is in for the fight of his life. You can tell the people for me that my block is safe, but Dahl's is not. We'll put this fellow Dahl in his place." Even this is a mild outburst.

CHASING RAINBOWS

The Mayor still sees red, however. He accepts full responsibility, for instance, "for checking the rapacious schemes of the B.-M. T., which Mr. Dahl tries to color with the hues of the rainbow at the expense of the people." Rainbow chasers always see red. It is one of the primary colors of the solar spectrum. To the Mayor the most recent rainbow was the Governorship. It peeves the Mayor to see Mr. Dahl using full page space in the dailies "falsely presenting actual conditions" and breaking into print "at the expense of the people." The Mayor's people, of course; not Mr. Dahl's. To the Mayor Mr. Dahl "is easily the most conspicuous disciple of brazen effrontery." So the Mayor advises City Transit Commissioner Delaney to ignore attacks of Mr. Dahl and others who seek speedy action on proposed subway projects. As for Mr. Delaney, he "is in his workroom, too busy on subway plans to dignify the attack with any response. He has indicated that he does not intend to make a reply."

The advertisement in question, it should be explained, contrasted the attitude of John H. Delaney as Transit Construction Commissioner under Governor Smith in 1920 with that of Mr. Delaney, now chairman of the Board of Transportation of the City, appointed to that office on Jan. 1, 1924, by the Mayor. "Which will it be, Delaney and Dig or Delaney and Delay?" asks Mr. Dahl in a smash advertisement of a whole page emboldened by big type, a map that anybody could understand and not too much type and that easily readable. In conclusion Mr. Dahl says boldly over his own name:

"Delaney and dig is a real constructive policy. Support it!

"Delaney and delay is a Hylan policy. Defeat it!"

As previously indicated, the Mayor has said that he assumes full responsibility. If Mr. Dahl shirks responsibility there has been no recent outward evidence of it. The courage isn't all one side. No, indeed! For instance, if further proof were needed Mr. Dahl announces that he will put some of his ten new buses in free operation over routes in territory now sorely in need of transportation service. And he did it. He did it last Tuesday. It was a day of violent storm.

SAMPLE BUS SERVICE RUNS FREE

It is "a sample service so as to let the people see our buses and form their own judgment, independent of the Mayor, as to whether they like the buses." At the end of the week the buses will be run in free service over other routes. This will afford a study in contrasts between the Mayor's buses and Mr. Dahl's, but Mr. Dahl isn't worried about that. Mark you, the service is all free. The company has applied for the right to run buses on three routes, and it has stated that it is ready to lay out a comprehensive system of routes supplemental to its existing transit and surface system.

As soon as the Mayor heard about the experimental system he wrote another letter. It was addressed to Police Commissioner Enright. Sometimes the wish is father to the thought. The B.-M. T. didn't intend to operate over routes on which others are running, but the Mayor didn't wait to find that out. To Commissioner Enright he said: "Any attempt by the B.-M. T., under cover of a so-called free bus system, to drive out of business little, independent bus operators on routes laid out and approved by the city should be stopped at once by summary police action." Mind you, it is the same man speaking who is working for municipal rapid transit and who has a $25,000,000 municipal bus plan of his own to compete with existing lines. Naturally Mr. Dahl is "glad to have the Mayor supporting so strenuously the principle that duplication of transit service should not only be avoided but should be prohibited, and that the support of the courts should be invoked to prevent that duplication of service. That principle applies, of course, not only to bus service but to surface line and rapid transit service. We congratulate Mayor Hylan on taking such a sound stand, and we hope he will adhere to it in the future."

A bus, of course, is a very elusive thing. No definite instructions were given by the Mayor to the commissioner as to how to proceed, except to take "summary police action." In times past many culprits have successfully eluded the New York City police, but as the local force boasts a number of ex-cowboys practiced in roping steers, the first thought of the Mayor may have been for them to lasso a bus by the front wheels as it dashed over the city's neglected pavements, intent upon escaping to the nearest garage and hiding itself away. So far New Yorkers have been spared the sight of a pair of the Dolly Sisters, as the police are known who ride around day and night in Fords supplied by the department, rope in hand, careening through the streets in hot pursuit of a fugitive bus. The first attempt to catch a bus turned out differently. A mounted cop in the suburbs ambushed two of the vehicles said to be operating in contravention of the competitive part of the Mayor's order and served two drivers with summonses to appear in court in Jamaica. The time was 9 p.m. There has been no need for the Mayor to carry out his threat "to stop them running even if it takes every cop in the city."

Incidentally it might be mentioned that the Mayor has charged that Mr. Dahl made a trip to French Lick in order to reach him. Just why Mr. Dahl should go to French Lick to reach the Mayor when he appears to be doing it so well right at home is not quite plain. An old axiom of prize fighters who desire to score a quick knockout is: "Get your man mad." Mr. Dahl has said publicly: "The Mayor is a bit excited." This isn't boasting on Mr. Dahl's part. The preponderance of evidence is all on his side. As the judge often explains to the jurors: "Reasonable doubt is the doubt of a reasonable man." The verdict of the public and the papers regarding the case, so far as the Mayor is concerned, is: "Guilty!" There can be no doubt about the reasonableness of that.

Agrees to Allow Deferment of Improvement

The Council of Sacramento, Cal., will allow the Central California Traction Company further time in which to relocate its tracks and pave between them on Stockton Boulevard.

In August, 1923, City Engineer Albert Givan notified the company to relocate its tracks and do the paving so that work could start on the improvement of Stockton Boulevard, one of the main entrances to the city. Officials of the railway declared it would be impossible to do the work at this time, because of financial difficulties, but they agreed to place the tracks in the center and to install temporary paving after Jan. 1.

News Notes

New Franchise Before Voters.—A new railway franchise for the Northern Ohio Traction & Light Company will be up for a vote at the election in Akron, Ohio, in November. Books of the company are now being audited to determine the basis upon which the new franchise will be written. This is in accordance with the terms of the agreement under which the car-bus dispute was settled, as noted in the ELECTRIC RAILWAY JOURNAL for March 1, p. 330.

Buses in Flint.—It is reported that the City Council of Flint, Mich., has ratified an agreement with the Detroit United Railway whereby it will be allowed to operate buses over streets in conjunction with its electric railway services. An ordinance provides that buses shall be in operation within 30 days. The fare is to be 10 cents, or four for a quarter, with free transfers to trolley lines.

Benefit Association Formed.—The employees and department heads of the Dallas Railway, Dallas, Tex., have formed an Employees' Mutual Benefit Association. Formerly, it was customary to take up collections to assist those who were in need, but under the proposed plan members will receive free medical and surgical attention; indemnity will be provided for time lost through sickness or accident and medicines will be furnished at cost. Under the insurance feature, each member will receive a $500 life insurance policy. Membership in the association will be voluntary, but fewer than forty eligible employees out of more than 800 indicated their unwillingness to become members.

More Transfer Privileges in Pittsburgh. — The Pittsburgh Railways, Pittsburgh, Pa., recently announced the granting of additional transfer privileges on virtually all divisions of the system. Practically every route in the city is affected by the schedule. The installation of the general transfer system, which gave Pittsburgh riders the advantage of riding from one end of the city to the other for 8⅓ cents, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of July 5, 1924.

Operating Buses in Natick and Lexington. — The Middlesex & Boston Street Railway, Newtonville, Mass., has received its bus license in Natick and has put four buses in service in that section. In Lexington the company has also received a license to operate and six buses are to be utilized in this operation. Some of these are already running and men are being broken in to operate the remainder.

Railway Officers Fill Bus Positions.—The organization meeting of the newly incorporated Binghamton Auto Bus Lines, Inc., Binghamton, N. Y., was held on Aug. 19 and executives of the Binghamton Railway were elected to the bus company as follows: President, Frank L. Fuller; vice-president, R. W. Day, Scranton; treasurer, Elmer M. White; secretary, William H. Hecox; assistant secretary and assistant treasurer, H. I. Jackson. These men fill the same offices in the Binghamton Railway. The meeting adopted a resolution to establish a line of buses on the south side of Johnson City which will include Riverside Drive and Grand Avenue. The company intends to commence bus service on Sept. 1 with two Mack buses.

Wages Advanced.—A new wage scale will become effective Oct. 1, under which trainmen of the Dallas Railway, Dallas, Tex., in the first year of employment will receive 45 cents an hour. The wages for the second year will be 48 cents an hour and for the third year and thereafter 50 cents an hour. In each classification the operators of one-man cars will receive 4 cents an hour in addition to the regular wage. In the old scale provision was made for two classifications, first year employees who received 42 cents an hour and those in second and subsequent years who received 46 cents an hour. It also provided for 4 cents an hour additional to one-man car operators.

New Transfer System in Force.—The Jacksonville Traction Company, Jacksonville, Fla., started a new transfer system on Aug. 1. In the new transfers the necessity of the trainman punching destination and time on slips is eliminated. The name of the line from which the transfer is issued and the transfer points at which it is good for passage on another line are given at one end, while the time units are at the other. Transfers used during the morning hours will be good until noon. They will be of rose color. The evening transfers will be light blue. The date will be designated by a letter of the alphabet printed in bright red and changed every day. It is believed that considerable time will be saved both for the passenger and the trainmen in the use of the new system.

Will Try Weekly Pass.—The Hagerstown & Frederick Railway, Hagerstown, Md., will experiment with the unlimited weekly pass system at Frederick. If the pass proves successful the company plans to introduce it at other points on the line, including Hagerstown. The pass will be sold for 85 cents. The schedule was filed with the Public Service Commission for approval.

Fare Ordered Cut.—In accordance with complaints filed by the city of San Bernardino, the California Railroad Commission recently ordered fares on the Pacific Electric Railway, between San Bernardino and Colton reduced from 9 cents to 6 cents. Reference to the petition of the city and the conclusion of the hearing were made in ELECTRIC RAILWAY JOURNAL of Aug. 16, 1924.

Trying Out Lower Fare.—The Eastern Massachusetts Street Railway, Boston, Mass., is trying out on its Taunton division an experiment of twenty rides for $1 for a period of sixty days. The plan is to determine if lower fares will produce more revenue through inducing a greater volume of business.

Subway Actually Started.—Construction on the Broad Street subway, Philadelphia, Pa., was started on Aug. 25, when Mayor Kendrick took the pick and shovel and started the excavation. City officials, officials of the Philadelphia Rapid Transit Company, and many citizens were on hand to witness the first step in the $42,000,000 project which has been under consideration for practically nine years. The first expenditure on this high-speed system is $14,000,000 which is the contract price for the construction of the first section. The many incidents in the promulgating of this plan have been referred to before in the ELECTRIC RAILWAY JOURNAL.

Wages Lowered.—The Court of Industrial Relations of Kansas recently issued an order cutting the wages of employees of the Arkansas Valley Interurban Company, Wichita, Kan., 3 cents an hour. This is understood not to have been all that the company had hoped. After the employees and management had been unable to agree upon a wage schedule, the court was appealed to by officials of the company. The former wages for the trainmen ran from 40 to 50 cents an hour. In its opinion the court points out a plea of poor financial return by a corporation is not sufficient cause for the lowering of the wages of its employees to a point that would put them below a fair living wage.

Paving Suit Transferred to Federal Court.—The suit to compel the Seattle & Rainier Valley Railway, Seattle, Wash., to pave between its tracks on Dearborn Street and on Rainier Avenue inside the city limits has been transferred by Superior Judge Mitchell Gilliam to the federal court, despite the opposition of the four Rainier Valley residents who brought suit against the company. Walter M. Brown, manager of the traction company, has made an affidavit that the paving would cost the company about $1,000,000.

Bus Line Permit in Syracuse Granted.—The Public Service Commission granted a certificate on Aug. 26 to the Syracuse Railways Co-ordinated Bus Lines, Inc., to operate a bus line from East Genesee and Warren Streets, Syracuse, N. Y., through Warren, James and Shotwell Park, returning by way of James, State, North State and East Genesee Streets. The bus line is to be operated under the provisions contained in a license certificate granted by the city of Syracuse on Aug. 6. The fare will be 7 cents. Transfers are to be given to and from the trolley lines and the company is directed to file a liability bond as required by the State Commissioner of Motor Vehicles.

Line Sought From Manteca to Stockton.—The Chamber of Commerce of Manteca, Cal., is anxious to secure a line between Manteca and Stockton. That organization recently called upon officials of the Tidewater-Southern Railway to divulge the project to them. The Tidewater-Southern Railway operates a line of which only 2 miles are in paved streets. Their reply was that the operating expense of such a proposed railway, would be much greater than the warranted business.

Foreign News

L. C. C. Committee Favors Tramways

After a Review, Says Tramways Are Most Suitable for Street Passenger Transportation

Relative costs and efficiency of tramcars, trolley buses and petrol buses was the subject of a report recently presented to the highways committee of London County Council. The object was to determine whether or not it would be advisable to develop the County Council's tramway undertaking by means of railless electric cars and petrol buses instead of tramways.

The committee reported a loss on trolley bus operation in Bradford and Leeds, after interest and redemption of stock were met. Birmingham decided to install trackless cars in place of a single track tramway with loops running through narrow streets where it was impossible to widen the streets, although the city was already operating a fleet of buses.

The operating costs per car mile of the three systems were: Tramway, 14.824d (12 months); petrol buses, 15.407d (12 months); trolley buses, 12.648d (4 months). Included in the latter the figure of 1.209d per car mile for repairs and maintenance was very low as it covered the first four months of operation, when these costs are lowest. The corresponding figures for repairs and maintenance at Leeds were 5.150d per car-mile, and at Bradford, 4.534d per car-mile.

In the case of these three large cities, tramways appeared a better commercial proposition than trolley buses. With regard to earnings of tramways and buses in provincial towns there was little or no competition, so that it did not follow that tramways over routes covered by bus service would not have shown better results.

A. Baker, manager Birmingham Tramways, reported that it is expected that trolley buses will be used as extensions of existing tramways or in substitution for a single line tramway where traffic is light, particularly when faced with reconstruction. He expects to use petrol buses in suburban districts and for cross country routes. He emphasized that for the transport of large masses of people expeditiously and cheaply, the tramcar had no competitor and still held the field.

Manchester City Council recently arrived at the conclusion that no other vehicle was available that could supersede the tramcar in its essential merits.

A. L. C. Fell, manager London County Council Tramways, agreed generally with the results reached in Birmingham and Manchester. It was his conclusion, therefore, that the tramcar was the most suitable vehicle for street passenger transport both from the financial and utilitarian point of view.

The committee recommended to the Council consideration of the trolley or motor bus as extensions of existing tramway service where competition by other means of transport did not exist but stated that in its opinion there were not many cases of extensions by means of trolley bus that would provide as satisfactory results as extension of the tramways, except in cross connections where the length of route was sufficient to justify operation of an independent service of motor or trolley buses.

P.L.M. Develops Feeder System in Dauphiny

The Paris, Lyons & Mediterranean Railway was the first to see the possibility of working in conjunction with the "light railways" and motor bus lines. Today almost all of the mountain touring regions of Dauphiny and Savoy are to be reached by transfer either to the light railways or the motor bus services, which latter have this year grown to proportions unforseen when the services were first put into operation just before the war.

The bus system of this one railway alone covers routes of nearly 4,000 km. (2,480 miles), running not only from Nice on the Riviera to Lake Geneva (or more properly Lake Leman, as is its geographical name) but in the high valleys of the French Alps as well, in on instance crossing the second highest carriage road in Europe, that of the Galibier at an elevation above the sea of 2,658 m. (8,750 ft.). Other routes are found in the Jura mountains to the north, and the Eastern Railway of France has inaugurated a similar service between the French slopes of the Vosges and those of Alsace, superseding the famous electric railway over the Col de la Schlute at 1,150 m. (3,800 ft.) altitude.

Circular tickets are issued covering the railway, the light railway and the motor bus circuits. For the most part, in the high altitudes, these services stop the last of September.

Paris Suburbs to Have Direct Subway Service

Extension of Line No. 1 of the Metropolitan Underground Railway has been approved by the Paris Municipal Council. This extension will run eastward from Vincennes into the country, making use of the Chemin de Fer de Paris a Vernuil, which leaves the Place de la Bastille, where two Paris subways have stations, thence to Bonneuil on the banks of the Marne, a distance of about 8 miles beyond the gates of the city.

Another project in view is the linking of the Sceaux-Robinson steam line, on the left bank of the Marne, with suburban subway lines, which will give access to the southern suburbs.

Both projects are of considerable magnitude, but there should be little difficulty or delay in changing over as the rails and right of way already exist.

British Bus News Summarized

It has now been definitely resolved by Darlington Town Council to substitute the trackless trolley system for the town's existing tramway undertaking. Estimates presented showed that to renew the tramways would cost £100,000 while £60,000 more would be required for new cars. If, besides the renewal, projected extensions were carried out, the cost would be £200,000, plus £100,000 for new cars. The estimated cost of substituting the railless system, including cars, was £35,000, or with the projected extensions £60,000. It was stated that the adoption of petrol buses would cost about the same as the trackless car installation, but the Council would only obtain a seven-year loan for the petrol buses, while for the railless electric cars a loan period of 15 years would be allowed. It was expected that the trackless cars would be run at 3d. per mile cheaper than petrol buses. The Council is to promote a Bill in Parliament to give it the necessary powers.

Another move in the same direction lies in the fact that Nottingham Tramways Committee has decided to adopt the railless system on a route which is 2½ miles long in substitution for existing tramways. The track is on a narrow road where there is no probability of widening being carried out. There will be ten railless cars, to cost about £25,000, and each will seat 26 passengers on the lower deck and 30 on the upper.

Indian Railways May Electrify

Electrification of some of the lines of the South Indian Railway connecting Madras City and nearby towns is forecast in proposals and estimates submitted to the Home Board for India. It is considered that electric service should be extended to Thambaram, 18 miles from Madras, and from Thambaram to Chingleput, 37 miles off Madras Beach. As a preliminary to electrification of the lines, the line from Madras Beach to Thambaram and then to Chingleput must be double-tracked.

Paris Subway Plans Further Extensions.—The Paris Transports en Commun expects to extend the Metropolitan Underground Railway with two connecting spurs running to the Place de la République from the Hotel de Vilie and from the Richelieu-Drouot station. The company engineers and competent municipal and prefectoral authorities are studying the question at present and work will be begun as soon as the project is declared a work of "public utility" by the government.

Another London Tube Extension Opened.—The 3-mile extension of the London Electric Railway from Hendon to Edgware was opened for traffic on Aug. 18. This is a surface extension in the open country of the Charing Cross and Hampstead tube line. Daylight color signals were employed on the new extension, having proved satisfactory on Golder's Green and Hendon Line. Each of the 45 signals used consists of a powerful electric lamp behind an 8-in. lens. The light can be detected from a distance of 2,000 ft.

Financial and Corporate

Hydro-Electric Railways Report

Many Interesting Data Contained in Report on Canadian Roads for Year Ended Oct. 13, 1923

The Hydro-Electric Power Commission of the Province of Ontario has just reported for the year ended Oct. 31, 1923. The report deals with all phases of the operations of the commission for the year with respect to thirteen systems to which are connected 356 municipalities, including 107 townships and rural districts, and 110 industrial companies. The report also shows the cumulative financial results for the various periods during which operation has been maintained. The operations of the electric railways are covered in one of the sections. These roads are divided into the Essex District Railways, the Guelph District Railways and the Toronto & York District Railways. The first comprises 39.77 route miles, the second 8.49 and the third 80.06.

In commenting on the affairs of the Essex District Railways the commission says that the trackless-trolley line on Erie Avenue and Ottawa Street has been discontinued and is being replaced by a double-track railway line in order to take care of this rapidly growing section. Incidentally it is mentioned that the revenue secured by the trackless trolleys was approximately $750 a month. Since that system has been supplanted the revenue has grown to approximately $9,500 a month. The commission says that the operation of one-man cars in the Essex section has been satisfactory. For the year ended Oct. 31, 1923, the one-man safety cars were operated a total of 759,341 car-miles, and the accidents amounted to 26.47 per 100,000 car-miles, the cost of which was 0.47 cents per car-mile. The single-truck two-man cars were operated a total of 355,852 car-miles, and notwithstanding the fact that they operate in a district less congested the accidents, per 100,000 car-miles, were 22.76, the cost of accidents amounting to 0.503 cents per car-mile. The trackless trolleys, operating 82,053 car-miles, were responsible for 17.06 accidents per 100,000 car-miles, the cost being 0.395 cents per car-mile. This is also one-man operation. The total accidents were 20.59 per 100,000 car-miles and the cost was 0.416 cents per car-mile. The year before the commission took over the Essex lines approximately 1,000,000 car-miles were operated. This was for 1919. The mileage for the year ended Oct. 31, 1923, was approximately 1,800,000.

OPERATING STATISTICS OF THE ESSEX DISTRICT AND GUELPH RAILWAYS

	Essex	Guelph
Route-miles:		
City trolley	15.11	
City trollibus	5.01	
Amherstburg interurban	13.54	
Tecumseh interurban	6.11	
Total route-miles	39.77	8.49
Passenger and freight car-miles operated	1,825,171	300,577
Passenger and freight car-hours operated	217,486	37,563
Average number of employees	200	28
Accidents	375	80
Passengers carried	12,318,236	1,521,171
Percentage of transfer to revenue passengers	14.7	14
Passenger cars operated	55	7
Passengers carried per route-mile	309,736	156,237
Passengers carried per car-mile	6.9	4.4
Passengers carried per car-hour	58.8	37.5
Average mileage per car operated	32,232	42,931
Average passengers per car operated	223,968	——
Average riding (revenue) habit	137.7	72.1
Freight tonnage carried	19,989	

The net deficit of the Guelph District Railways for the year, payable by the city of Guelph, was $12,982, as compared with $22,911, for the previous year, notwithstanding the fact that the interest charges increased on account of the additional capital expended. In addition $1,264 was set aside as a provision for unredeemed tickets. The value of one of the carhouses, amounting to approximately $600, was written off capital, the carhouse having been destroyed by a wind-storm. In addition $256.30 was written off the valuation and other expenses in connection with the purchase of the line by the commission. The accidents on the line were 80 in number, most of them of a minor character.

The rehabilitation of the Guelph District Railways was completed during the year, with the exception of a portion of the track on the York road line from Carden Street to Waterloo Street through the Canadian National subway, and the line is now operating with very few delays and is giving a regular service. The monthly car-mileage has increased from approximately 14,000 to 27,600 car-miles. The one-man car operation has proved very successful and has decreased the cost of operation. The operating expenses have decreased, notwithstanding the fact that there has been a very heavy increase in car-mileage. The industrial conditions in Guelph have been such, for the past year, that the revenue shows a very slight increase. The closing of the summer term of the Agricultural College, and the absence of excursions from various points in Ontario during the summer months helped to decrease the revenue.

COMPARATIVE FIGURES SHOWING GROWTH OF THE ESSEX DISTRICT RAILWAYS

Year	1921-21	1921-22	Percentage of 1920-21	1922-23	Percentage of 1920-21
Passenger earnings	$488,185	$526,982	107.8	$625,601	128.1
Freight earnings	9,883	19,470	197.0	50,570	511.6
Miscellaneous earnings	7,757	10,339	133.2	12,244	157.8
Gross earnings	$505,826	$556,792	110.1	$688,416	136.5
Operating expenses	426,604	436,910	102.4	500,202	117.2
Net earnings	$79,222	$119,881	151.3	$188,214	237.5

When the commission prepared its first report on the Guelph Street Railway, some four years ago, there was a scarcity of rolling stock and the second-hand value of cars was at a peak. There were delays in transferring the railway to the commission and still further delay on the part of the manufacturing companies in filling the commission's order for the new safety cars. After the new cars were delivered it was found that there was practically no market for the old double-truck cars. They were carefully gone over and the commission is now transferring this equipment to one of its other lines where the bodies will be rehabilitated and new trucks, motors, etc., supplied.

The Toronto & York Radial Railway has been operated by the commission since Nov. 1, 1922. It is explained by the commission in connection with the presentation of the operating statement that it is not possible to present comparative results for previous years because the records which have been kept in the past included the revenue and the mileage of the local service which was operated in connection with the Metropolitan division from Farnham Avenue to what was then known as Stop 26 and is now the new terminal for the interurban lines.

OPERATING STATISTICS OF THE TORONTO & YORK RADIAL RAILWAYS FOR 1923

Route miles—1923	Miles
Metropolitan and Schomberg and Aurora division	63.100
Scarboro division	8.349
Mimico division	8.620
Total	80.069
Passengers carried—1922-1923	
Metropolitan and Schomberg and Aurora division	1,969,800
Scarboro division	1,261,628
Mimico division	3,760,299
Total	6,991,727
Passenger car-miles operated	
Metropolitan and Schomberg and Aurora division	Miles 723,553
Scarboro division	331,750
Mimico division	588,982
Total	1,644,285
Passengers carried per car-mile	
Metropolitan and Schomberg and Aurora division	2.72
Scarboro division	3.80
Mimico division	6.38
Freight tonnage carried	
Total freight, tons	130,616
Freight tonnage per car-mile, tons	0.981
Freight revenue per car-mile	$1.30
Freight revenue per route-mile	$2,735.47
Freight revenue per ton	$1.52

The operation of the system for the year ending Oct. 31, 1923, shows a net deficit of $204,505. This is accounted for by the loss of the revenue formerly received from the local line operation and the inability to decrease the operating expenses in the same ratio. The discontinuance of the local service occasioned a loss of 6 cents per passenger, being the amount of reduction in interurban fare which became effective with the change of terminal location which shortened the interurban journey. The gross revenue also shows a reduction on account of the transfer of the revenue received from the sale of

STATEMENT OF EARNINGS AND EXPENDITURES OF THE TORONTO & YORK RADIAL RAILWAY FOR YEAR ENDED OCT. 31, 1923

Receipts	Metropolitan	Scarboro	Mimico	Total
Passenger	$356,822	$85,749	$207,898	$650,469
Freight	172,608	....	....	172,608
Rentals of property, including amount charged Niagara system for use of poles	11,206	1,015	40	12,262
Miscellaneous	6,787	1,511	469	8,768
	$547,424	$88,276	208,407	844,108
Net deficit (or surplus) for year after payment of interest on the bonds issued by the commission to cover its investment in the railways, but before making provision for renewal of road and equipment	184,067	28,300	(17,116)	195,252
	$731,492	$116,577	$191,291	$1,039,360
Expenditures				
Transportation expenses	173,124	39,806	85,120	298,051
Maintenance—way and structures	106,906	14,614	14,891	136,411
Manitenance—equipment	75,280	11,452	17,218	103,951
Power costs	115,963	18,409	29,881	164,254
General operating and management expenses	43,246	5,131	8,248	56,626
Proportion of the administrative and accounting expenses of the commission chargeable to the operation of the railways	31,208	4,172	6,788	42,168
Taxes	13,193	930	1,278	15,402
Insurance (fire and liability)	24,278	4,478	8,901	37,658
Written off valuation and other expenses re purchase by Hydro-Electric Power Commission	3,831	494	574	4,900
Total operating expenses	587,033	99,489	172,902	859,324
Interest: On bonds $2,375,000 issued by the Hydro-Electric Power Commission to cover the purchase price of the Railways	112,500	14,400	15,560	142,500
Bank and other interest	31,958	2,687	2,789	37,435
	$731,492	$116,577	$191,291	$1,039,360

power from the railway revenue account to that of the power department.

After a careful investigation the commission recommended a further capital expenditure of approximately $2,000,000 for the rehabilitation of the line and the purchase of new equipment. When these changes have been completed it is believed that these railways can be put on an operating basis that will take care of all necessary charges and permit a certain amount to be set aside for depreciation.

Toledo Still Going Behind

Operations of the Community Traction Company, Toledo, Ohio, for July showed a deficit of $56,033. This was after crediting the stabilizing fund with $22,074 power refund. Interest brought the stabilizing fund to a deficit of $30,431.

Gross revenue for the month was $276,549, compared with $314,330 for the corresponding month last year. A total of 3,937,039 revenue passengers was carried during the month, for a daily average of 127,000. In February the daily average was 182,092 revenue passengers. There are about 14,000 men at work in fifty-one plants in the city compared with 29,000 at work about a year ago.

Operating costs were $240,551. This is a cut of $20,560 from July last year. This year there is included an additional charge of $15,000 for extraordinary maintenance. The number of car miles operated in July this year was 595,850, compared with 669,950 in July a year ago.

Bus operation produced a revenue of $1,413 at an expense of $3,179. The Monroe-Central feeder line was discontinued after the month's trial.

With an additional purchase of $126,000 of Community Traction Company bonds from sinking fund the city will hold $722,000 of the common stock of the company. Interest on the retired bonds provides a monthly credit of $3,610 to the sinking fund.

Payment of dividends on the preferred stock of the Community Traction Company has been suspended by the company, but minority stockholders in Toledo are being paid by Henry L. Doherty & Company, to whom the dividends are being assigned.

Bond interest was paid by borrowing about $37,000 from Henry L. Doherty & Company on a demand note.

Car Trust Terms for Trenton Approved

Approval has been granted by the Board of Public Utility Commissioners to the car trust agreement entered into on July 8 by the Trenton & Mercer County Traction Corporation, Trenton, N. J., and the J. G. Brill Company. In the same action the board authorized the railway to issue ten serial notes aggregating $304,943. Of this amount $234,122 is listed as the principal and $70,821.85 as the interest thereon. The application of the railway to the commission was the outgrowth of the corporation's plan to add twenty new cars to the service—an improvement already approved by the commissioners.

Streator Abandons Railway Service

The Illinois Commerce Commission has issued an official order authorizing discontinuance of railway service in Streator, Ill., by the Illinois Light & Traction Company. The date for the abandonment was fixed at Nov. 1. The company has agreed to tear up its tracks and replace the pavement. In announcing its finding the commission states that the company had been operating at a loss for many years and that neither a change in the operating schedule nor rate of fare would insure a profit. It held that the company could not be expected to continue operation at a monthly loss, especially when a substitute service by bus was promised the moment the trolley ceased to operate.

It seems that the Streator Yellow Bus Company has been authorized by the commission to operate buses upon all lines desired by the City Council and subject to the latter's rules and regulations. The bus company is already operating in Streator, but not in competition with the railway. It promises to add new buses so as to take care of all sections of the city as outlined by the Council.

The city of Streator has a population of only 16,000. The railway there operates only 6 miles of line, of which 4.5 miles are in city streets.

Wants to Buy Trolley Equipment.—Fred Wilmoth, superintendent of the Meyersdale Light, Heat & Power Company, recently submitted an offer to the stockholders of the Pennsylvania & Maryland Street Railway, Elk Lick, Pa., whereby his company would purchase the trolley line and equipment. Mr. Wilmoth intimated that if his offer is accepted his company would continue to operate the line for general freight and passenger service. The power house at Boynton, near Salisbury, would be abandoned and the power secured from the Meyersdale plant, thus making cheaper operation possible.

Loss in Six Months' Period.—According to the semi-annual statement of the United Traction Company, Albany, N. Y., the company operated at a deficit for the first six months of 1924, although the number of passengers carried increased 13,415 over the number carried in the similar period of 1923 and despite decreases in operating costs. The loss was attributed to decreased income caused by loss of power sales and a decrease in passenger traffic for the second quarter. The revenue amounted to $1,670,367, a decrease of $32,396 over last year. Operating expenses were $1,353,345, compared with $1,410,342 last year. This saving, it was said, was offset by the taxes and loss of power sales. Net loss from operation during the six months amounted to $75,000, compared with $42,704 a year ago.

Co-operative Dividend Depends on Fare Increase.—In a statement accompanying the latest financial report of the Philadelphia Rapid Transit Company, Philadelphia, Pa., issued at a recent monthly meeting of the board of directors, it was brought out that as operating revenues have failed to maintain the usual rate of growth the payment of a large part of the co-operative wage dividend this year would depend on an increase in fare. Operating revenue for 1924 would appear now to be more than $2,000,000 less for the year than was anticipated. The petition of the company for an increase in its fares has been referred to previously in these columns. City Solicitor Gaffney sent to the Public Service Commission on Aug. 18 two additional complaints supplementing the protest recently filed by the city against the company's application for permission to increase its fare rate.

Operating Revenues Increase.—During the first month of operation under a 20 per cent increase in straight fares granted by the Maryland Public Service Commission the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., showed an increase in railway operating revenues from $218,031 in July, 1923, to $223,117 in July, 1924. Operating expenses increased from $143,720 to $151,758 in July of the present year. The net income also showed a falling off, being $33,463 in July, 1923, and $31,464 in July, 1924.

Prior Lien Stock Offered.—Pynchon & Company, New York, N. Y., are offering at $97 per share and accrued dividend to yield about 7.22 per cent 10,000 shares of the Middle West Utilities Company 7 per cent prior lien stock. The company, with headquarters in Chicago, operates eighteen electric railway lines through its subsidiaries.

Preference Stock Offered.—A syndicate headed by A. B. Leach & Co., Inc., is offering at $93, to yield more than 7.50 per cent, 32,500 shares of prior preference stock of the Virginian Power Company. The stock is known as series A. Through its subsidiaries the company furnishes the railway and interurban service to Portsmouth, Ohio, and vicinity.

Surplus Realized for Six Months.—For the six months period ended June 30, 1924, the net income of the Washington Railway & Electric Company, Washington, D. C., was $544,263, an increase of $132,946 over the previous year. After the payment of dividends for the first half of the year the company had a surplus of $169,000.

Railway Service Abandoned.—Bus service between Rocky Grove and Franklin, Pa., is to be started in the near future by the Citizens Traction Company, Oil City, Pa. Railway service will be abandoned. The company reserves the right, however, to restore railway service if bus service does not prove satisfactory.

Additional Issue of Tide Water Bonds.—An additional issue of $1,070,500 Tide Water Power Company first lien and refunding mortgage gold bonds, Series A, sinking fund 6 per cent, is offered at 97½, to yield in excess of 6.20 per cent, by Hemphill, Noyes & Company, Stroud & Company, Coffin & Burr, Inc., and Otis & Company, New York. The bonds are due on Oct. 1, 1942. The company furnishes electric light and power, gas and electric railway service in Wilmington, N. C., and nearby territory.

Receipts Show Decrease.—For the six months period ended June 30, 1924, the Boston Elevated Railway, Boston, Mass., realized total receipts of $17,612,609, against $17,448,488 for the similar period in 1923. The total cost of service for this period of the current year and last year respectively were $17,374,308 and $16,386,354. The excess of receipts over the cost of operation was $238,301 for the period of January through June, 1924, against $1,062,135 for the similar six months period of last year. The great disparity in the excess of receipts between the two years is found in the increase in maintaining track, cars and also in transportation expenses. Revenue passengers carried on a 10-cent fare in the period of January to June, 1924, numbered 145,077,613, against 145,392,522. Revenue passengers carried on a 5-cent fare increased from 49,668,497 for the six months period of 1923 to 54,096,867 for the similar period this year.

July Deficit Lower.—The deficit for operation of the United Electric Railways, Providence, R. I., during July was much less than for preceding months. According to the report filed with the Public Utilities Commission on Aug. 21 the deficit for July was only $28,801. This compares favorably with the "red ink" balance of $42,794 reported for June. The deficit for the seven months ended July 31 totals $252,313, after interest and taxes. Operating revenues for July totaled $676,772, compared with $655,962 for June, while total operating expenses were $620,025, against the June figure of $613,962. Net operating revenue jumped to $56,747 for July, up from $41,999 for June. Deduction of $86,779 for bond interest and taxes resulted in a July deficit of $28,801.

Gross and Net Earnings in Brazil Decrease.—The annual report of Brazilian Traction, Light & Power Company for the year ended Dec. 31, 1923, as issued in Toronto, shows gross operating earnings of $24,184,761, a decline of $1,321,659, or 5.18 per cent, from the figure reached in 1922. Net earnings from operation before provision for depreciation were $15,332,329, as compared with $16,299,229, a decrease of $966,900, or 5.93 per cent. This result, the report states, was due entirely to the decline in exchange as the earnings in Brazilian currency, both gross and net, exceeded those of any previous year.

Expects Lower Deficit.—The Tacoma Municipal Railway, Tacoma, Wash., is expected to show a better balance sheet in future monthly reports of the line, by reason of the action of the City Council in canceling book charges against the line for gross earnings tax, which has never been paid into the general fund, and directing that hereafter no gross earnings tax be charged against the line. The deficit of the car line will be reduced by $39,623 by cancellation of past gross earnings tax charges. The balance sheet hereafter will also show a reduction of current liabilities by $46,480, standing on the books as interest due the Emergency Fleet Corporation. Both this interest charge and a bonded indebtedness of $233,000 were wiped out by the settlement of the government loan recently. The line will hereafter show only $348,000 as the total amount of bonds outstanding.

Personal Items

DeWitt C. Baird, formerly connected with the Burke Garage, Inc., New Brunswick, N. J., has been appointed to supervice the operation of buses for the Public Service Transportation Company, a subsidiary of the Public Service Railway, in the New Brunswick district. Mr. Baird has had considerable experience in handling traffic, having served as district superintendent of the Public Service Railway. He was later transferred to the Perth Amboy district, but resigned his connections with the trolley company to enter the bus business with Thomas J. Burke, organizing the Burke Garage, Inc.

R. M. Orser is serving in the capacity of cost accountant on the staff of H. H. Couzens, vice-president of the Brazilian Traction, Light & Power Company's subsidiary companies with headquarters in Rio de Janeiro. He was formerly connected with the firm of Hagenah & Erickson of Chicago, which acted for the Toronto Railway in the arbitration case between the city and the company.

A. B. Paterson, ranking vice-president with the late A. L. Kempster of the New Orleans Public Service, Inc., New Orleans, La., operating the electric railways there, will for the present at least continue also to discharge the duties of the office of general manager, the title held by Mr. Kempster, in addition to that of vice-president. All during the long illness of Mr. Kempster Mr. Paterson acted in his stead.

George W. Jones, treasurer of the Brooklyn City Railroad, was made second vice-president and treasurer of the company at the last meeting of the board of directors. Mr. Jones has been treasurer of the company since the lines of the Brooklyn City Railroad were separated from the rest of the old Brooklyn Rapid Transit System in 1919. Before he joined the Brooklyn City Railroad forces Mr. Jones had been associated with Sanderson & Porter, New York, for many years.

Warren Hastings, assistant purchasing agent for the Northern Ohio Traction & Light Company, Akron, Ohio, for the past six years, has accepted a position with the Akron Oil Company as sales manager.

B. F. Lyons is president of the Kewanee & Galva Railway, Kewanee, Ill., which he recently purchased. Mr. Lyons was formerly vice-president and general manager of the Beloit Water, Gas & Electric Company, Beloit, Wis. In Mr. Lyons' efforts to restore these rehabilitated properties connecting Galva and Kewanee to a paying basis he will be assisted by George A. Mills as vice-president and general manager.

W. B. Miser, at one time operating manager and general sales manager of the Illinois Traction Company, Peoria, Ill., operating railway, electric light and power and gas properties, has recently been made commercial manager of the Emporia division of the Kansas Electric Power Company. He has served as branch manager with the Westinghouse Electric & Manufacturing Company.

Obituary

Walter B. Lewis, cashier of the Springfield Traction Company, Springfield, Mo., died recently. He entered the employ of the company about 14 years ago as a conductor. He became cashier about six years ago.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

England and Holland Are Recovering Commercially

Many Obstacles to Business Prosperity Still to Be Overcome—Some Good Underlying Conditions

E. J. Mehren, vice-president of the McGraw-Hill Company, has just returned from a European trip, during which he attended the Advertising Convention and Power Conference in London and visited a number of countries on the Continent. Below will be found some notes by him on business conditions in England and Holland.

ENGLAND FIVE YEARS AFTER THE PEACE

The war is only a yesterday with Britain and the consequences are still sharp upon her. I do not mean that she is discouraged; that word has no place in the British vocabulary, nor has the state of mind it indicates any place in British consciousness. But the burdens that weigh her, the obstacles still to be overcome, are fully appreciated and are a stock subject of discussion will all her thinking men.

To enumerate some of the troubling factors:

1. There is still large unemployment, though the amount is lessening.
2. There is marked depression in the "engineering trades," as they are called here—shipbuilding, machine tool building and the metal fabricating industries generally. In construction there are few large projects in hand, though there are a few that, after long delay, now seem likely to be taken in hand.
3. A new housing bill, that will again dip heavily into the national and into local government treasuries—and increase, accordingly, national and local tax burdens—is before Parliament.
4. The income tax rate on even small incomes is 4 shillings 6 pence per pound sterling, or 22½ per cent. The super-taxes are very heavy.
5. The continental problem is acute and the consequent uncertainty, the upset exchanges, the diminished purchasing power curtail British export markets.
6. Finally, the never-ending exchange of views with their continental war allies on German reparations keeps before the British people constantly the fact that peace, though declared five years ago, is not yet here. There is cessation of military activity; there is not that accord which is peace in actuality.

That the consciousness of the international element in these difficulties is ever present with the thinking Britisher was strikingly demonstrated in addresses at the great advertising convention held at the British Empire Exhibition last month. Man after man emphasized the distressed position of Europe and expressed the hope that out of the international discussions now under way in London, and participated in by the United States, there may come that peaceful adjustment for which Europe has been longing since Nov. 11, 1918.

In private conversation one gets an even more serious picture of England's difficulties, for there the talk turns to social conditions. Briefly, the burden of these conversations can be reduced to just this—that the altruistic promises of wartimes and the coddling of politicians have taken from the mass of British workers a sense of responsibility for their own welfare and led them to expect the government to take care of them. Thrice, indeed, was the statement made to me, and in separate conversations, that there was a growing opinion, fostered by socialist agitators and politicians, that if the people would have the babies the government would do all else. Such an attitude, of course, leads, and has led, to shiftlessness, inefficiency when at work, failure to provide for the rainy day—in a word, all of the economic vices of a dependent, spineless people.

Withal, though, it should be repeated that the Englishman is not discouraged. He has lived through a lot. He hopes that he will live through this trying period, and that a better day will come.

HOLLAND'S POST-WAR DIFFICULTIES

The innocent bystander often is hurt. So it was with Holland during the war. So it is now. Holland, in common with the former belligerents, is suffering from the effects of the world's decreased purchasing power.

During the war, it will be recalled, Holland suffered severely. She had no military participation in the conflict, but her economic relations with all the world were disrupted. Her food supply was diminished and strict rationing was necessary. So she shared the war hardships.

After the war her course, economically, followed that of the other nations. She had a period of hectic activity, construed, at the time, as an evidence of prosperity. Then came the slump—and Holland has not even yet fully recovered.

The Hollanders say that labor conditions are improving. Wages have come down from the peak, efficiency is increasing, and hours of labor, though fixed at 45 per week by law, have been increased in a few cases. The turn for the better in the labor attitude seems to have come, even though conditions are far from being as good as they were before the war.

INCREASE IN POPULATION A PROBLEM

Holland has another large economic problem before it. The population is increasing quite rapidly, but the country has no colonies of its own to attract immigrants. Thus far it has been mainly agricultural. The lands to be made by the Zuyder Zee drainage will offer only a small measure of relief to a population inclined toward becoming an industrial one. Economically, therefore, the problem is pressing and its solution is likely to have very important results for that country. Holland appreciates this.

Order Placed for Motors for Staten Island Electrification

An order has been placed with the General Electric Company for 80 two-motor equipments for use on cars in the electrification of approximately 17 miles of double-track passenger line of the Staten Island Rapid Transit Company and the Staten Island Railway, now under way.

The motor equipments will be installed on subway type of steel coaches seating 71 passengers. Each coach is separately driven with two motors of 200 hp., operating at 600 volts and equipped with G. E. type PC-10 control. Current to the trains will be supplied through a top contact third rail.

The cars are to be manufactured by the Standard Steel Car Company. They will be similar to those now operating in the subways of the Brooklyn-Manhattan Transit Corporation.

Details of the cars, the third-rail and other features of the installation were reviewed in an article in the issue of the ELECTRIC RAILWAY JOURNAL for May 17, page 776.

84,424 Square Feet of Space Sold for A.E.R.A. Convention

Practically 200 manufacturers will use 84,424 sq.ft. of display space at Atlantic City next month for the forty-third annual convention of the American Electric Railway Association. About 27 per cent of the space will be given over to bus exhibits, but the requests for space from manufacturers of buses had to be cut more than 6,000 sq.ft. in order to accommodate all who desired to exhibit.

The arrival of all buses intended to be on exhibition is to be scheduled. In order to avoid confusion, the association has decided that each company shall have its bus arrive at Atlantic City at a time that will permit it to be put into place before the bus next nearest the street entrance is permitted to go on the Pier. This will eliminate accidents, and do away with any possible congestion in handling material of other exhibitors. It is aimed to have all exhibits ready for inspection at 2 p.m., Sunday, Oct. 5, at which time the exhibit committee will make its tour of inspection.

Metal, Coal and Material Prices

Metals—New York	Aug. 26, 1924
Copper, electrolytic, cents per lb.	13.313
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	8.025
Zinc, cents per lb.	6.212
Tin, Straits, cents per lb.	51.875
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.15
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.55
Kansas screenings, Kansas City, net tons.	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.55
Weatherproof wire base, N. Y., cents per lb.	18.50
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.05
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.12
Turpentine (bbl. lots), N. Y., per gal.	0.90

Rolling Stock

Worcester Consolidated Street Railway, Worcester, Mass., has recently purchased 10 30-ft. double-truck, prepayment, semi-convertible cars from the Osgood-Bradley Car Company. The specifications of these cars follow:

Date order was placed	Nov. 22, 1923
Date of delivery	March, 1924
Seating capacity	44
Weights:	
Car body	19,760 lb.
Trucks	12,000 lb.
Equipment	11,180 lb.
Total	42,940 lb.
Bolster centers, length	19 ft.
Length over all	44 ft.
Truck wheelbase	4 ft. 6 in.
Width over all	8 ft. 8½ in.
Height, rail to trolley base	11 ft. 7 in.
Body	Semi-steel
Interior trim	Mahogany
Headlining	Agasote
Roof	Arch
Air Brakes	General Electric
Armature bearings	Sleeve
Axles	Hot forged
Bumpers	Hedley anti-chamber
Car signal system	Faraday buzzer
Car trimmings	Statuary bronze
Center and side bearings	Plain
Compressor	GE, CP-27
Control	K-35C
Drawbars	Metropolitan type
Curtains	None
Destination signs	Keystone
Door operating mechanism:	Osgood-Bradley
Fare boxes	International
Gears and pinions	Tool Steel
Hand brakes	Peacock, staff
Heater equipment	Gold
Headlights	Neal
Journal boxes	Symington M.C.B. type
Lightning arresters	General Electric MD.
Motors	Four GE-200J, outside hung
Power saving device	Arthur
Registers	International
Safety devices	Standard
Sanders	Murphy
Sash fixtures:	National No. 102 Lock and two Howard compression rolls.
Seats	Osgood-Bradley, slat
Slack adjuster	Turnbuckles
Springs	Double full elliptical and coil
Step treads	Kass
Track scrapers	Air operated
Trolley catchers	Wilson No. 2-C
Thermostats	Utility
Trolley base	U.S. 13
Trolley wheels	4¼-in. diameter
Trucks	Standard O-50
Ventilators	8 Osgood-Bradley exhaust
Wheels	33-in. steel

Track and Line

Omaha & Council Bluffs Street Railway, Council Bluffs, Iowa, has begun the work of tearing out the old paving from between the tracks on Pierce Street and is replacing rails with heavier steel.

Dallas Railway, Dallas, Texas will start work Sept. 1 on the Ervay Street line extension decided on nearly a year ago by the city and the railway company.

San Diego Electric Railway, San Diego, Cal. will construct a connecting link between the dock terminals of the city and the lines of the San Diego & Arizona Railway. This will serve as the first unit of a municipal harbor belt line. The line will be a standard gage line running from Atlantic and Market Streets, over Belt Street on the tidelands to the foot of G Street. It will be approximately three blocks long. It will be financed by the San Diego Electric Railway, but it eventually will be taken over by the city. The plans for the line contemplate including it later in a belt line system which eventually will feed the entire industrial and shipping enterprises of the city. For the time being it will be used for the handling of cargoes and for the distribution of the cargoes through the city.

Capital Traction Company, Washington, D. C., is putting in new track on Fifteenth Street for a stretch of two blocks at a cost of $25,000. The company has just completed the paving work on Connecticut Avenue. The work accomplished extended for a distance of 10,000 ft. and cost altogether about $172,500. It included paving with concrete in the tracks, between them and for 2 ft. outside the outside rails. In addition new ties, spikes and bonds were put in. The concreting alone cost about $85,000.

Los Angeles Railway, Los Angeles, Cal., will soon start reconstructing its track on Griffin Avenue with 116-lb. rail. Track reconstruction on Second Avenue has been completed.

Power Houses, Shops and Buildings

Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio, has awarded a contract for the erection of a car shop on the south side of Dumont Avenue, Cincinnati. The building will be constructed of brick and reinforced concrete and will be utilized for the repair of cars.

Elmira Water, Light & Railroad Company, Elmira, N. Y., plans to build a power house and transformer station on First Street and Railroad Avenue, Elmira, at a cost of $40,000.

Hartford & Springfield Street Railway, Warehouse Point, Conn., is negotiating for a central location for a railway and bus terminal. Search by Manager Hambleton for a suitable terminals has led Thomas H. Benton, supervisor of public motor transportation in Springfield, to stir the issue of a municipal motor bus terminal with a waiting station for various lines entering the city.

Trade Notes

Industrial Works announces the opening of a new district office at 455 Monadnock Building, San Francisco. Cal., in charge of J. M. McGuire, district sales manager.

Albert Swartz is representing the Areco Anti-Rail-Creeper Company in Chicago territory with offices at 1526 Manhattan Building. Mr. Swartz was formerly manager of the Toledo & Western Railroad, Toledo, Ohio.

Sykes Company, St. Louis, Mo., has been incorporated with a capital stock of $100,000 to manufacture, sell and design automotive railway motor coaches and passenger trailers. C. E. Sykes is the president and Charles S. Lynch secretary and principal agent. The office is located at 1400 Liberty Central Trust Building, St. Louis.

Mitchell - Rand Manufacturing Company, New York, N. Y., is distributing thousands of sample wedges loose in an envelope, which enables them to be more readily tested for size in the armature. Heretofore the samples have been attached to a card. Each of the wedges is numbered. The envelope shows the style number, thickness and price of the different wedges. It has en eyelet at the top which enables it to be hung on a nail in the shop ready for instant use.

Railway Improvement Company, New York, N. Y., has taken over the manufacture and sale of the Hartman center plate, the Perry street car side bearing, the Paragon side bearing, the Woodman side bearing and the Peerless street car side bearing.

Osborne E. Quintin, formerly of the Continental Railway Specialty Company and Burry Railway Supply Company, Chicago, has severed his connections with these companies to enter the sales department of the Railway Improvement Company, which organization is taking over the manufacture and sale of the products of the Continental Railway Specialty Company, including the Hartman center plates, Perry side bearings, Paragon side bearings, Woodman side bearings and Peerless side bearings. Mr. Quintin spent several years in newspaper and financial work and from 1909 to 1914 was Western sales manager of the American Silver Company. In 1914 he became sales manager of the Peter Smith Heater Company and later vice-president and general manager of that organization. During the war period he superintended the testing and inspection of heating equipment used on submarines and submarine chasers, and in 1919 became secretary and treasurer of the Holden & White Company, which later merged with the Railway Supply Company. With the Railway Improvement Company Mr. Quintin will be located in the Chicago office.

New Advertising Literature

American Engineering Company, Philadelphia, Pa., has issued a fifty-page pamphlet describing the new Taylor stoker. Copies are being distributed by the company gratuitously upon request.

Line Equipment Sales Company, Cleveland, Ohio, has issued Catalog No. 1, a data book of materials and supplies for line construction and maintenance work.

International Motor Company, New York, N. Y., has issued a folder describing the Mack buses. Illustrations include the city bus body, the sedan bus body and high spots of the chassis design.

Cleveland Twist Drill Company, Cleveland, Ohio, has put into booklet form the records of the tests of the Cle-Forge high speed drills exhibited at the recent convention of the American Railway Association, Mechanical Division. The company hopes that the booklet will be of value to all drill users.

New York, Saturday, September 6, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 10

A Railway that Came Back

WHEN a railway is abandoned it usually means that the junk man is called in and what remains of the physical assets is salvaged by him for what it will bring. But in the case of the abandoned western section of the Shore Line Electric Railway, an interurban operating in Connecticut, when the junk man determined to take out the rails he found there was no profit in the procedure, even in the period when scrap metal was high some five years ago. That is the only thing that saved the property for the present owners, as the local bankers said the railway had failed and there was no hope of reviving it.

Exclusive of the terminal city, the population to be served was only 40,000, including the many summer visitors who frequent the small towns along Long Island Sound, and the largest town outside of New Haven has only 3,000 people. The New York, New Haven & Hartford Railroad paralleled the route. In addition, independent buses had come in when the railway was shut down as it was thought they could handle the business. These factors all seemed to indicate that the property never could be made to pay.

With such a discouraging outlook ahead, it seems surprising the any one would consider further a project to resurrect the line. But all this did not prevent further consideration by the original builder of the road, who knew the possibilities of the situation. His opinion that with light cars and frequent service the line could be made to pay was confirmed by a number of outside railway men.

The resumption of service and the results obtained are described in some detail in an article in this week's issue. When the road was started up once more as the New Haven & Shore Line Railway, after four years of idleness, it was possible to change some of the conditions that had resulted in the failure. The new cars, weighing 28,000 lb. against 69,000 lb. for the old ones, permitted one-man operation. Purchased power, automatic substations and other recent developments have all contributed to economy in operation. From a transportation standpoint, a study of the needs of the people has resulted in arranging the schedules so that they really serve the riders, which was not the case formerly. The fare collection has been simplified and delays due to this cause practically eliminated. The territory has been surveyed to obtain new sources of revenue. Freight business has been developed so that it is a real aid to the company.

On a small property such as this it is essential that there be no wasted labor, and it is interesting to note that the maintenance men are willing to do work in more than one trade. This permits payment of good wages while keeping down the cost to the company.

As a result of the enterprise shown in rehabilitating this property the riders have steadily come back, proving that the public is really desirous of getting satisfactory railway service. The competing bus lines have gradually lost business and one has finally retired, while another is said to be finding it difficult to operate at a profit.

It is worthy of note that in the physical restoration of this property there have been no radical innovations. Everything has been carried out along well-proved lines, such as can be done by any railway. Here should be an inspiration for the railway man who has found business declining, for it shows that in some places, at least, it is possible to regain confidence and improve conditions so that an essential service can be retained for the community.

Publicity as a Means of Preventing Unfortunate Results from Superficial Thinking

OUR means of distributing information appear to have increased very much more rapidly than the ability of the average man to digest this information. As a result of this situation, nearly every one possesses a little knowledge on almost every subject, and it is axiomatic that a little knowledge is a dangerous thing. Never before has careless and superficial thinking been so prevalent as it is today.

Railways suffer in many ways on account of this superficial thinking. They suffer because the man in the street believes that he knows as well as the experienced transportation man how to operate the road. City officials usually consider themselves equipped as well as, or frequently better than, the company's engineers to solve technical problems. Hearing that this or that scheme has been tried somewhere else, they seize upon it eagerly as the solution of the transportation problem in their own city, failing entirely to consider that in many cases the local circumstances may be altogether different.

It is necessary only for some evil to be discovered before a dozen ready remedies are suggested. The fact that the remedy may be worse than the disease seems never to occur to the ardent reformer. If a careless automobile driver collides with a span pole, it is proposed to remove the pole. Teaching caution to the autoist would be too long a process.

To some extent the railways are now suffering from the effect of superficial thinking in the past. They have been compelled by the weight of uninformed opinion to do many things against their own judgment—things that have not turned out particularly well. They are likely to have even more trouble of this kind in the future unless steps are taken to forestall it.

A few railways still adhere to an out-of-date policy of talking to the public as a grown person talks to children—in a pleasant voice and with a smile perhaps, but without mentioning any of the harsh realities of life. If a question is raised concerning some phase of railway operation, the public is put off with polite words and good wishes, but no facts. This simply lays a foundation for erroneous or even dangerous ideas.

The best way to prevent unfortunate results from loose thinking is by full and complete publicity which will leave the public no opportunity to be misinformed on important subjects. Today the public is not willing to sit back and give the railway management free rein to do as it pleases. If the public is going to manifest any interest in railway operations, therefore, the only way in which it can have an intelligent interest is when the company itself presents all the facts fully and frankly.

Lost—One of the Greatest Virtues of the Electric Motor

FEW railway men stop to consider that noiselessness is one of the great virtues of the electric motor. Compared with the steam engine or the internal combustion engine, the quiet operation of the electric motor is marked.

Somehow the great virtue of noiselessness appears to have been lost in the cars run on many electric railways. At least it has not been capitalized to the fullest extent, because a frequent criticism heard today of electric railway operation is that it is noisy.

Not all such criticism is justified. Other and more disturbing noises, such as the hideous exhaust horns on automobiles, pass almost unnoticed. But it must be admitted that electric railways are not infrequently offenders in the matter of noise.

Generally speaking, the noises incident to street railway operation may be divided into two classifications, those for which the rolling stock is responsible and those due to the track. Every electric railway man knows that improperly maintained equipment results in noisy operation. The elimination of this nuisance is only a matter of care and attention to detail. Experiments are being conducted with a view to shrouding the wheels, improving springs and modifying the car design in other ways to reduce vibration and noise. One company is trying out car wheels with rubber cushions between tire and hub. All this represents a movement in the right direction, but one might wish that the movement were at a somewhat faster rate.

Less thought, perhaps, is being given by way engineers to the responsibility for noise that rests on the track than is given by mechanical men. Bad track is at least as likely as bad cars to be a nuisance. Corrugated rail, loose switches and worn out crossings should receive prompt attention or the reputation of the railway will suffer.

There is also another phase of the situation which has not received so much attention. Some brand new track, badly designed, may be just as noisy as old track. One can ride along the street in a railway car and notice the difference in the amount of noise produced on different sections of track. Here is a problem that, while not new, challenges the ingenuity of the best engineers. An even more determined effort to find the cause and the remedy should lead to an improvement in the operation, for noise, in addition to being objectionable in itself, is an indication of wasted energy and an excessive rate of deterioration of one or more parts of the railway property.

"Ye Shall Know the Truth"—An Impression from England

ADVERTISING has come to be a common denominator to all business. Executives of the electrical industry will therefore feel a very personal interest in the impression which Americans have brought back from the recent international advertising convention held in London. In a word, this impression is that although tremendous advances have been made in America in the technique and detail of advertising, and we have undoubtedly advanced in its application beyond any other nation, the Englishman has perhaps come to a deeper realization of the fundamental values of advertising as a constructive influence for use in great social, national and economic emergencies.

Crown, Church and State were marshaled to stage by the advertising men of England before the 5,000 delegates from the United States and other nations. The convention was opened by the Prince of Wales. The Bishop of Durham, in a sermon on advertising in Westminster Abbey, issued a call to arms to all advertising men to keep the aims and the purposes high of this one of the greatest of forces in educating the people. His theme, "Ye shall know the truth, and the truth shall make ye free," was developed into a masterpiece of logic and flawless English. No business man in his audience in that "Hall of Great Traditions" of England could escape the truth that advertising, this most modern expression of a civilization, could be associated with propriety with the lessons of the past, whose memorials were everywhere about him.

The ministers of the British government addressed the convention on the force and purpose of advertising as a great instrument for public and industrial education, and called upon advertising men to use their influence through the public prints to bring about a better understanding between nations.

On the economic importance of advertising, as well as its intimate social significance today, there were many fine addresses. Perhaps the keynote of the many contributions to the economic place of advertising in modern industry was struck by Winston Churchill, when he said:

> The great upward movement of productivity was checked by the war, but not arrested. . . . We are suffering from a serious and widespread decline in consuming power. . . . It spurs exertion. It brings together in fertile union what otherwise would have never met. . . . The advertisement is a protection against profiteering. The standard of the goods is made uniform. Advertising is a great security to the public against fraud. . . . Let me endeavor to sum up in a few sentences what I conceive to be the main theme of your discussions. Truth will conquer; beauty is a practical utility, art is serviceable in itself; merit will achieve its just reward; better times are coming to all of us and to the whole world; all the men in all lands are necessary to one another.

No brief editorial can summarize the work of this convention nor attempt to picture completely its many lessons. Advertising pays, yes. Advertising is a great instrument in the distribution of commodities and equipment in this complex age. But advertising is only in its beginning, if its power is to be guided by the great ideals set forth in the convention just closed.

For in England today they are looking to the force of advertising as a great instrument for social influence that gives promise of help not alone to the business man and to industry but to nations and to all humanity in the solving of the great besetting problems of our complex modern civilization.

SAYBROOK
FOXON PARK.
TOTOKET.
NO. BRANFORD.
GUILFORD.
EAST RIVER.
MADISON.
HAMMONASSETT PK.
CLINTON.
GROVE BEACH.
WESTBROOK.

The Line Passes Through Several Attractive Connecticut Towns Like This

Line Once Abandoned Modernized and Made Profitable

Light-Weight One-Man Cars Are Operated on New Haven & Shore Line Railway Through Sparsely Settled Territory at 17.79 Cents per Car-Mile—Service Resumed After Four-Year Suspension

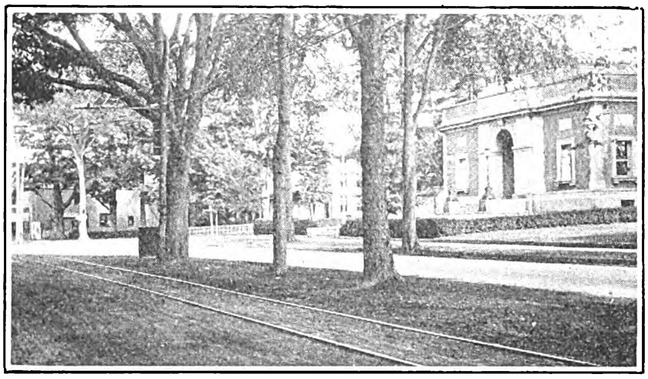
ALMOST exactly one year ago electric railway service was resumed on the abandoned "Shore Line" running from New Haven, Conn., east along the edge of Long Island Sound to Saybrook. From the summer of 1919 to the summer of 1923 not a car was operated on this 34-mile interurban line. Bus service was inaugurated in the territory formerly served by the railway, and it was generally believed that the electric railway in this district was gone, never to return. Careful investigation by experienced railway men, however, showed that modern light-weight one-man cars could be operated at a cost sufficiently low to make such service profitable. With that end in view the property was purchased and reconditioned, and the first year's operation has shown that the estimates of the engineers were correct.

In order to have a clear understanding of the factors involved in the rehabilitation of this railway, it is necessary to go back several years to the time when first it was built. Construction was commenced in 1910 on what was then called the Shore Line Electric Railway, running from New Haven to Saybrook. The principal financial backer of the enterprise was Morton F. Plant, who was a wealthy shipowner and also interested in real estate and other investments in southern Connecticut. Under Mr. Plant's direction the line was constructed and combined with other electric railway properties in eastern Connecticut, so that it extended from New Haven, Conn., to Westerly, R. I.

On the western end hourly service was provided by large heavy interurban cars of the type widely used in those days. The running time to Saybrook was two hours, cars leaving New Haven on the hour. In spite of the thinly populated character of the territory served, the railway operated at a profit for several years. But in 1916 the increase in wages and other costs began to assume serious proportions. In 1917 there were further increases in the cost of conducting transportation, generating power and general maintenance, and there was a disastrous collision on the western division. The next year serious trouble developed in the power house and it was necessary to shut down the railway for three weeks while repairs were being made. These troubles caused much loss of revenue and a serious deficit was reported at the end of the year.

A demand was made by the trainmen in 1919 for still higher wages, although they were then receiving a rate higher than the average in Connecticut. After having operated the road at a deficit for 2 years the management was unwilling to pay higher wages and increase the deficit. This situation was explained very thoroughly to the trainmen, who were told that insistence on their demands would mean the suspension of service altogether. Apparently this was believed to be merely a bluff, as the men did not recede from their position, and eventually in the early summer went on strike. The western end then suspended operation entirely and remained shut down for 4 years. Bus service was inaugurated to furnish transportation for the territory.

During this period various offers were received by



Madison, Conn., with Its Memorial Library

the management from persons who desired to buy the property and scrap it. One junk man actually got to the point of removing some of the rails, but soon found the undertaking was not profitable. Finally A. William Sperry of the Sperry Engineering Company, original builder of the "Shore Line," conceived the idea that with modern equipment operation on the section shut down might be resumed on a paying basis. The scheme was suggested to several bankers in New Haven, who flatly turned it down. They said that the railway had failed and that the bus had come in to do the business and there was no hope of reviving the electric line. Nevertheless, Mr. Sperry continued his investigation of the possibilities of the situation and secured the advice of a number of outside railway men. The latter were emphatic in their statements that the railway could be made to pay.

Accordingly arrangements were made for the purchase of the property and its operation by a new company under the name of the New Haven & Shore Line Railway. The purchase price was $140,000, which with rehabilitation costs of about $250,000 made a total capitalization of about $400,000. Bonds for this amount were sold at par and a 20 per cent bonus in common stock was given to the bond buyers.

SERVICE RESUMED UNDER NEW MANAGEMENT

The territory through which it was proposed to resume service might well have discouraged the new management. Outside of the city of New Haven the largest community served is that of Guilford, with a population of only 3,000 people. The population of the whole area is not more than 40,000 people in summer and is considerably less in winter, when many temporary visitors return to the city. Moreover, the New York, New Haven & Hartford Railroad and the Boston Post Road traverse the entire district at no great distance from the interurban right of way. The bus service begun when the railway was shut down covers the entire length of the Boston Post Road.

At first only two cars were operated between New Haven and Guilford. Then a third car was added and the operation continued to Madison. Finally a fourth was put in service and hourly service through to Saybrook was commenced. An important change was made in schedule, however, whereby the cars now leave New Haven on the half hour instead of on the even hour as formerly. This plan has worked out very much better for people who live in the country and work in New Haven, as most employees must get to their jobs on the hour or a little before and leave their jobs on the hour or a little after. The old schedule got them to town either an hour before it was necessary or a little late. When going home, at 5 o'clock in the afternoon, a wait of nearly an hour for the 6 o'clock car was necessary. The new schedule has overcome this difficulty.

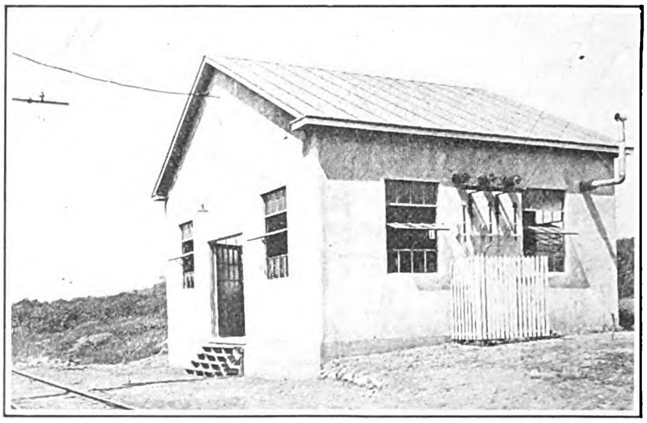
LOW OPERATING COST AN OUTSTANDING FEATURE

The outstanding feature of present operation under William Walker, general manager, is the low operating cost of 17.79 cents per car-mile with modern light-weight cars. The cars operated by the old Shore Line were of the type commonly used on interurban lines 10 or 12 years ago and weighed 69,000 lb. each. The new car is of semi-steel construction and weighs only 28,000 lb. and seats 48 persons. It was built by the Wason Manufacturing Company. These cars are equipped with four General Electric No. 264 motors and maintain a schedule speed of 17 m.p.h. on the round trip between New Haven and Saybrook. Operating costs per car-mile for the first quarter of the present year averaged as follows:

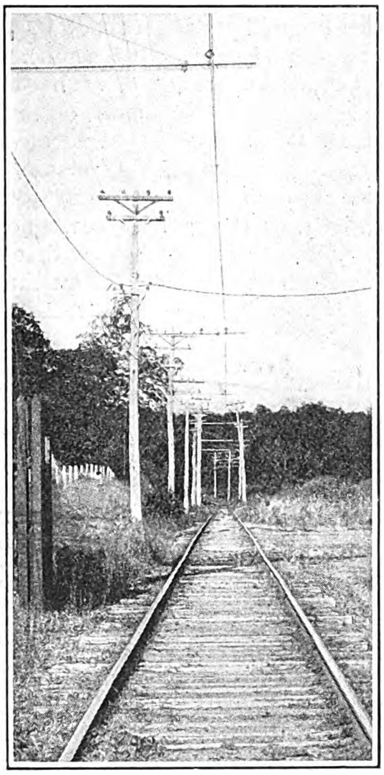
Way and Structures, Cents	Equipment, Cents	Power, Cents	Transportation, Cents	General and Miscellaneous, Cents	Total, Cents
1.51	1.42	4.45	5.32	5.09	17.79

A number of important changes were made at the time operation was resumed. The road was originally built with catenary overhead construction and designed to operate at 1,200 volts, d.c. Power was generated in the railway's own power station at Saybrook. With the reorganization, however, it was decided to purchase power from the Connecticut Company. New substations were built at Totoket and Westbrook, and one is shown in an accompanying illustration. It was found possible to equip these substations almost completely by redistributing the rotary converters and switchboard apparatus already on hand. This work was carried on with the assistance of the General Electric Company, and the new arrangements have turned out to be much more satisfactory and economical than the old.

Along with the other changes that have been made in the rehabilitation of this railway is an alteration in the method of collecting fares. The line is now divided into a number of zones, each approximately 3 miles long and in each of which a fare of 10 cents is charged. Outward bound from New Haven all passengers pay as they leave the car. Those who board in the first zone, which corresponds with the city of New Haven, simply



The Automatic Station at Totoket Is Between New Haven and North Bradford get on and go into the car to sit down. Those who board in the second and later zones receive checks showing the number of the zone. As they leave the car the operator examines these checks, collects the proper fare and rings it up on an Ohmer fare register. Inbound to New Haven fare collection is pay enter. Passengers receive tickets when they pay their fares showing the destination to which they intend to go. As they leave the car they surrender these tickets to the operator, who glances at them to see that they are not over-riding. Under this arrangement the delays of fare collection are reduced to a minimum in the New Haven area, which is the only part of the line where congestion exists.



A Large Part of the Line Is Over Private Right of Way

Under the circumstances which prevailed when service was resumed on the Shore Line it is impossible to make a worth-while comparison of present traffic with that at any specific time in the past. Conditions are now so different from what they were when the old railway was operating that a comparison of the number of passengers carried would have no value. Neither would a comparison with the number carried during the corresponding month a year ago, when the line was just getting back on its feet and before it was running all the way through to Saybrook. Without going into detailed figures, however, it may be said in a general way that traffic has been increasing steadily in a most gratifying manner ever since operation of the line was resumed.

In the early part of this summer a 4,000-ft. extension was built to serve Hammonasset Beach. This is a picnic resort on property owned by the State of Connecticut on Long Island Sound near Madison. Four second-hand open cars were purchased and have proved to be very useful in carrying special parties from New Haven to the beach during several months in the summer season.

Another important source of revenue that has been developed for the company is from the quarry of the New Haven Trap Rock Company at North Branford, which is the largest trap rock quarry in the world. An average of 150 carloads of broken stone is produced daily. Much of this rock is hauled by the New York, New Haven & Hartford Railroad, which has a spur running into the quarry, but the New Haven & Shore Line Railway gets 600 to 700 tons of freight a week from this source.

A factor that has been helpful in building up the railway's passenger traffic is the geographical features of the towns. These are in most cases long and narrow, strung out along the Boston Post Road. Between towns the railway operates on private-right-of-way, but leaves this and operates through the main street of every community. Thus it provides a much more convenient service than does the N. Y., N. H. & H. R.R., which has only one station in each town, necessitating a long walk for most of the inhabitants. There are many new houses being built along the route of the electric railway and it is expected that traffic will increase steadily for some years to come. During January, February and March of this year passenger revenue was approximately 26 cents per car-mile and with the low cost of operation left sufficient to pay all operation and interest charges.

BUS COMPETITION IS BEING DRIVEN OUT

During the time that the old railway was shut down bus operation was commenced throughout the entire territory formerly served. Since the resumption of service by the New Haven & Shore Line one bus company has retired from the field altogether and another company, in spite of the advantage of many miles of excellent concrete paving on the Boston Post Road, is finding it very difficult to keep its head above water. Propositions have been made to the Shore Line to purchase the bus rights, but the railway company feels so sure of driving out competition by the superior service afforded that it has not availed itself of the opportunity to buy out the buses.

An interesting feature of the maintenance methods of this company is the small number of men employed. This has been instrumental in keeping operating costs low. They are paid good wages and no supernumeraries are employed. In the mechanical department each man is supposed to be more or less a jack-of-all-trades and there are no instances when a workman who is called upon to do a particular job refuses on the ground that it is not his work. Any job in connection with the railway is any man's job.

The operating headquarters of the new company have been moved to Guilford, which is more centrally located in the territory served, and there was no use, therefore, for the old carhouse in Saybrook, which has been rented to the Transit Equipment Company. It has proved a great convenience to the new railway to have this second-hand equipment company conveniently located where it can make heavy repairs and relieve the railway of the necessity of having equipment to do this work.

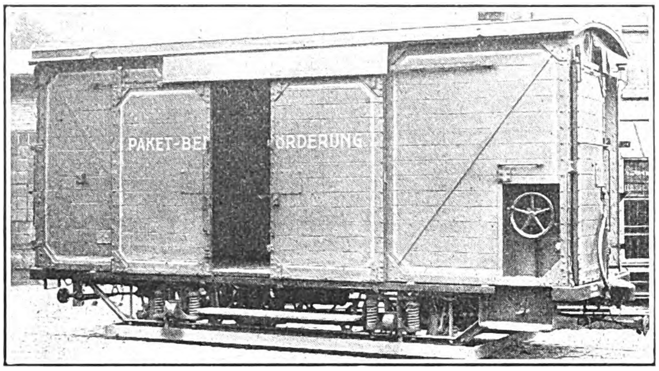
Substitute Pages for Aug. 30 Issue

OWING to an error in the press rooms of this paper last week, some of the matter on pages 303 and 304 was omitted and other matter was duplicated.

While this error occurred in only part of the edition it was not discovered until most of the copies had been mailed and it became impossible to know which copies mailed were defective.

The two pages are reprinted correctly in the supplement mailed loose with this issue.

Readers whose copies last week were defective in the manner described are requested to substitute the attached sheet for pages 303 and 304 of their copies. They are also urged to call the attention of the binder at the end of the year to the importance of including the correct pages in the bound volume.



Trailer Used in Parcel Post Service in Berlin

Electric Cars Haul Parcel Post Packages in Berlin

These Trains Have Replaced Horse-Drawn Vans with Profit to the Post Office Department and to the Railway System

By E. KINDLER
Chief Engineer Berlin Street Railway System

THE transportation of parcel post packages between the five railroad stations and the eight parcel post offices in Berlin is now being done over the Berlin Street Railway. The first parcel post car for this service was run in 1917. The service has proved so satisfactory that there are now 21 trains, each consisting of one motor car and one or two trailers. These trains are dispatched according to definite schedule and carry nothing but parcel post packages.

The motor cars are former passenger cars, which have been rebuilt to make them suitable for the carrying of packages by the removal of the seats and the replacement of the glass sash by sheet iron panels. The trailers are especially built and have a length over all of 22 ft. 4 in. and width of 7 ft. 3 in. The floor of these trailers is 31½ in. above the rail, which is the same height as that of the loading platforms at both the railway stations and post offices. This makes it possible to load and unload a car very quickly. The sliding doors on each side are in two parts, to give an opening of 79 in. There are also front and end doors 29½ in. wide. The trailers are equipped with automatic air brakes, so that if the trailer gets separated from its motor car it will stop automatically. No attendant is carried on a trailer.

At present the motor cars make about 500 car-miles a day, and the trailer car mileage is about 800 per day. During December, 1923, 4,500,000 parcel post packages were transported. The system will probably be extended.

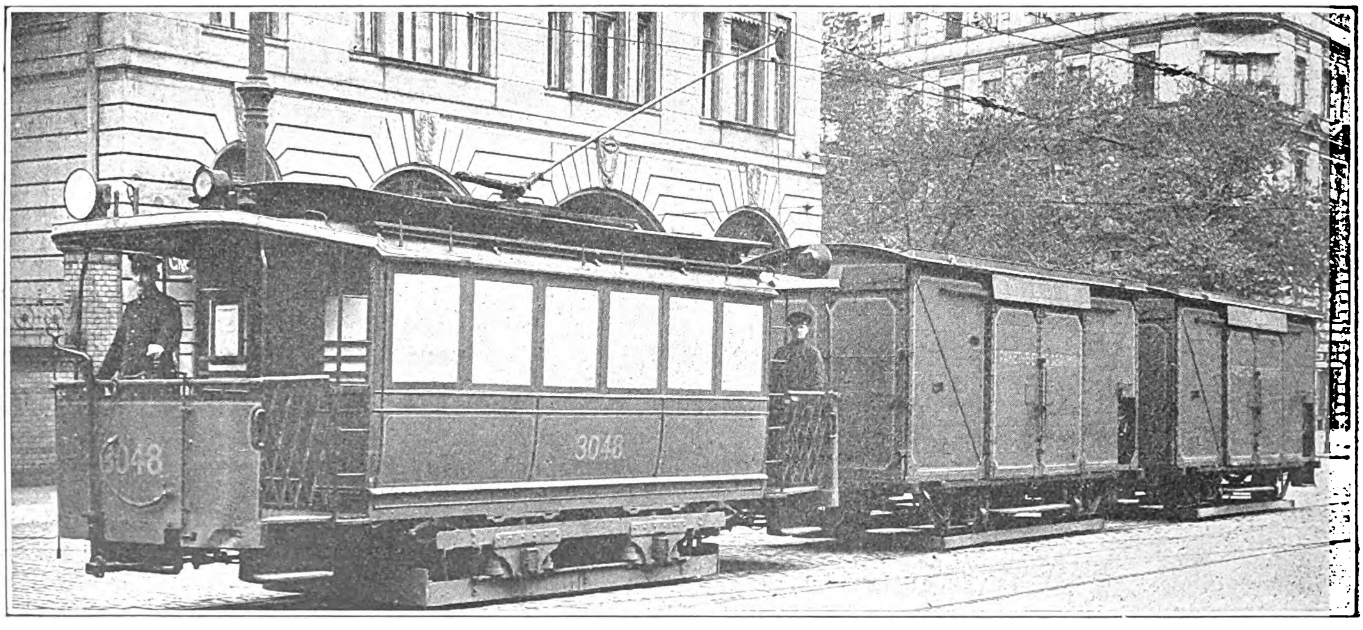
The government pays the street railway for this service 10 gold marks (about $2.40) per motor car hour and 4 gold marks (95 cents) per each trail car hour. Even at this price it is saving money because each train carries about 3,000 parcels, or the number which formerly would have required an average of 8½ two-horse vans. For the vans 17 employees would be necessary, whereas for the train only two are required. At the same time the railway earns some money with obsolete cars and can man them with older employees who perhaps otherwise might be on the pension list.

Features of Rebuilt One-Man, Two-Man Youngstown Car

Full Safety Car Equipment Placed on 48-Passenger Cars of Youngstown—Air Piping and Lightning Arrester Placed Within Car

LIGHT double-truck, double-end cars have been built by the Youngstown Municipal Railway for operation by one man or by two men if occasion demands. When operated by one man, the rear platform is not used, the passengers being prevented from occupying the rear vestibule by a removable wood railing across the passageway at the rear bulkhead.

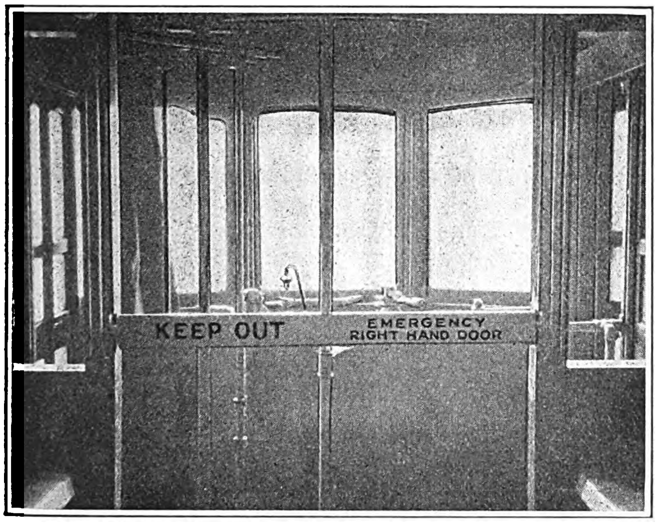
Full safety car equipment has been provided, the operator having control over the double doors at the front end, which are interlocked in the usual manner with the air-brake apparatus. As the car is double-end



Electric Trains Carry Parcel Post Packages in Berlin Between Post Offices and Railroad Stations equipped, the rear doors on the devilstrip side are also air operated. All air-operated doors are free to swing open when the brakes are thrown into emergency, thus an emergency exit is provided at the rear. On the bar which shuts off the rear platform are the words "Keep off" and "Emergency exit right-hand door."

When the car is operated by two men, the two folding rear doors are opened by the conductor on the rear platform through hand-operated door mechanisms. The two handles for actuating the two doors are mounted on stanchions placed near the center of the platform. These handles may be removed, thus preventing any one opening the rear doors while the car is being operated by one man.

In rebuilding the car, much of the equipment usually found on the outside of the car was placed inside. All of the air door-operating mechanism was placed in the vestibule. The door engines are in the header above the doors. The air pipes which are a part of the door-operating and control system are inside the car along the truss plank just below the electric heaters. This was done to prevent freezing of the air pipes.



A Bar Between the Posts of the Rear Bulkhead Prevents Passengers Occupying the Rear Platform When the Car Is Operated by One Man

The hand-operated door mechanism is also in the vestibule. It is overhead but easily accessible for lubrication. In this position, the chances of the mechanism becoming inoperative through lack of lubrication, or through damage, which might occur if located under the car, are eliminated. The aluminum lightning arrester has been placed under one of the longitudinal seats.

The appearance of the interior of the car has been improved by reupholstering the seats, replacing the side trim, laying new floor and painting the headlining and flooring. The coal heater has been replaced by electric heaters mounted on the truss plank on each side of the car. The exterior of the car has been repainted with the company's colors of green and yellow. There is no decorating or lettering on the exterior other than a sign on the left-hand side of the dash, at each end, which reads: "Look out, do not try to drive by this car at a curve." The background of this sign is a brilliant red, while the lettering is done in yellow. This sign is to warn motorists about the danger of passing the car on a curve, inasmuch as the car has considerable overhang at the ends.

The car has a seating capacity of 48, with 32 on reversible cross-seats and 16 on four longitudinal seats at the four corners of the body.

The total cost for rebuilding each car was $3,000, which included sheet-steel siding over the wood siding, the rebuilding of the vestibules and the full safety car equipment as already outlined.

What Is A Casual Rider?

In the Same City Successive Fare Schedules Produced Variations from 31 to 88 per Cent in the Revenue from the Unchanged Cash Fare

BY WALTER JACKSON
Fares and Bus Consultant

WHILE the differentiation of fare according to length of ride, time of day or number of rides taken within a fixed period is of recent growth in America, it has long been customary to sell tickets or tokens at a lower price. In the old 5-cent days the Canadian railways were pre-eminent in this line with their rates of six or seven tickets for a quarter constituting more than 90 per cent of the rides. The railways in our Central States were not far behind. A majority of the roads on the Atlantic and Pacific seaboards did not become ticket and token vendors until the disappearance of the 5-cent fare.

There are two points of view concerning the reduced rates. One school of operators believes in selling tickets directly on the cars at a liberal discount and in quantities requiring but a small investment, so that the patron will have the greatest inducement to buy. The other school believes in selling the tickets at little or no discount, in quantities calling for a large investment and only through store agencies to which many persons hesitate to go lest they feel obligated to buy something else beside tickets. The former school believes that a ticket-pushing policy pays by speeding up passenger interchange and schedules, especially on one-man cars, and in encouraging riding. The latter school believes that a sharp reduction in rate is not compensated by these advantages.

Both schools often overlook the fact that wholesale buyers are not necessarily wholesale twice-a-day (or more) users. The tickets may be used any hour and may be divided among as many passengers per trip as there are persons for the ride. Analyses by stations or routes in many cities show that the highest ticket ratios are to be found among the wealthier classes. This is true in places as different and as far apart as Glasgow and Chicago. Recognition of this fact led to the introduction of the monthly personal card and the weekly transferable pass. Under either of these plans a reduction in fare can be obtained only by frequent use of the service within a fixed period. The railways using the personal card generally do so on the basis of a 10-cent cash fare and a card of varying price. The operators using the weekly pass generally have a cash fare, ticket fare and pass to give what may be termed retail, semi-retail and wholesale rates.

It so happens, fortunately, that there are available for study the results of different fare schedules on a property which tried four plans within a year but retained in each one the cash fare of 7 cents. These changes afforded a unique opportunity for securing an answer to the question: "What is a casual rider?"

The town in question has a population of 30,000. As four of its six routes averaged a length of only 2.3 miles, it is obvious that upward changes in fare would have to be made with great circumspection. The original fare had been 5 cents, but with the change to 7 cents cash and fifteen tickets for $1 the rides per inhabitant per annum had fallen 10 points during a period when the corresponding figure in a neighboring city of the same population rose 40 points. However, there had also been such a fall in industrial conditions that the management hesitated to make a straight cut in fare to everybody. At this time 88 per cent of the revenue came from the 7-cent fare and only 10 per cent from the tokens. At fifteen for $1, the latter were not sufficiently attractive to lure any large proportion of the riders. In the accompanying table these figures are given under the heading "First Period."

WEEKLY PASS BRINGS DOWN CASH REVENUE RATIO

With the desire to determine how many really regular riders there were and to give such riders a lower rate for wholesale use, the management added a $1 weekly pass to the then scale of fares. The pass soon brought 13 per cent of the revenue, but it is significant that 6 per cent of the revenue still came from the tokens, indicating that less than half of the token buyers had been using more than one dollar's worth of transportation a week. On the other hand, a number of former cash riders seem to have become pass-users, whether or not they had been riding previously a dollar's worth each week.

The result of the introduction of the pass without any change in the cash or ticket rates was to reduce the revenue from cash riders from 88 per cent to 79 per cent. From the pass sales we see that only 13 per cent of the revenue came from truly regular riders. This shows that in a city of 30,000 the great majority of the public do not have to use the electric railway every day, distances being short and private automobiles numerous.

Despite the small market, the twenty weeks of the pass, when compared with the like period of the year before, showed 13 per cent more passengers and 2 per cent more revenue over all. As this increase came during a car-mile cut, the increase in revenue per car-mile was close to 11 per cent.

The average fare per passholder (on the basis of 20 rides a week) was 5 cents. This cut the average fare from 6.7 cents to 6.4 cents.

CASH RIDERS DROPPED TO 39 PER CENT WITH 5-CENT TOKENS

Because of conditions beyond its control, the management deemed it politic to give a 5-cent token a trial in place of the $1 pass. The pass had given the 5-cent rate to wholesale users only, but the 5-cent token (officially sold at twenty for $1) would give the lower rate to less regular riders. During the twenty-three weeks this plan was tried the cash ratio dropped to 39 per cent and the token ratio rose to 58 per cent. It will be recalled that the original pre-pass ratios had been 88 per cent cash and 10 per cent tokens. This change clearly indicates that the term "casual rider" is exceedingly elastic, the number of such riders depending altogether upon the profit to be gained in laying up tokens.

The assertion of the municipal officials that the 5-cent token would increase the revenue was not borne out in practice. The number of revenue riders was greater than in similar pre-pass weeks but less than in similar pass weeks. The pass weeks had reduced the average fare from 6.7 cents to 6.4 cents, but the 5-cent token weeks cut the average to 5.4 cents because so great a proportion of the riders took advantage of the lower token rate. The pass increased passengers 13 per cent while the 5-cent token increased passengers 9 per cent over a corresponding period. Because of the lower average fare and smaller number of passengers, in contrast with the pass, the 5-cent token produced a drop in revenue per car-mile of 4.5 per cent.

TABLE SHOWING VARIATIONS IN FARE AND IN RATIOS OF PASSENGERS PAYING DIFFERENT RATES OF FARE FOR FOUR PERIODS

	First Period		Second Period (20 Weeks)		Third Period (23 weeks)		Fourth Period (12 Weeks)	
	Price in Cents	Per Cent of Revenue	Price in Cents	Per Cent of Revenue	Price in Cents	Per Cent of Revenue	Price in Cents	Per Cent of Revenue
Cash fare	7	88	7	79	7	39	7	31
Ticket	6.7(*a*)	10	6.7(*a*)	6	5 (*b*)	58	6.3(*c*)	68
School fares	.....	2	.....	2	....	3	.....	1
Pass	.....	...	$1	13	....	...	.....	...
Total	.....	100	.....	100	....	100	.....	100
Per cent of passengers paying cash fare to total number of passengers		84	.....	71	....	30	.....	27
Average fare	6.7 cents		6.4 cents		5.4 cents		6.3 cents	
Increase in passengers carried over corresponding period previous year			13 per cent		9 per cent		9 per cent	
Decrease in total revenue over previous fare period, per cent			2.0*		13.0		4.4	
Decrease in revenue per car-mile, per cent			10.5*		4.5		9.8	

* Increase. (*a*) Fifteen tickets for $1. (*b*) Twenty tickets for $1. (*c*) Four tickets for 25 cents.

NOTE — The fourth period compares with a period when the weekly pass schedule (second period) was in use.

CASH RIDERS DROP TO 31 PER CENT

The next schedule gives further insight into the public's purchasing habits. The token fare was set at 6¼ cents, but only 25 cents instead of $1 had to be invested in token purchase. So it turned out that the token ratio rose to 68 per cent maximum while cash revenue reached the minimum of 31 per cent in twelve weeks compared with the preceding year. The average fare with the 6¼-cent token was 6.32 cents against 6.36 cents under the pass. Both gross revenue and riding were about 4 per cent less than under the pass. The pass period actually earned 10 per cent more per car-mile because of a decrease in service caused by track reconstruction.

MORAL POINTS TO HIGHER CASH FARE

To avoid complications, only the revenue ratios have been presented above and in the accompanying table. In conclusion, however, it is of interest to know that the rides on cash fares constituted the following percentages of total revenue rides during the several fare schedules: 84 per cent under the fifteen tokens for $1 plan; 71 per cent under the pass plan with same price token; 30 per cent under the 5-cent token and only 27 per cent under the current 6¼-cent token plan.

This experiment shows that despite very strong inducements to save money through purchasing tokens, such as a 2-cent saving in one case or a four-ride investment in the other, 27 per cent of the riders still rode so infrequently that they continued to use an awkward cash fare. Inasmuch as none of the four schedules produced sufficient revenue, it would seem that the ideal schedule for this case is one that would call for a 10-cent cash fare, a 6¼-cent or 7-cent token fare and a $1 pass. Then and then only would the operator have a series of rates graded according to the amount and the time of riding.

Tunnel Digging Is Begun in Los Angeles

The Hollywood-Glendale-San Fernando Valley Tunnel Will Eliminate 1,000 Daily Car Movements from Streets in the Congested District—An Expenditure of Approximately $3,500,000 Is Planned—The Length Will Be 5,025 Ft.

By Clifford A. Elliott

Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

WORK was commenced on May 3, 1924, by the Pacific Electric Railway on its Hollywood-Glendale-San Fernando Valley tunnel in Los Angeles. Excellent progress is being made, and unless unforeseen difficulties arise, it is expected that operation over the new route will be undertaken in about 18 months. The severe traffic congestion which has been causing anxiety in Los Angeles for some time past will be relieved by the elimination of more than 1,000 daily movements of electric cars in the narrow streets of the business district. The subway will shorten the route between Hill Street and Hollywood by about 7,500 ft.

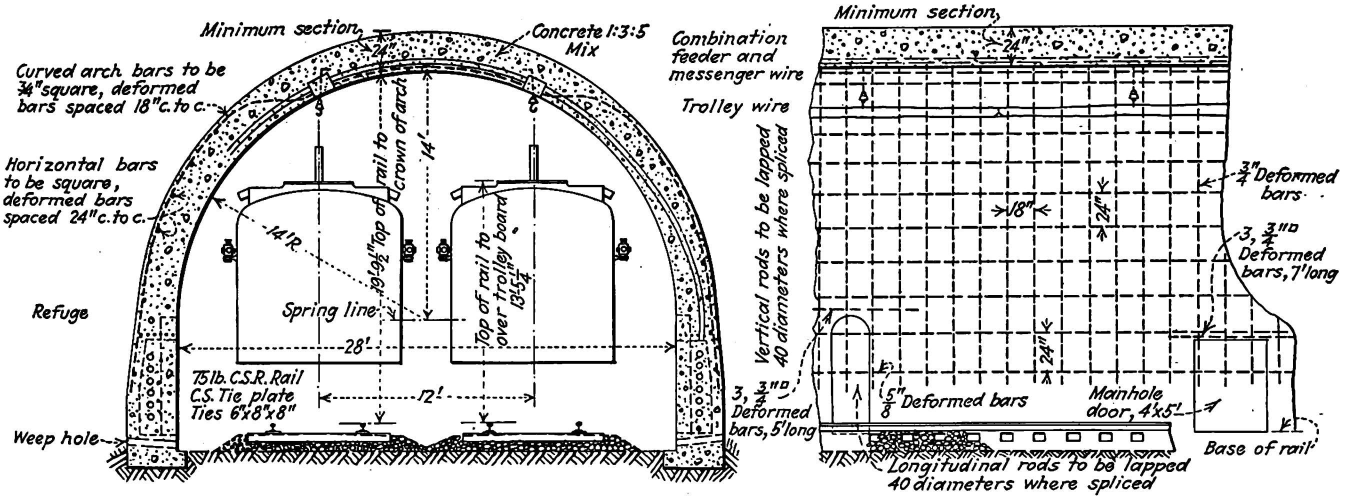
At present the Hollywood service of the Pacific Electric Railway is operated on a 45-second headway during the rush hours. Besides this, the company operates through this part of the city three-car interurban trains for the Glendale and San Fernando Valley district on a 7-minute headway. Delays on account of motor vehicle congestion were such that it was thought impracticable to operate cars on a shorter headway. The territory served by these lines has had a remarkable growth during the past three years, and it was felt that additional transportation facilities should be provided. With this object in view, the subway is now being built.

The new route begins at the present Hill Street terminal of the Pacific Electric Railway and extends westerly and northerly to First Street and Glendale Boulevard. The length of the subway is 4,225 ft., exclusive of an open cut of 500 ft. at one end and 300 ft. at the other end. It begins at grade at Hill Street and comes out to grade again at the northerly portal about 600 ft. south of the intersection of First Street and Glendale Boulevard. The gradient is such that little trouble is expected with the drainage of the tunnel.

Beginning the Excavation at the West Portal of the New Hollywood-Glendale Tunnel in Los Angeles

Subway operation will not only shorten the mileage considerably but also reduce the running time by 10 or 15 minutes. The Hollywood service will be operated in two-car or three-car trains, at a speed of 30 to 35 m.p.h. in the tunnel. Fifty new cars were placed in this service during 1923 and fifty more of the same type were added during the early part of the present year. The entire order of 100 cars entailed an expenditure of $2,000,000.

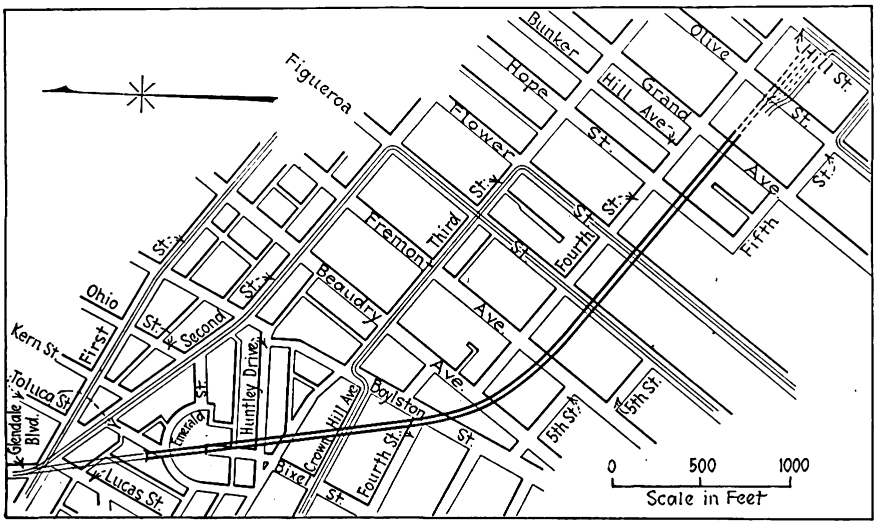
The subway project was one of the issues involved


Minimum section
24"
Concrete 1:3:5 Mix
Curved arch bars to be ¾" square, deformed bars spaced 18" c. to c.
Horizontal bars to be square, deformed bars spaced 24" c. to c.
Refuge
Weep hole
14'R.
19'-9½" Top of rail to crown of arch
14'
Spring line
Top of rail to over trolley board 13'-5¼"
28'
75 lb. C.S.R. Rail
C.S. Tie plate
Ties 6"x8"x8"
12'
Combination feeder and messenger wire
Trolley wire
Vertical rods to be lapped 40 diameters where spliced
3, ¾"□ Deformed bars, 5' long
18"
24"
24"
¾" Deformed bars
3, ¾"□ Deformed bars, 7' long
⅝" Deformed bars
Manhole door, 4'x5'
Base of rail
Longitudinal rods to be lapped 40 diameters where spliced

Typical Cross Section

Longitudinal Section

The Tunnel Passes Through Clay and Is Being Lined with Reinforced Concrete



Route of the New Tunnel from Hill Street Terminal to Glendale Boulevard and First Street

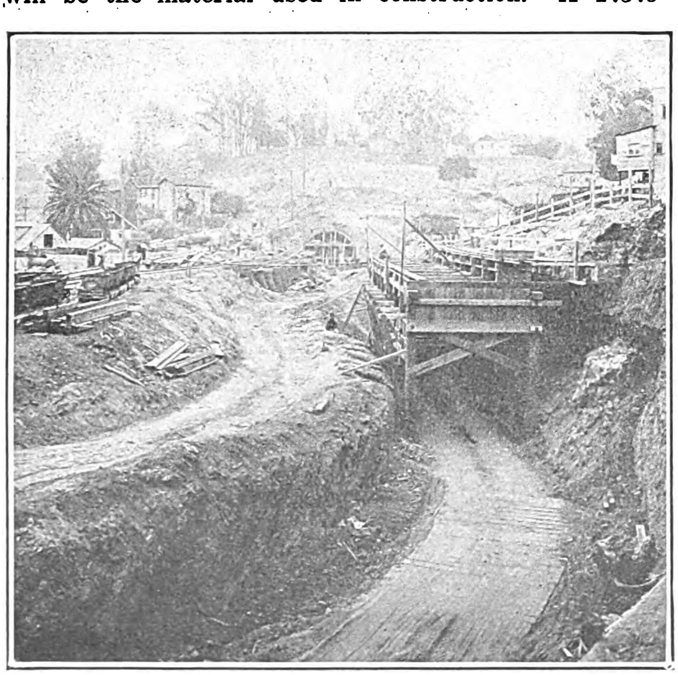
in the decision of the California State Railroad Commission granting a fare increase to the Pacific Electric Railway in January, 1922. At that time the commission ordered the company to construct a tunnel for its Hollywood, Glendale and San Fernando Valley service. Rerouting after the completion of the tunnel will eliminate 778 car movements per day on Hill Street and 301 on Sixth Street. The plan involves also an important expansion of trackage at the Hill Street terminal. Structures now standing adjacent to the terminal are to be removed. Five passenger loading and unloading tracks, each with a capacity of six cars, will be constructed. The method of handling traffic at this point will be similar to that followed at the Sixth and Main Streets terminal of the railway.

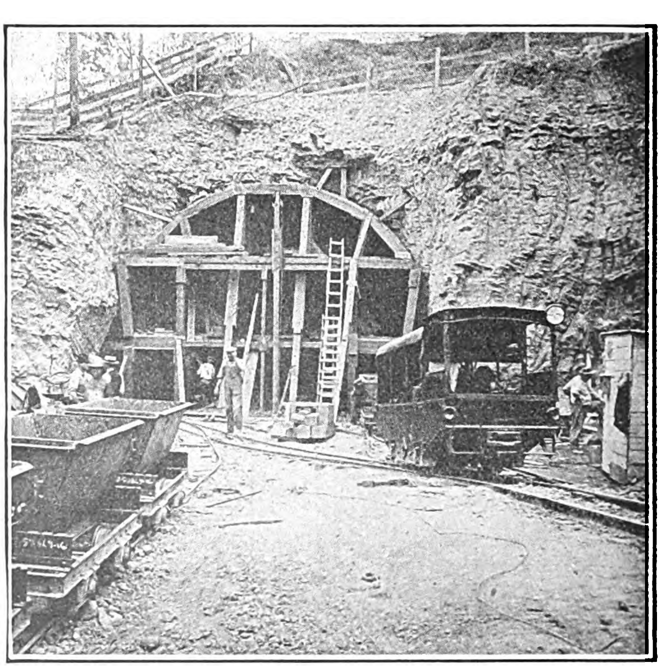
The tunnel is of semi-circular cross-section. It will be double tracked throughout and equipped for overhead trolley operation. An inside width of 28 ft. is provided, while the height is 21 ft. $3\frac{1}{2}$ in. from the subgrade to the spring of the arch. Reinforced concrete will be the material used in construction. A 1:3:5 mixture has been decided upon with $\frac{3}{4}$-in. and 1-in. steel reinforcing bars.

In commencing the bore, the first drive was made from the northerly portal. Somewhat later a second drive from the midway section was undertaken. The latter will be carried in the direction of the initial bore and also in the opposite direction toward the easterly portal at Hill Street. Soil encountered in digging has been principally blue shale clay. The tunnel is being driven by the drift method of excavation. The character of the earth required that the two lower drifts proceed in advance of the two upper drifts. Altogether the excavation work involves approximately 135,000 cu.yd. of earth.

It is planned to use the skip method of disposing of spoil removed from the midway section. Near the center of the subway will be built a circular vent shaft 8 ft. in diameter and extending 6 ft. above the natural surface of the ground. During construction this shaft will be utilized for removal of excavated material, and after completion of the tunnel it will serve for purposes of ventilation. An air compressor plant furnishes air for operating the pneumatic tools used in boring the tunnel. Compressed air from this source is used also to remove the gases formed in drifts Nos. 1 and 2. The core of the tunnel will be removed with steam shovels.

Several innovations have been introduced in the construction of this subway. Taking advantage of the open cut 300 ft. in length at one end of the tunnel, a large timber bunker was erected for use in disposing of the excavated earth. From the tunnel entrance a portable light railway track extends up the right-hand side of the cut and onto the bunker. Typical mining equipment is used for hauling. Gasoline-operated locomotives and small steel dump cars having a capacity of 1 cu.yd transport the material excavated from the tun-


In Digging the New Los Angeles Subway, Excavated Material Is Removed by a Light Railway and Dumped Into Timber Bunkers, from Which It Is Hauled Away by Motor Trucks


Gasoline Locomotive and Dump Cars Used in Tunnel Construction to Remove the Spoil from the Portals. A Central Shaft Will Also Be Used for the Purpose

nel to the bunker. Motor trucks pass under the bunker and are loaded by gravity, so that no time is wasted by trucks or trains waiting for transfer of the material.

On the left-hand side of the open cut at the west end another large timber bunker has been erected. This is used for storing sand, rock and gravel. The top of the bunker is level with a spur track on which construction material is brought to the job, thus permitting the handling of rock and sand directly from the cars into the storage bunker. A concrete mixing plant is located under the base of the material storage bunker. The mixture is carried into the tunnel for placement in the form by Universal air-operated mixing and placing machines.

Reinforcing steel placed in the tunnel is spaced 18 in. vertically and 2 ft. horizontally. The average section of reinforced concrete work completed at one time is 20 ft. in length. This average will probably not be changed much during the entire tunnel construction job.

On each side of the subway will be six 4-in. fiber ducts. These conduits will carry two 20-pair telephone cables, two 600-volt feeder lines, and will provide facilities for the installation later of two 15,000-volt, three-phase, high-tension circuits. On the opposite side, the six ducts will carry two circuits for the block signal system.

Manholes will be spaced 300 ft. apart on tangent track and 200 ft. apart on the curves. These will be 4 ft. x 5 ft. in size and will facilitate maintenance and permit making carry-off connections to the electrical lines. Combination refuge and telephone recesses are spaced 1,000 ft. apart on one side of the subway only. Ordinary refuge recesses are spaced 50 ft. apart on each side. Electric lights will be installed in the manholes and refuge niches.

The construction of the subway is under the supervision of E. C. Johnson, chief engineer Pacific Electric Railway. The contracting work is being done by Twohy Brothers of Portland, Ore. W. R. Fontaine, tunnel engineer, is acting in the capacity of consulting engineer for the contractors. Both he and Mr. Johnson have had extensive previous experience in tunnel construction.

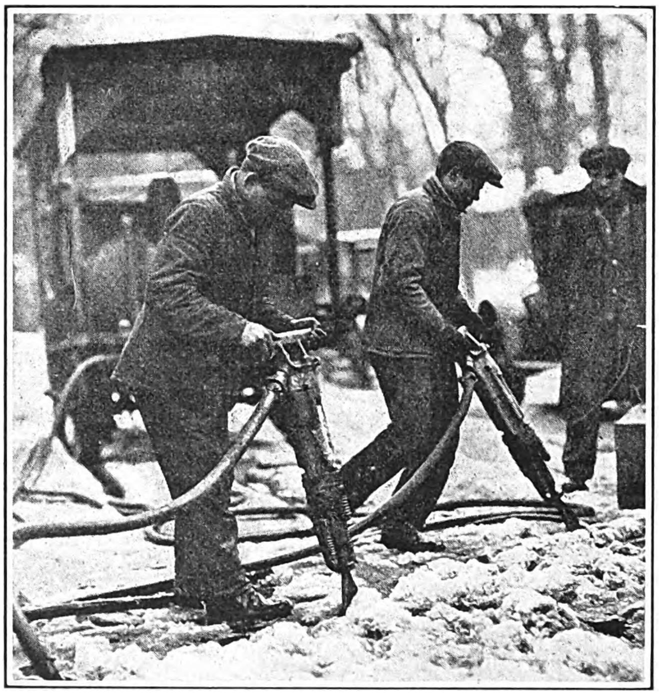
Three-color automatic d.c. electric block signals will be installed. These signals will be so arranged that trains can be operated through the tunnel on a 25-second headway. The Hill Street terminal track layout will be controlled by a 32-lever electric interlocking plant. An ample number of spare levers to accommodate future extensions will be provided.

When the Pacific Electric Railway was preparing its plans for this subway project various civic bodies started a movement to locate the downtown terminal under Pershing Square in the heart of the business district. This location would have been more central than the one eventually chosen, and could have been utilized at a later date for subway construction to other parts of the city. The railway management was agreeable to this suggestion and prepared new plans for the utilization of part of the space under the square. The plans were indorsed by the Los Angeles Chamber of Commerce, the Los Angeles Traffic Commission, the Community Development Association and the Engineers and Architects' Association.

Inasmuch as Pershing Square was city property, however, it was necessary to secure a favorable vote of the people before it could be used for such a purpose. In due course a referendum was held and the proposal received the permission of the public by an overwhelming majority. The city charter, however, gave the city council final jurisdiction in this matter, and in spite of the popular approval which the project had received, this municipal body refused to sanction it. Although the railway plan contemplated no interference with the trees, shrubbery or general beauty of the park, as all of the facilities were to be underground, the plan had to be abandoned. Had it not been for the delay thus incurred, the subway would probably be nearing completion at the present time.

Pavement Cutters Used to Break Ice

THE city of Buffalo by attaching special bits to its paving breakers and clay diggers has found a partial solution to the problem of freeing the streets of ice in winter. Considerable trouble has been experienced in many cities because of ice forming in the gutters and later causing the streets to be flooded. Years ago when general contracting was inactive during the winter months and labor was therefore available and not too expensive it was possible to put enough men to work to break up the ice quickly. Nowadays, however, labor is just as scarce during the winter as at other times of the year and it is only by means of modern labor-saving devices that cities can break up ice and remove snow in their streets.



Pneumatic Pavement Cutters Break Up Ice in Buffalo, N. Y.

Electric railways are often faced with a similar problem. Following a sudden drop in temperature ice may form in places where the tracks are lower than the rest of the pavement, and quite frequently a ridge of ice is formed between the rails and damage to motor cases results. Nearly every railway is equipped with a portable air compressor, paving breaker, jack hammers, clay diggers and various other pneumatic tools used in track construction and paving work. These machines are available for breaking up ice in the way described and their use involves no additional capital expenditure.

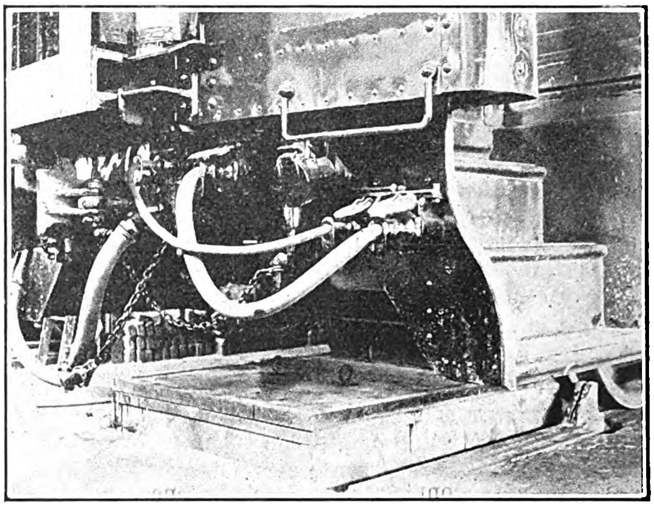
New Dipping Tank and Baking Oven Installed by N. Y., W. & B. Ry.

AFTER a careful study of the apparent advantages to be derived from dipping and baking various parts of railway equipment, the New York, Westchester & Boston Railway has recently installed a dipping tank and baking oven in its Unionport Road shops. One of the points that confronted the railway was the location of the dipping tank. It was desirable to have this so it could be readily served by the overhead traveling crane and still not take up space which could be used advantageously for other purposes. It was finally decided to install the dipping tank in the end of one of the track pits. A tank of 585 gal. capacity has been installed. This is 4 ft. 8 in. long, 3 ft. 6 in. wide and 4 ft. high. It is constructed of ¼-in. sheet steel, and the size is sufficient to dip transformers, which are an important part of the car equipment for this road. An accompanying illustration of the tank with a car over the pit shows that the installation of the tank has not reduced the track capacity. When equipment is dipped, cars are, of course, run back sufficiently so as to clear the tank.

The oven installed is of Westinghouse Electric & Manufacturing Company design, equipped with type C oven heaters. The oven is 6 ft. x 6 ft. x 6 ft. in size, and the heating equipment is installed along the sides as shown in the illustration.

The heating element consists of nichrome ribbon which is wound on fire clay insulators. Two steel tie rods are used for assembling and for supporting the flange end frames. Each end of the ribbon is permanently secured to the tie rod, so the ends of the tie rod become the terminals of the heaters. A busbar construction is used to connect the heaters to the control equipment. The heaters and busbar connections are protected by sheet steel barriers and open screen work inside the oven.

The control panel includes a three-pole magnet switch, a motor operated transfer switch and three inclosed fuses, mounted on a slate base. This equipment is entirely inclosed in a cabinet. Underneath this is the thermostat, the door switch and the push-button station. The thermostat is a contact-making instrument operated by vapor tension in a closed tube system. The door switch cuts off current whenever the doors of the oven are open and the push button provides an independent means for cutting off the current at any time.

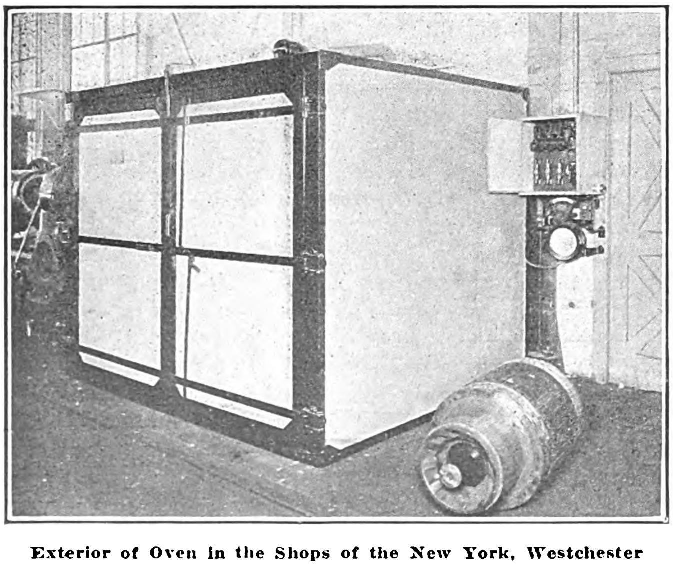


The Dipping Tank Is Installed in a Pit Beneath the Track

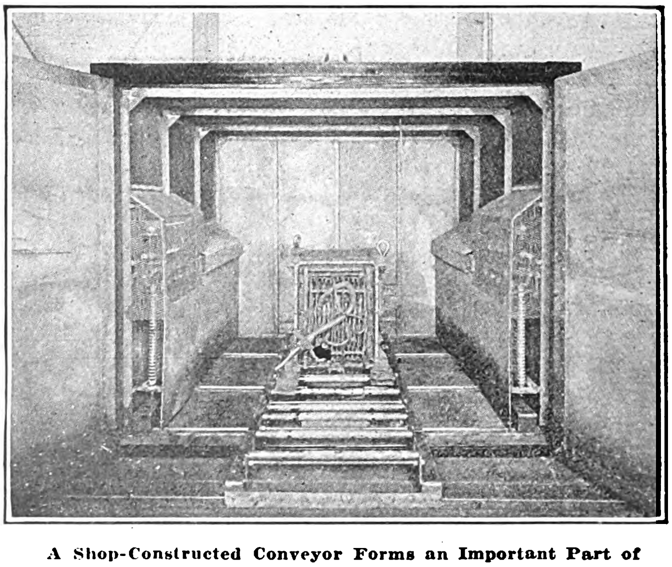
An important feature of the oven is a conveyor which was designed and constructed in the railway company's shops. This conveyor is 3 ft. wide and has rollers spaced 9 in. apart. The rollers are 1¼ in. in diameter and they are mounted on angle-iron framework. A front section containing three rollers pulls out so that when equipment is placed in the oven or removed from it, the heavy parts can be handled directly by the overhead traveling crane.

Gold Striping Worth Extra Cost

IN SPITE of a widespread tendency in the electric railway industry to reduce the cost of painting by the elimination of striping on the exterior of the car body, the Cumberland County Power & Light Company, Portland, Me., continues to decorate its cars with gold striping. The painting scheme used by this railway is a dark green background with cream-colored window posts and trimming and a buff-colored roof. On the dark green background two rectangles are outlined in gold, the outside stripe being fairly broad and the inside much narrower. Car numbers also are painted in gold. Paint is used instead of gold leaf and has proved more economical and equally satisfactory.



Exterior of Oven in the Shops of the New York, Westchester & Boston Railway with Control Equipment



A Shop-Constructed Conveyor Forms an Important Part of the Oven Equipment

Daylight Shelves Improve Storeroom

A Unit System of Racks and Shelves Painted White Features Flexible Installation in South Side Storeroom of Chicago Rapid Transit Company—All Stock Is Stored in Standard Units Directly on Shelves or on Trays

FOLLOWING a study under the direction of the management of the Chicago Rapid Transit Company a new arrangement of shelving has recently been installed in its south side division storeroom. This system, known as "daylight shelving," provides a place for everything. With everything in its place, each item is found more quickly than with the older type of shelving, because every square foot of shelving is well lighted and the contents are visible as one passes down the aisle. Along with the installation of this system, the company inaugurated a simplified record system to determine the location, quantity and proper amount of stock of every item in the storeroom.

A noticeable departure from ordinary practice is that all the shelves, fixtures and inclosures in the storeroom are painted white, and the floor has been painted light gray. This has not only assisted materially in diffusing daylight throughout the room but has had the effect of instilling in the storekeeper and his assistants the value of the individual items in their keeping.

The room does not appear like the conventional stockroom. As the shelving, manufactured by the Durand Steel Locker Company, is without backs, ends or partitions, it is almost possible to look entirely across the room through the openings in the shelving. The equipment is similar to that having back and ends made by the same company. It is of steel throughout, the uprights being formed hollow members and the shelves pressed steel. Holes in the uprights spaced every 3 in. on each side receive the shelf supports. The uprights are spaced 3 ft. longitudinally and 18 in. apart from front to rear. Adjustable longitudinal shelf supports fit into the openings in the sides of the uprights and supporting rods which lock over the longitudinal supports extend from front to rear. These rods have lugs pressed out of the body of the material to receive the crimped-over end of the shelf. Each shelf measures 36 in. x 18 in.

THE SHELVING IS ASSEMBLED IN 3-FT. SECTIONS

In setting up the shelving, two sections are placed back to back, the shelf height being the same in adjacent sections. This makes the shelves at least 36 in. x 36 in. opening on two aisles. The upright is 9 ft. 1$\frac{5}{16}$ in. long, which gives what is known as a 9-ft. high shelf. The groups of shelving have been arranged on lines 8 ft. apart. In front of each tier is a counter shelf made up in the same manner as the main shelving but only 3 ft. high and 1 ft. wide. This extends the full length of the main shelving with the exception of the 3-ft. openings for transverse aisles, which occur every 15 ft. With this arrangement, it has been possible to place five rows, made up in this manner, across a room which is 50 ft. wide. The lengths of the rows vary, since it was necessary to provide a receiving platform and office in one corner and a shipping counter in another. However, three of the rows are 45 ft. long, one is 36 ft. long and the shortest is 27 ft. long.

Along one wall is a rack for pipe and tube, while against the opposite wall are the waste bins. These are built along the same lines as the steel shelving, the pipe and tube rack having the same style of hollow steel uprights spaced 3 ft., with special brackets which may be placed at any height. The waste bins have hollow steel tube corners and shelf supports. The sides, bottom and top and doors are similar in construction to the standard steel shelving. This arrangement gives considerable flexibility as almost any combination of units can be set up in order to accommodate various sizes, quantities and shapes of material.

A WIDE VARIETY OF MATERIALS SHELVED

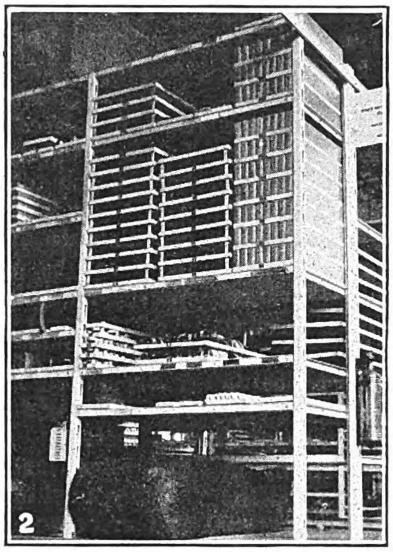
Everything handled by the storeroom, with the exception of oil and gasoline, is accommodated by this shelving method. Mop handles, shovels, brooms, scrapers and other long-handled tools are stored in a special arrangement of the framework with enough longitudinal and cross supports to divide the material into quantities which may be readily counted and numbered. Sheets of insulating material and glass are also taken care of in compartments in which the skeleton framework has vertical steel strap dividers spaced at a convenient distance apart across the front and rear. Horizontal straps connect the vertical ones, giving additional stiffness to the section and holding short pieces. Glass is set on a $\frac{3}{8}$-in. board laid on the shelf.

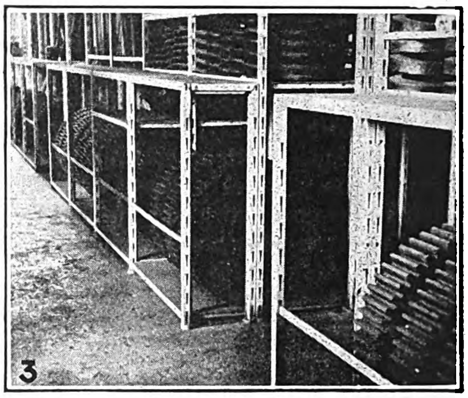
Even gears, pinions, elliptical springs and other heavy materials are shelved. Three gears, which weigh approximately 400 lb. each, are placed on a bottom shelf, which is $\frac{1}{2}$ in. above the floor. No trouble has been encountered due to their weight. A rod closes the opening in front of the gears and prevents them from rolling out. This is the first time this company has ever housed the gears in the main storeroom.

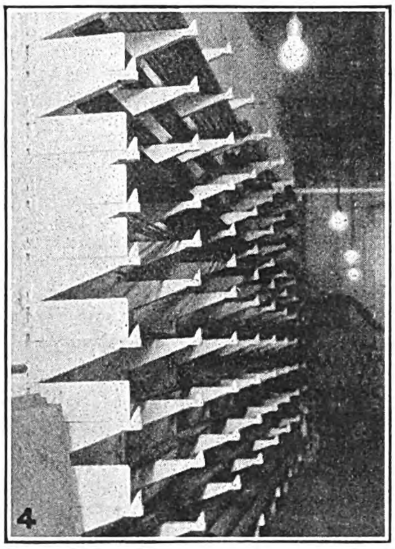
For large materials this type of shelving does not differ greatly from the old inclosed type. For the many small pieces the advantages of daylight shelving are readily apparent. Pipe fittings, nuts and washers of such size as to be too large to handle in small cartons are kept in metal trays. These are 18 in. long, the depth of the shelves $\frac{5}{8}$ in. deep and in four widths—3 in., 6 in., 9 in. and 12 in. With material which stacks easily the tray merely serves as a separator for the various layers and also to hold the tag showing the quantity included. Many small materials do not lend themselves readily to stacking. It is necessary in such cases to provide legs for the trays, which are merely short lengths of steel strap, bent over at both ends and held to the bottom corners by stovebolts. The length of these legs depends upon the size of the material stored. If the material is too small to stack or to carry in trays as a separate unit it is stored in the cartons.

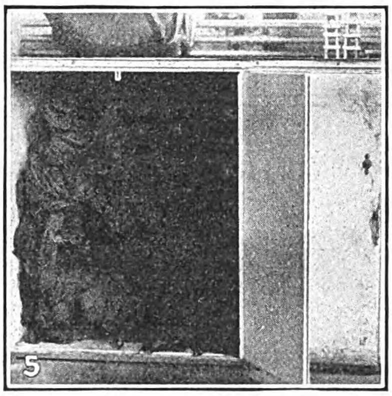
It is the practice of this storeroom to store all materials in standard unit trays or cartons containing the approximate quantity usually ordered by operating departments. For instance, cotter keys are put up in packages of 50, pumice stone in 10-lb. cans and green oil soap in 25-lb. pails. The details of this distribution have been worked out so as to simplify the physical handling and accounting considerably.

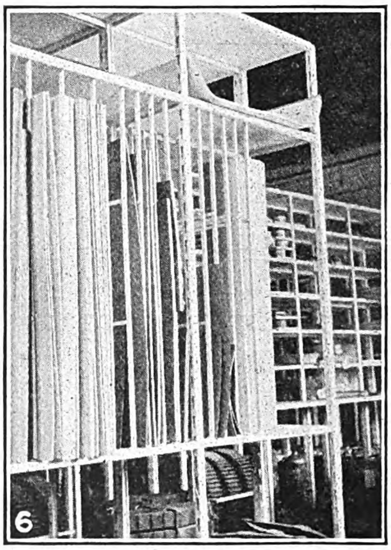
On the edge of each shelf is a holder into which may be slipped an indicating card giving the lot number, description and other information relative to the material directly beneath. In addition numbers are fastened to the ends of the tray indicating the cumulated number of pieces contained in the trays below and the one upon which the number is placed. These number tags are of aluminum, a single digit being carried on each piece. This system permits quick and accurate determination of the quantity of material on hand, as it is only necessary to add to the uppermost figure the old number of pieces in the top tray to give the total quantity of material. While the company has not as yet had a general inventory with this new type of

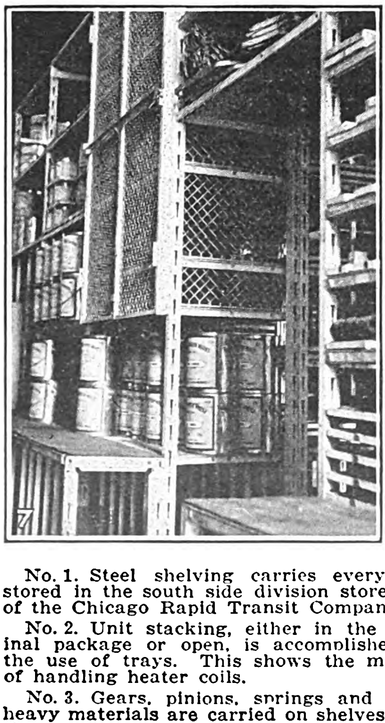


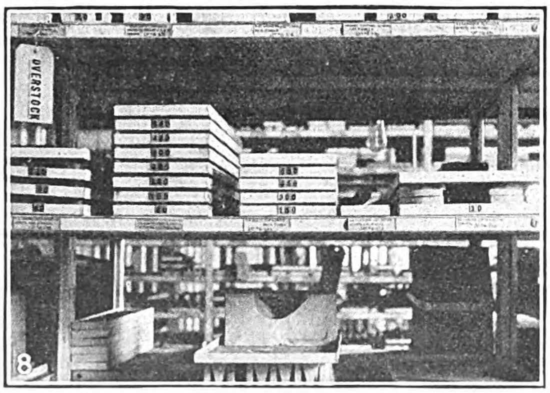


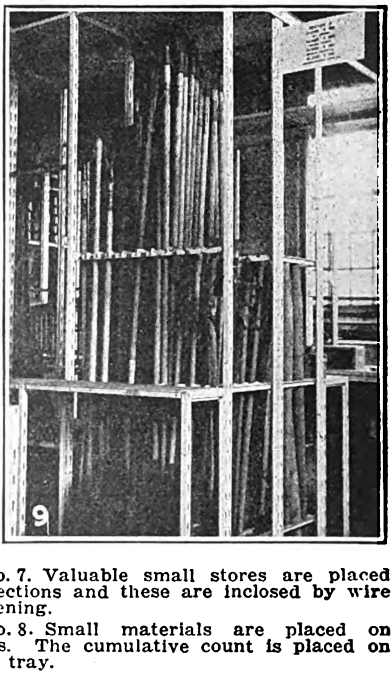












Wide Variety Is Shown in the Arrangement of Daylight Shelving in the Chicago Rapid Transit Storeroom

No. 1. Steel shelving carries everything stored in the south side division storeroom of the Chicago Rapid Transit Company.

No. 2. Unit stacking, either in the original package or open, is accomplished by the use of trays. This shows the method of handling heater coils.

No. 3. Gears, pinions, springs and other heavy materials are carried on shelves near the floor.

No. 4. Pipe and tubing are carried on racks with special brackets. Metal plates at the end serve as stops for measuring pipe lengths.

No. 5. A special application of the standard shelving parts provides bins for waste and rags.

No. 6. Sheet-insulating materials and glass are stocked on shelves provided with light steel framework dividing partitions.

No. 7. Valuable small stores are placed in sections and these are inclosed by wire screening.

No. 8. Small materials are placed on trays. The cumulative count is placed on each tray.

No. 9. Even mop handles, snow shovels, sleet scrapers and brooms are handled in an open application of the shelving so as to divide them into convenient quantities.

shelving, it is estimated that it will require approximately one-half of the time to count the stock in the south side division storehouse that was consumed at the last inventory, when it was equipped with wooden shelving.

To maintain a stock as small as possible but yet sufficient a system of indicating the minimum quantity needed has been applied to all stores. A red marker, of the same size as the quantity number, is placed on the tray adjacent to the number at which an order should be placed. When a requisition is filled which brings the stock below this mark the storekeeper is notified. After making an order, he places a green marker next to the red one, showing that the replenishing stock is on order, and putting in concrete form the knowledge of the calls for an article and the time required for shipment.

With this type of fixture any section may be inclosed with wire screening to protect particularly valuable stores. An accompanying illustration shows how this has been applied to a 3-ft. section housing various types of brushes.

In allocating space an attempt was made to make the method of storage as simple as possible. Consequently the materials were arranged according to lot numbers, with the materials drawn out more frequently placed on shelves near the distributing or shipping counter. At the end of each tier of shelving is a section indication sign, giving the class number and classification of material carried on the shelves in that section. Although such information usually is carried in the minds of the storekeeper and stockman, these signs are a valuable assistance to the new man entering the room. When an order is received for a particular kind of material a glance at the sign shows in which row of shelving it is to be found.

The principle of issuing material on the piece basis has been applied to pipe and tubing. Pipe is purchased in lengths most commonly used by the department and is issued to that department. Thus, all ⅜-in. galvanized pipe is between 21 and 24 ft. in length. When the man presenting the order for a piece of pipe is given a piece approximately the length which he orders, it is charged out as one piece of ⅜-in. pipe. To facilitate determination of lengths of various pieces, a steel plate fastened to one tier of brackets in the pipe rack serves as a guide against which the end of the pipe may be pushed. As the brackets are spaced 3 ft. apart, it is easy to determine the length of a piece of pipe or tube within a few inches.

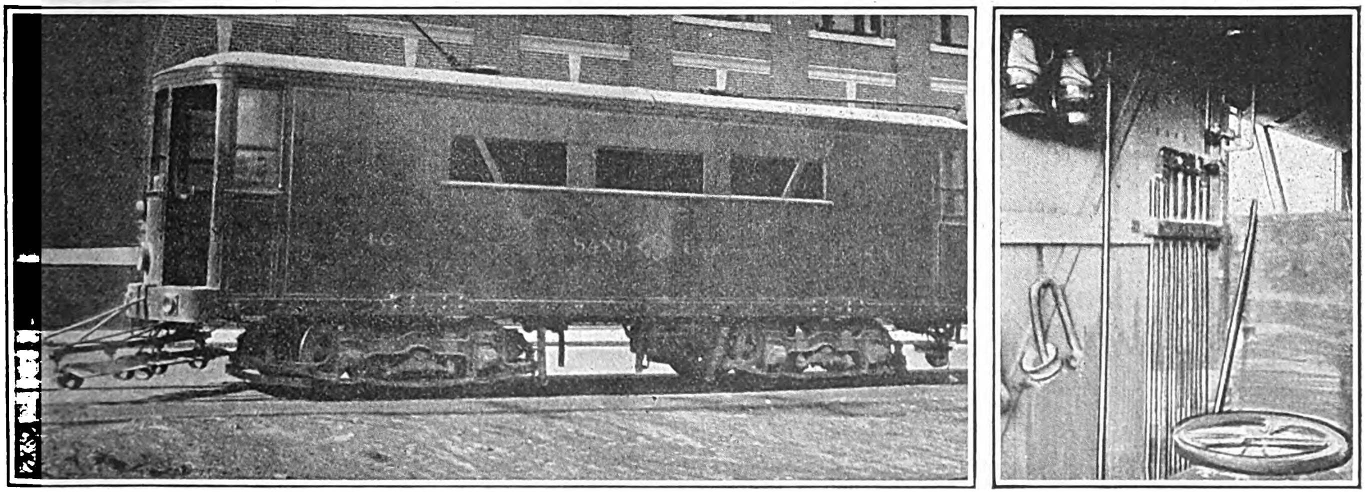
The materials being accessible, it is possible for the storekeeper to maintain a perpetual inventory by counting a number of items each day and sending the count to the bookkeeper. If the books do not agree with this count a recount is made, after which an adjustment for difference is made. In this way the books are a true reflection of the stock carried on the shelves. In addition to this accounting feature, the white, clean, open shelves give the men in the storeroom a better conception of the value of the $57,000 worth of material on hand in this storeroom.

Collecting for Damages in Detroit

BILLING all damages to its equipment resulting from vehicular collisions in which the railway was not at fault has been made the practice of the Detroit Department of Street Railways. As a result of this practice and a careful follow-up of damage claims of this kind the department is collecting during the present year damages which up to this time have amounted to approximately $1,100 per month. In addition to the actual financial saving which is thus made in the cost of maintenance of equipment the practice is reported to have a tendency to make the owners of large fleets of trucks and other vehicles more careful in instructions to the drivers regarding the operation of their vehicles on streets carrying car lines and in crossing and turning into such streets.

Air-Operated Traps on Sand Car

A SPECIALLY built double-truck sand car of the Union Street Railway, New Bedford, Mass., is a departure from usual practice. This car has steel bins for holding the sand, and the traps are operated by compressed air. Several advantages are claimed for this arrangement. A large quantity of sand can be carried in a double-truck car, and on account of the powerful motors and heavy trucks the operation is more reliable than that of a single-truck car. Air-operated traps have proved very satisfactory and less likely to clog up than are hand-operated traps. An interesting feature is that the car has been painted outside to conform to the company's standard for passenger cars, and has the same style of gold striping and lettering.



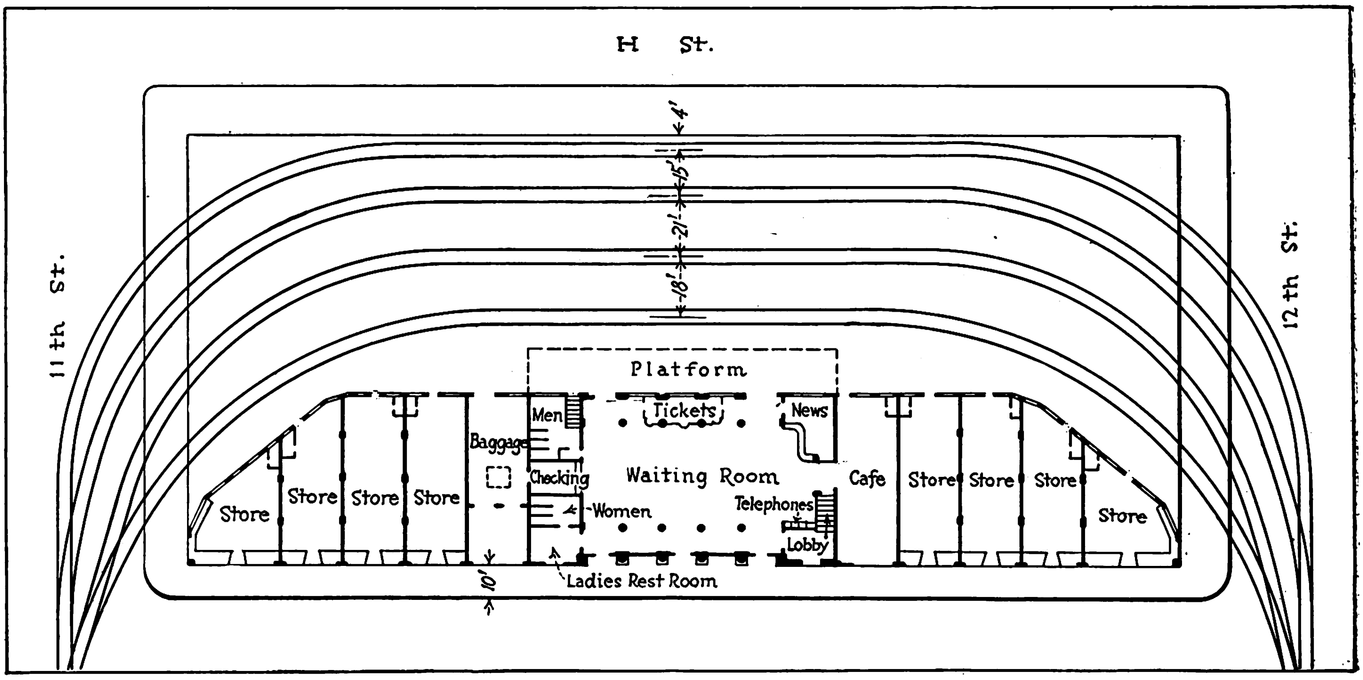
The Exterior Painting of the Sand Car Conforms to Standard Passenger Car Practice. At Right, Valves Situated Behind the Motorman Control the Flow of Sand from the Bin

Railways Build Joint Terminal in Sacramento

New Structure to Be Used by Three Electric Lines Will Cost $350,000, Including the Price of Land— The Number of Passengers Averages Approximately 7,000 per Day

CONTRACTS have recently been awarded for the construction of a union electric railway terminal in Sacramento, Cal., for the joint use of the Sacramento Northern Railroad, the San Francisco-Sacramento Railroad and the Central California Traction Company. The terminal will be located in the middle of the north half of the block surrounded by Eleventh and Twelfth, H and I Streets and will face the present alley, which is to be widened into a 40-ft. street with two 10-ft. sidewalks. The front will be of ornamental brick design with Corinthian columns and an arch treatment. Selected hard-burned tinker brick will be used; they will be laid in Flemish bord and ornamental plaster will be used for trimmings. A group of pleasingly designed stores will be erected on the property adjoining the terminal.

Passengers will enter the station from the new street and pass through the commodious waiting room to gates in the rear leading to trains. The waiting room will be well lighted by groups of windows facing north and south. A central ticket office will be located in the rear. The checking room for hand luggage, men's toilet and ladies' rest room will be at one end, while the concession counter and telephone booths will be in the other. A lobby will connect with a dining room adjacent to the station; this will be under separate management. The baggage room will be provided with an inclosed automobile and delivery space, for loading express wagons under cover.



Track Layout of New Union Terminal for Three Interurban Railways in Sacramento, Cal.

One end of the mezzanine floor will be occupied by the offices of the general agents of the San Francisco-Sacramento Railroad and the Central California Traction Company, while the other end will provide trainmen's and employees' rooms. The entire second floor will house the general offices of the Sacramento Northern Railroad, with a large central office for clerical work and private offices for engineering, operating and managerial departments.

The mechanical equipment will be modern in every respect. Trains will enter the terminal property via Twelfth Street and leave via Eleventh Street. Four tracks will have a capacity of 20 cars. The investment in land and terminal facilities approximates $350,000. The terminal will be leased with a purchase clause to the Sacramento Northern Railroad, with privileges to be sub-leased to the San Francisco-Sacramento Railroad and the Central California Traction Company. The three railroads will prorate the cost of operating the terminal on a mileage basis. The combined interurban railroads which will use the terminal at present handle approximately 7,000 passengers daily in and out of Sacramento.

Mental Test for Autoists

MAJOR CLINTON H. FISK, director of streets and sewers at St. Louis, Mo., at a recent meeting of the St. Louis Traffic Council urged that an ordinance be passed to force every motor vehicle driver of the city to submit to a mental test in order to obtain a license to drive. At a round-table discussion of traffic problems in which officials of the United Railways, the Peoples Motorbus Company, taxicab and truck operators and police department officials participated, Major Fisk was assured that each of the interests represented would support such a bill.

Major Fisk pointed out in his talk that at present taxicab and motorbus drivers are compelled to submit to a mental test to obtain licenses, and expressed the belief that there is no valid excuse why all drivers should not be compelled to do so. He stated that a bill of that nature will be submitted to the Board of Aldermen when they reconvene in October.

Association News & Discussions

A New Classification of Accounts for Bus Subsidiary*

The Dayton & Columbus Transportation Company, Operating in Conjunction with a Parallel Interurban, Has Promulgated a New System of Operating Charges—The Bus Operations Have Been Quite Successful

By F. A. Healy
Auditor and Treasurer Indiana, Columbus & Eastern Traction Company, Springfield, Ohio

The privately owned automobile and the competitive intercity bus have made enormous inroads into the gross earnings of interurban railways until in the year 1922 this company's gross passenger revenue was reduced some $130,000 below the gross passenger revenue of 1921, largely, but not entirely, by reason of this class of competition. In the spring of 1923 this company organized an auxiliary corporation, known as the Dayton & Columbus Transportation Company, to operate 14 big-six Studebaker seven-passenger cars between Dayton and Columbus and between Springfield and Lakeview.

This new company took in gross revenue of $71,000 from April 12 to Dec. 31, 1923. During the year 1923 the gross passenger revenue of the traction company decreased $30,000 below 1922, which showed a net gain in gross revenue for both forms of transportation during the year 1923 of $41,000. For the first six months of 1924 the gross pasesnger revenue of the traction company decreased $26,000 below that for six months of 1923, while the gross revenue from buses was $37,955 during this period, or an increase in gross of $11,955.

We are in the transportation business, and it does not make so much difference to us whether we use electricity or gas as a motive power, so long as we can give service at a profit.

Several months ago our competitors put on cars carrying 12 passengers, so on July 1 of this year, we replaced the touring cars with Fageol safety coaches, carrying 22 passengers. Operation of these buses, extending a little over 30 days, is most satisfactory. We are considering making changes in our traction operation to give greater prominence to the bus operation.

Our schedules provide half-hourly service on the principal lines, the railway cars leaving on the hour and the buses on the half hour, with practically the same time between terminals. The rate of fare is the same on the railway and the buses between all stations, except that the minimum charge is higher on the buses to reduce the number of short riders as much as possible. Agents of the traction company sell tickets on the buses or cars as requested by the patrons. Where tickets are not purchased the drivers collect fares and issue cash fare receipts. Each driver makes a trip report, using the same forms as now used by the railway. This is inclosed in an envelope along with the tickets and cash collected. It is deposited daily with the cashiers, and is checked against the trip reports.

Separate Terminals for Buses

For some time we used the traction terminals for the buses, at Dayton, Springfield and Columbus, but now have provided separate terminals at Dayton and Columbus, finding it advantageous to go to the extra expense to provide bus terminals in sections of the city frequented by would-be bus riders. All buses, however, call at the traction terminals for passengers.

A conveniently located building in Springfield has been rented and equipped as a garage and repair shop. A complete line of car repair parts, tires, tubes, etc., is kept in stock, and the accounts are handled in the same manner as are the store accounts of a railway.

All drivers are carefully trained. They are high-class, capable men, courteous, and each of them is a salesman. They all sell the one thing we have to sell, namely, transportation. Drivers are bonded, and are insured against hold-ups. They are furnished uniforms, including cap and puttees.

Annual Convention

and Exhibits

A. E. R. A.

Atlantic City, N. J.

October 6, 7, 8, 9, 10

Employees are insured under the Ohio state compensation act. The company carries liability insurance against accidents to passengers and property. All cars are insured against fire and theft and collision damages. With careful supervision and management, we have had very few accidents, none of an expensive character, and as our liability insurance is written on the basis of our accident experience, the rate consequently is comparatively low.

New Classification of Bus Accounts Promulgated

The Public Utilities Commission of Ohio classifies the revenue and expenses of buses as follows:

Revenue

1. Passenger revenue.
2. Freight revenue.
3. Express revenue.
4. Baggage revenue.
5. Mail revenue.
6. Revenue from other sources.
7. Total revenue

Expenses

8. Salaries and expenses of officials.
9. Clerical and office expenses.
10. Drivers' wages.
11. Gasoline and oil.
12. Repairs and replacements.
13. Insurance.
14. Taxes.
15. Licenses.
16. Stationery and printing.
17. Rent.
18. Interest.
19. Injuries and damages.
20. Law expenses.
21. Depreciation.
22. Miscellaneous.
23. Total expenses.
24. Net operating revenues (item 7 less item 23).

As the classification of accounts promulgated by the Ohio Public Utilities Commission did not cover the company's accounting requirements a new classification for the Dayton & Columbus Transportation Company was worked up in conjunction with the Day & Zimmermann organization and became effective as of May 1, 1924.

Under the classification of the Public Utilities Commission, "Depreciation" is shown as Account 21, under "General Expenses," while under the company's classification "Depreciation" is included under the "Income Deductions" as "Renewal Reserve" because in its judgment this is an account set up for renewal of worn-out or obsolete equipment, and as such should not be classed as operating expenses.

Experience with the Studebaker cars indicates that they will run an average of 150,000 miles. At 1 cent per mile for renewal reserve there will have been set up $1,500. This with the salvage value of the old machine will purchase a new one.

From the best data obtainable on the Fageol coaches, they should run 300,000 miles, which at 2½ or 3 cents per mile will set up a reserve sufficient to replace them, less their salvage value. At present the company is crediting to renewal reserve at 3 cents per mile, subject to adjustment after full experience from its operations.

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*Abstract of paper presented at meeting of the Central Electric Railway Accountants' Association, Cleveland, Ohio, Aug. 15-16, 1924.

The classification of accounts now used follows:

Classification of Revenue and Operating Expenses of the Dayton & Columbus Transportation Company

Gross Revenue

801. *Passenger.* This account shall include amounts earned from transportation of passengers on regular passenger buses.

802. *Special Bus.* This account shall include amounts earned from transportation of passengers on special buses.

803. *Freight and Express.* This account shall include amounts earned from transportation of freight and express.

804. *Mail.* This account shall include amounts earned for transportation of mail.

805. *Advertising.* This account shall include amounts earned from advertising on buses.

Other Income

806. *Miscellaneous.* This account shall include revenue from weighing, vending and other automatic machines and revenues derived from operations other than transportation and not provided elsewhere.

807. *Revenue of Equipment, Building and Other Property.* This account shall include amounts received as rents for use of equipment rented to others, also rents received from others for buildings, land and other property rented to them when such property is used in connection with operations.

Operating Expenses

M—Maintenance of Plant, Shop and Equipment

900. *Superintendence of Plant, Shop and Equipment.* Salaries and expenses of those directly in charge of the maintenance of plant, car shop, garage, motor cars, etc.

901. *Buildings, Fixtures and Grounds.* Cost of labor and material used in repairing garages, shops, stations, waiting rooms, platforms and other buildings and structures.

902. *Body, Chassis and Engines.* Cost of all repairs to the body, including labor and materials; such as glass, doors, roofs, side sheathings, heaters, window cleaners, lighting wire and all lamp fixtures, repairs to seats, etc. Also, the cost of repairs made to the frame on which the body and motors are mounted, including springs, brakes, drive shaft, fenders, mud guards, bumpers, headlights, brackets, wheels, brake drums, as well as brake linings, ball bearings, roller bearings, differential, steering knuckles, tension rods, tie rods, and equalizers; also all labor and material in repairing engine, including all parts thereof together with transmission system, ignition system including magneto and generators, gas tanks, gas line, carburetor, vacuum tank, radiator, manifold, fan belts, oiling devices and water pumps.

903. *Service Cars.* Cost of maintaining service cars, body, chassis, engines, painting and varnishing; tire renewals and storage batteries.

904. *Painting and Varnishing Motor Buses.* Cost of all labor and material used in connection with the painting and varnishing of motor buses.

905. *Shop Equipment and Expenses.* Cost of all labor and material used in repairs to power driven tools, pump, battery charging equipment, lathe, etc. Also, the cost of repairs and renewals of small hand tools.

906. *Storage Batteries.* Cost of all repairs and renewals of storage batteries.

Note—This account to be used in the operation of electric storage battery driven cars, ordinary battery repair expense on gas or fuel oil cars to be charged to account 902.

907. *Tire Renewals.* Includes the cost of all renewals and repair of tubes and tires.

908. *Miscellaneous Equipment.* Costs for maintenance of equipment which is not properly chargeable to other equipment accounts.

P—Power Expenses

909. *Gasoline.* Cost of gasoline and other fuel used in motor buses.

Note—Electric storage battery operated cars, charge to this account the cost of power purchased or generated for charging of batteries used as motive power.

C—Transportation Expenses

910. *Superintendence of Transportation.* Salaries and expenses of those directly in charge of transportation.

911. *Garage Expenses.* Cost of fuel, lights, water, ice, rent and other garage supplies and expenses; cost of material and supplies used by garage employees in cleaning and servicing of cars.

912. *Lubricants.* Cost of oils and greases used in the lubrication of motor buses.

913. *Wages of Garage Employees.* Labor of washing and cleaning vehicles, sweeping and keeping the premises in order; as well as the cost for transferring buses from one division to another; also the time to and from the various lines in changing buses.

914. *Operation of Service Cars.* All expense of operation, operators' wages, gasoline and oils, material and supplies used in operation.

Note—Repairmen and mechanics charged to proper accounts under maintenance.

915. *Wages of Bus Operators.* All wages of conductors, chauffeurs and others engaged in transportation service, including wages paid for time during which they are required to be on duty and to hold themselves in readiness for active service.

916. *Other Miscellaneous Transportation Expenses.* Cost of lamps used in illumination of buses; alcohol or non-freeze compound for radiators; skid chains and repairs thereto as well as the cost of towing disabled buses to the garage; licenses paid.

916*a*. *Rent of Terminals and Facilities.*

N—Traffic Expense

917. *Advertising.* Cost of solicitation and advertising in newspapers and periodicals, signs and car advertising; also the cost of printing, publishing and distributing time tables, folders, etc.

B—General Expenses

918. *Salaries and Expenses, General Officers and Clerks.* Salaries and traveling expenses of general officers and general office clerks.

919. *Injuries and Damages.* Casualty, workmen's compensation, liability, property damage, accrual of company reserve, also premiums paid by company for this class of insurance; legal expense in connection with settlement of injuries and damages.

920. *General Office Expense.* Cost of office supplies, repairs to office furniture and equipment, wages of janitors and miscellaneous expenses.

921. *Insurance.* All premiums paid for burglary and fidelity, fire and theft insurance. Also amounts set aside as an insurance reserve by a company carrying its own insurance.

922. *Law Expenses.* All law expenses exclusive of that incurred in connection with the settlement of injuries and damages, which are chargeable to account 919.

923. *Management Expenses.* Expense of general manager.

Note—In connection with special service charge appropriate account.

924. *Stationery and Printing.* All expenditures for stationery, printing, postage and other supplies.

925. *Rental of Land and Buildings for General Office.* All rentals paid for land and buildings which cannot be charged direct to any other department.

926. *Societies and Associations.* All dues and expenses in connection with societies and associations of which the company or officials are members.

927. *Employees' Welfare Work.* All expense incurred by the company for the welfare of employees, all group insurance, association and relief departments.

928. *Miscellaneous General Expenses.* All general expenses not provided for elsewhere; also, donations other than employees.

Standard Screw Threads Adopted

THE American Engineering Standards Committee has just approved as American Standard a 32-page document constituting the finished work of the sectional committee on standardization and unification of screw threads. By the adoption of the report, screw threads are narrowed down to two series—an "American Coarse Series" for general work and an "American Fine Series" for work in which a finer thread is desirable, as with the special alloy steels used extensively in the manufacture of automobiles. The same form of thread is used in both.

The Coarse-Thread Series is the present "U. S. Standard" (or "Sellers") supplemented by the "A. S. M. E. Standard" below one-fourth inch, and the Fine-Thread Series is the "S. A. E. Standard" supplemented by the "A. S. M. E. Fine-Thread."

Different classes of fit ("loose," "free," "medium" and "close") are established to provide for unavoidable inaccuracies of workmanship under practical conditions, also a standard screw thread nomenclature and system of identification symbols.

American Association News

Convention Transportation Committee at Work

THE committee on transportation to the October convention is actively preparing plans for special service to Atlantic City. In order to facilitate this work the entire country has been divided into territorial districts by Chairman E. C. Faber of New York. Vice-chairmen of the districts are now actively making plans for special trains or cars. Specific announcements will be published as rapidly as the arrangements are completed.

The personnel of the committee follows:

Chairman, E. C. Faber, vice-president Barron G. Collier, Inc., New York City.

Regional vice-chairmen:

San Francisco—W. V. Hill, manager California Electric Railway Association.

St. Louis—B. W. Frauenthal, traffic agent United Railways of St. Louis.

Chicago—H. J. Kenfield, president Kenfield-Davis Publishing Company.

Boston—Edward Dana, general manager Boston Elevated Railway.

New York—George Keegan, general manager Interborough Rapid Transit Company.

Atlanta — J. P. Dick, assistant to vice-president Georgia Railway & Power Company.

RAILWAY MEMBERS

Arkansas—C. J. Griffith, Little Rock.
California—W. V. Hill, San Francisco.
Colorado—Ernest Stenger, Denver.
Connecticut—J. K. Punderford, New Haven.
Delaware—T. W. Wilson, Wilmington.
District of Columbia—J. H. Hanna, Washington.
Florida—J. P. Ingle, Jacksonville.
Georgia—J. P. Dick, Atlanta.
Illinois—H. J. Kenfield, Chicago.
Indiana—Harry Reid, Indianapolis.
Iowa—F. C. Chambers, Des Moines.
Kentucky—Samuel Riddle, Louisville.
Maine—Alfred Sweeney, Lewiston.
Maryland—H. B. Potter, Baltimore.
Massachusetts—Edward Dana, Boston.
Michigan—J. F. Collins, Jackson.
Minnesota—V. O. Law, Minneapolis.
Missisippi—W. R. Phipps, Meridian.
Missouri—B. W. Frauenthal, St. Louis.
Montana—E. J. Nash, Butte.
New Jersey—M. R. Boylan, Newark.
New York City—George Keegan.
New York—W. H. Collins, Gloversville.
North and South Carolina—Raymond Hunt, Wilmington, N. C.
Ohio—J. H. Alexander, Cleveland.
Oregon—F. T. Griffith, Portland.
Pennsylvania—F. R. Phillips, Pittsburgh.
Rhode Island—R. R. Anderson, Providence.
Tennessee—E. D. Reed, Chattanooga.
Utah—H. F. Dicke, Salt Lake City.
Virginia—J. H. Hancock, Roanoke.
Wisconsin—S. B. Way, Milwaukee.
Canada—F. D. Burpee, Ottawa, Ont.

MANUFACTURER MEMBERS

Connecticut—C. L. Hancock, Bridgeport.
Illinois—H. J. Kenfield, Chicago.
Kentucky—J. D. Augustus, Louisville.
Maine—E. F. Hodgkins, Gardiner.
Massachusetts — John E. Bradley, Worcester.
Maryland—W. S. Godwin, Baltimore.
Michigan—M. J. Phelan, Detroit.
Missouri—W. H. Ivers, St. Louis.
New Jersey—Philip C. Guion, Harrison.
New York City—C. D. Eaton.
New York—W. K. Archbold, Syracuse.
Pennsylvania—R. L. Twitchell, Pittsburgh.
Rhode Island—A. J. Thornley, Providence.
Washington—G. C. Eggers, Spokane.
Wisconsin—J. R. Jeffrey, Milwaukee.
Canada—W. W. Horwood, Montreal, Que.

Interesting Entertainment Feature at the Convention

AMONG the diversified forms of amusement and entertainment that are being planned by the entertainment committee of the American Electric Railway Association for the coming convention to be held in Atlantic City in October is a musical treat occasioned by the appearance of Josephine Lucchese, coloratura soprano.

Mme. Josephine Lucchese

Madame Lucchese is not only young and beautiful but has a wonderful personality and a quality and range of voice which fittingly have given her the title of the American Nightingale. Though only in her early twenties, Madame Lucchese has already toured the United States four times and has won her way to fame in innumerable concerts and in grand opera. The appearance of Madame Lucchese is in addition to the other well-selected musical features that have been arranged as a part of the entertainment for the convention.

While the details of the entertainment program have not been completed, it is planned that she will sing both Tuesday evening and at the ladies' musical entertainment to be held in one of the hotels on Wednesday afternoon during the week of the convention.

Further announcement will be made as the details of the program are completed. Delegates to the convention will be assured of at least two opportunities to hear this truly wonderful singer.

Hotel Reservations for the Convention

ACCORDING to information received at American Association headquarters from Atlantic City hotels advance bookings for convention week are heavy. From the number of advance registration cards that have been received at headquarters, there is every indication that the 43d annual convention will be the largest in the history of the organization. It is suggested that those who have not made hotel reservations already do so at once.

Special Reports Available

THE following special reports have been prepared by the Bureau of Information and Service of the American Electric Railway Association and are available to member companies in good standing upon request:

State Regulation of Depreciation Rates—A compilation of state laws defining the jurisdiction and powers of public utility commissions over depreciation accounts, together with abstract of court and commission decisions interpreting and applying the provisions of the laws.

Analysis of Labor Agreements—An analytical digest of the provisions appearing in the labor contracts of a group of representative city and interurban companies, arranged in such a way as to make possible a ready comparison of working conditions.

Fare Changes and Their Effects on Revenues and Riding Habit—A group of companies having recently made changes in their fares have been selected and comparative data on their operations prior to and subsequent to the fare change have been compiled.

Transportation of United States Mail Carriers—A tabulation and summary of replies to an association questionnaire covering methods of handling the matter of transporting mail carriers, arrangements with government, compensation, records kept, etc.

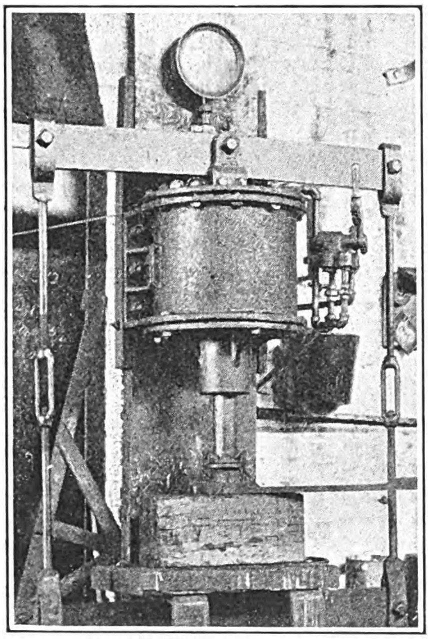
In addition to the above, supplements to the Fare Bulletin, Wage Bulletin and Cost of Living Studies have been prepared so as to bring them down to date.

Maintenance of Equipment

Serviceable Air-Operated Press

BUSHINGS are inserted in truck swing links and members of the brake mechanism at the Wheaton shops of the Chicago, Aurora & Elgin Railroad by means of an air-operated vertical press built in the shops. By attaching dies and forms to the piston rod and bed plate, various kinds of work may be performed requiring a force of not over 5 tons.

The apparatus consists of a 12-in. x 12-in. brake cylinder mounted on a pilaster of the brick side wall of the shop. Across the cylinder head is fastened a 5-in. x 1-in. steel beam approximately 3 ft. long. To the ends of this two 1-in. rods are attached by means of stirrups. These support another 5-in. x 1-in. steel bar beneath through turnbuckles arranged so that the lower bar may be drawn up tight against the under side of the table which forms the bed of the press. The rear edge of the table is attached to the wall and the front edge is supported on 3-in. x ½-in. steel legs.



Air-Operated 5-Ton Press Forcing Bushings Into Swing Links

By bringing the lower bar up tight against the table all pressure is removed from the table supports, which are only strong enough to stabilize the bed. The distance between the cylinder and the bed is such that the piston rod when extended will not strike the table. By building up with blocks or dies it is possible to bring the work within reach of the piston rod.

A standard engineer's valve is used to admit air to either side of the piston, moving it up or down or holding it in any position. The shop air supply of 90 lb. per square inch is used, giving a pressing force of 10,200 lb. on the piston rod when full pressure is turned on. This is sufficient to press in large sized bushings. Elliptical truck springs are compressed in this apparatus and held together while the spring clip is applied. Other uses are made of the press, which has more than paid for its construction and operation.

Armature Winding Information

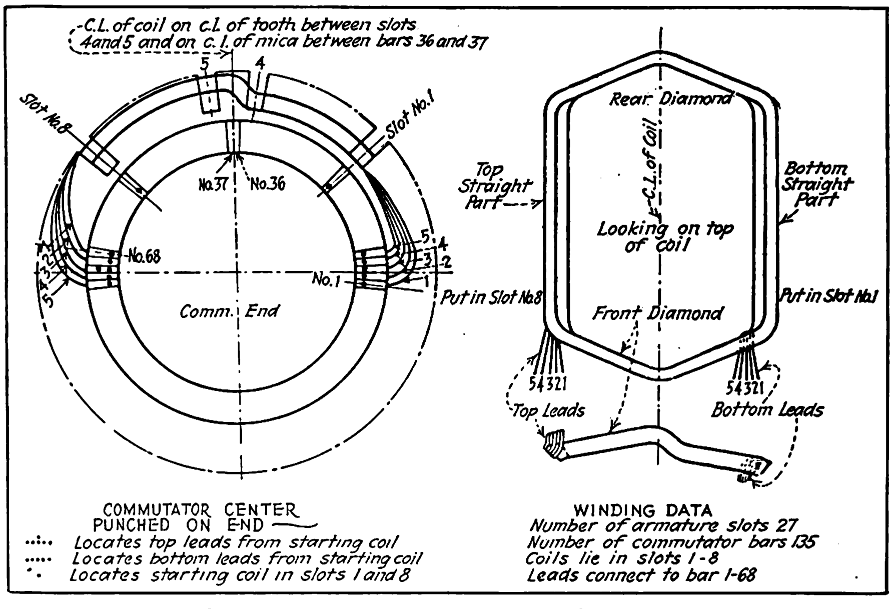
THE armatures for railway motors are usually laid out for a wave or two-circuit type of winding which always requires an odd number of commutator bars. When the number of coils per slot is even there will always be an idle or dead lead. The same is true with an odd number of coils per slot and an even number of slots on the armature. However, when an odd number of coils per slot are used and there are an odd number of slots on the armature there will never be an idle or a dead lead.

The alignment of the commutator slots or teeth with respect to the commutator mica or bars is as follows:

1. With the coil throw even and the lead throw even, the center line of the tooth will line up with the center line of the mica.
2. With the coil throw odd and the lead throw odd, the center line of the slot will line up with the center line of the bar.
3. With the coil throw even and the lead throw odd, the center line of the tooth will line up with the center line of the bar.
4. With the coil throw odd and the lead throw even, the center line of the slot will line up with the center line of the mica.

In the accompanying illustration the center line of the starting coil is on the center line of the armature tooth between the fourth and fifth slots and on the center line of mica between the thirty-sixth and thirty-seventh commutator bars. To lay off the winding start at bar 36 and count back (clockwise) to bar No. 1 and in this bar place lead No. 1 from the bottom leads of the starting coil.

Then count from bar No. 1 forward (counter clockwise) to bar No. 68 and in this place lead No. 1 from the top leads of the starting coil.



COMMUTATOR CENTER PUNCHED ON END

..:.. Locates top leads from starting coil

..... Locates bottom leads from starting coil

·. Locates starting coil in slots 1 and 8

WINDING DATA

Number of armature slots 27

Number of commutator bars 135

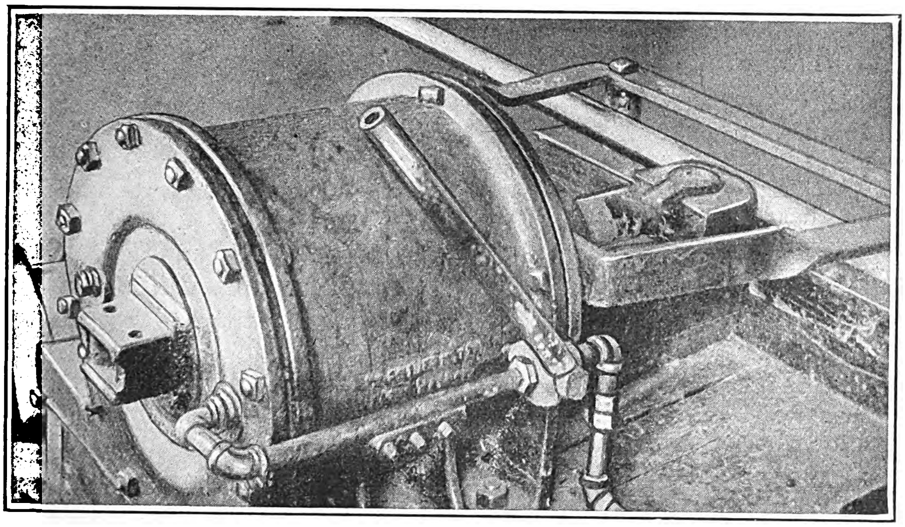
Coils lie in slots 1-8

Leads connect to bar 1-68

Armature Winding Diagram for a Railway Motor

Pipe Bender Made from Air Cylinder

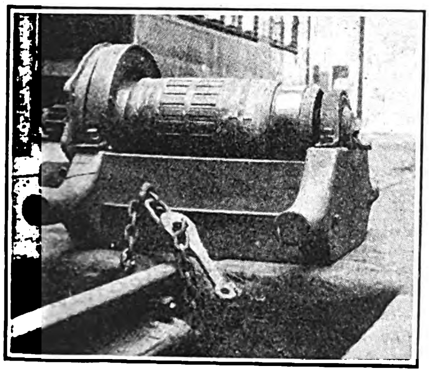
IN THE Decatur shops of the Illinois Traction System a pneumatic machine has been installed for bending iron pipe and conduit. This device has an air cylinder with 16 in. diameter and 12 in. stroke. A framework for holding the pipe is attached to the cylinder. The pipe to be bent rests on a wood block and is held in place by two vertical pins 24 in. apart. At the end of the piston of the air cylinder is a curved wooden block which presses against the pipe midway between the pins. Air is admitted to the cylinder and after the pipe has been bent to the desired form the pressure is released and a spring in the cylinder returns the piston to its normal position.



Air-Operated Pipe Bender Used in the Shop of the Illinois Traction System at Decatur

Saddle Holds Armature During Pinion Pulling

THE removal of pinions from the armature shafts of General Electric No. 258 motors used to be rather a problem in the shops of the Bangor Railway & Electric Company. It required four or five men to hold the armature while the housing was turned loose at the end. In order to obviate the necessity for this, a wood saddle has been designed by H. B. Baldwin, master mechanic. This is chained to the pit rail as shown in the accompanying illustration and holds the armature securely in place during the removal of the pinion.



Safety Car Armature Is Held Fast by This Device When the Pinion Is Removed

Maintenance of Controller Fingers

THE parts of platform controllers which require the most frequent attention in maintenance are the contact plates and fingers. Methods of repair on various railways differ to a considerable extent, and in most cases the work is left largely to the judgment of the inspector or controller man. These are important parts of the equipment, however, and an effort should be made to educate the men in the essentials of proper maintenance.

Since both the fingers and contact segments are made of copper, which is comparatively soft, excessive wear will take place unless some form of lubricant is used. The best lubricant may vary with different climates and temperatures, but vaseline is generally considered satisfactory for summer and moderate winter temperatures, while engine oil is found to work well under very cold conditions.

There seems to be a general idea among controller maintenance men that if a considerable amount of lubricant is used it will remain longer on the contact segments and so require less frequent attention. This is an error, as the surplus soon wipes off or else is burned off and accumulates on the arc barriers, fingers and drum castings. This accumulation collects copper dust and dirt and there is a resulting tendency toward short circuits and insulation failures. The contact segments also become sticky and dirty, so that improper contact sometimes results. The controller drum also turns harder, making the motorman's work more difficult.

A practice which works satisfactorily is to spread the lubricant over the segments with a cloth as smoothly as possible. Then operate the fingers over the segments several times and wipe around the fingers and segments so as to remove any surplus.

Contact segments and fingers become roughened through arcing and they should be carefully smoothed with emery cloth or a file before the lubricant is applied. The cutting action at the contact is also made more severe if the fingers do not bear accurately across their entire width.

Another important consideration in the maintenance of the fingers is the contact pressure. The safe current load which a finger will carry depends on the width of the contact surface, the pressure at the point of contact and the mass and radiation of the fingers and segments. The capacity for a given width increases with the pressure, but too heavy pressure causes excessive wear and stiff drums.

Finger pressures found satisfactory are 8 lb. for a 1-in. finger and 6 lb. for a ¾-in. finger. This pressure should be measured by means of a small spring balance and a wire stirrup by placing the wire just beneath the point of contact of the fingers. After measuring the pressure in several instances, the controller man becomes accustomed to the feel of the finger pressure and can adjust it very accurately without the use of a spring balance.

Where the pressure is too small or too great, it should of course be changed. This can be done by altering the bend in the flat finger spring. Particular care should be exercised in bending to make certain that the finger will make full contact after adjustment. Most fingers have an adjustable stop, which limits the drop of the finger tip when it leaves the contact, but this stop does not vary the finger pressure, its sole purpose being to prevent stubbing. The drop should be set at $\frac{1}{16}$ to ⅛ in., or enough to allow the finger to lift entirely free from the stop when the finger is on the contact. This allows full pressure of the contact circuit. The lift should be checked in all positions of the drum, as an eccentric drum, or one having worn bearings and shafts, may have good finger pressure in one position and weak finger pressure in another.

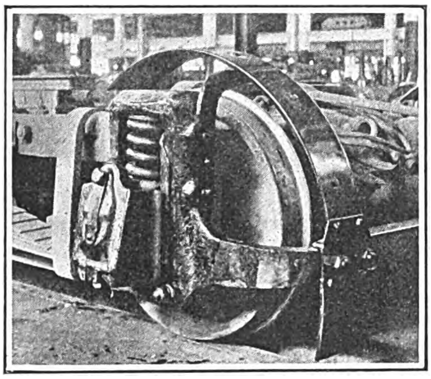
Where new fingers are installed some controller men find it of advantage to grind in the contact surface with emery cloth or with a mixture of emery and vaseline. In grinding, fingers should be adjusted as frequently as possible beforehand, however, as otherwise an excessive amount of copper will be ground off from the edges before proper contact is obtained.

Mud Guard for Car Wheels Tried in Detroit

By H. S. Williams

Assistant Superintendent of Equipment, Department of Street Railways, Detroit, Mich.

As a result of the troubles during last winter and spring which were directly attributable to wheel wash, it was decided by the Department of Street Railways, city of Detroit, to try out some form of wheelguard in an effort to minimize this trouble. The accompanying illustration shows an experimental type that has been installed on several trucks. This is built along the lines of an automobile fender and is of light weight. At the lower end is a flexible extension of canvas belting. If this device proves as successful as is anticipated, the guard will eventually be made in a crowned form to attain the greatest strength and rigidity with the least weight.



Mud Guard for Car Wheels

Instead of mounting several splash guards under the car to protect equipment from wheel wash, the Department of Street Railways in Detroit is placing this type of guard directly over the wheels.

It is known that if grit and wheel wash can be reduced on the wearing parts underneath a car, proportionately greater life will be obtained; also that exposed electrical parts such as resistors and wires will stand up much longer. It is self-evident that a properly designed wheelguard will accomplish this result.

Reports received from carhouses indicate that this guard is doing satisfactory work, though of course the real test will be applied during the winter months.

New Equipment Available

Standardized Cutting Tools

In an attempt to overcome the difficulty of getting the right angle and shape for planer tools, the G. A. Gray Company, Cincinnati, Ohio, has brought out a line of standardized cutting tools recommended for use on Gray planers. A chart is furnished by the company giving the proper shape as well as the angles of rake and clearances for a set of 6 general purpose tools, together with sketches showing the use for which each tool is intended.

To supplement this chart, the Gray company furnishes aluminum models which are numbered to correspond to the chart and which have their various surfaces actually ground. They can be used by blacksmiths in forging tools. Experience shows that many men will imitate the model more accurately than they would work to a drawing.

Electric Machine for Small Tapping Work

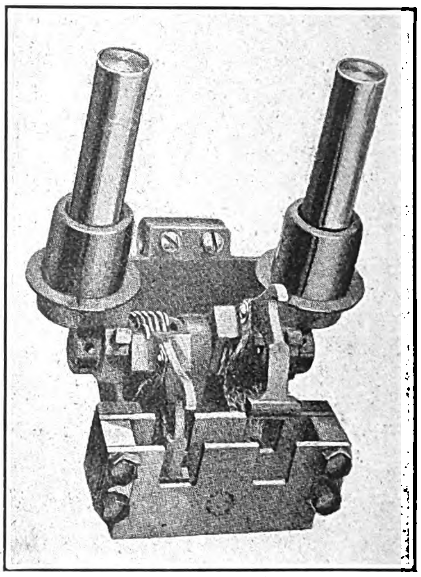
A portable tool for tapping small drilled holes similar in appearance to a portable electric drill has recently been placed on the market by the Independent Pneumatic Tool Company, Chicago, Ill. Its trade name is the Thor reversible electric tapping machine. It is suitable for tapping holes up to $\frac{3}{16}$ in. diameter and for retapping holes up to a diameter of $\frac{5}{16}$ in.

The machine has the same motor as the standard Thor portable electric drill, but the speed of the spindle has been reduced to 550 r.p.m. through worm gears which are inclosed in the gear case. The reversing device is mechanical.

A slight pressure toward the work will engage the clutch which causes the spindle to rotate to the right. When the tap has been run in, a pull on the machine immediately reverses the spindle for backing out. It is not necessary to cut off the current between operations. When no pressure is exerted in either direction, the spindle runs free. The gears may also be locked so that the machine can be operated in reverse only. The universal motor furnished with the machine can be operated on either alternating or direct current circuit. The weight of the machine is 6¾ lb.

Brush-Holder with Built-Up Box

A type of brush-holder made of rolled plates instead of the usual cast metal box is being marketed by D. B. Flower, Philadelphia, Pa. This has been designed particularly so that the front and rear plates which wear due to the action of the carbon brushes are removable. The plates may be reversed when one side has become worn, so as to obtain double the amount of wear. When completely worn out they may be readily replaced by new parts taken from stock.



Brush-Holder Designed to Permit Replacement of Box

The parts of the built-up box are held in position by four cap screws which bind it together. Special precautions have been taken to prevent the cap screws working loose by providing a soft brass lock washer which has turned-up ends so as to lock the screw heads.

The News of the Industry

Elaborate Detroit United Program

Economies of $1,000,000 Annually Expected—Program Calls for Use of Bus as Feeder

With all the various economies put into effect that are permissible under the plans worked out for the Detroit United Railway, officials of the company look for an aggregate saving of $1,000,000 per annum in operating expenses and a return to normal earnings just as soon as the railway and bus services of the company have been co-ordinated.

Elliott G. Stevenson, president of the company, said recently that he thought the stockholders understand that the company has been passing through a period of unusual conditions growing out of bus competition and the general business and industrial depression. It has been determined by the board, after a most exhaustive investigation, that the only practicable way of meeting the bus competition is to engage in and co-ordinate the bus with the street railway.

As Mr. Stevenson sees it a plan of this kind calls for an entirely different program with reference to the operation of the railway, and involves the substitution so far as possible of one-man operation of cars instead of two-men. In consequence the company has recently contracted for 30 double-truck cars for one-man operation, with a weight complete of 28,500 lb., as compared with a very much heavier type of equipment at present in service. This contract will probably be increased to 50 or more cars of this type, hence the need for additional financing. Moreover, in order to effect a large saving in the costs of operation it is planned to transfer passengers from the company's interurban cars at the outside of Detroit and other cities to buses, thus saving a car rental for the use of city tracks of approximately $400,000 per year at the present rate of cost. At each transfer point the company will have to erect terminal stations, which it is estimated will cost approximately $200,000 to $250,000.

Mr. Stevenson has explained further:

> The acquiring of buses for co-ordinating service with the railways, with the cost of terminal stations, garages, gasoline storage tanks, etc., will involve an expenditure of $1,000,000 or more, while the change in and addition to the company's equipment will involve the expenditure of approximately another $1,000,000. I am not able at the present moment to state definitely how many cars now operated by two men can be superseded by cars operated by one man, but I can give you, in an isolated instance, an example of what the accomplishment would effect in the matter of economy in operation.
>
> In our local service in the city of Flint, under normal conditions, we operate about 125 cars, all of which have been and now are operated by two men, motorman and conductor. The entire platform expense—wages of motormen and conductors—exceeds $600,000 per annum, and the saving in discontinuing one-half of this service will approximate $300,000 per annum.
>
> We feel confident that in the entire service the substitution of one-man for two-men operation—where practical—a saving of $500,000 per annum will be effected, as we think that in all 200 to 250 one-man cars can be substituted for two-men cars and can be safely and efficiently operated.

In this connection it should be explained that the changes contemplated do not involve the company's high-speed interurban service, but only its local and semi-local service.

Mr. Stevenson has also explained recent financing operations for the benefit of stockholders. He says that by the application of part of the proceeds the company is now in a position to comply with its covenant to convey a clear title to the property which it contracted to sell to the city whenever the city is prepared to make payment of the balance of the purchase price.

Railway's Bus Plea Unheeded

Peoples Company of St. Louis Gets Permits for Eight More Lines—Suburban Service Suggested to Railway—Officials of Omnibus Company of America Plead Cause of Independents

PERMITS were issued on Sept. 2 to the Peoples Motor Bus Company, St. Louis, Mo., by the Board of Public Service to start eight new bus lines. The application of the company was filed with the Board of Public Service five months ago. The new permits enable the company to extend its lines into virtually every section of the city with two cross-town lines as well as through routes downtown from Lindenwood and Gratiot and other outlying sections.

The Board of Public Service in discussing the application of the St. Louis Motorbus Company, a subsidiary of the United Railways, to operate buses along routes practically the same as those asked by the Peoples Motorbus Company referred to the action as an attempt to prevent the extension of the Peoples company as a comprehensive transportation system. This the board felt an unwise step. It recommended that the St. Louis Motorbus Company apply for permits to run lines out into the suburban districts at the terminals of the present street car lines.

Richard W. Mead, speaking for the Peoples company, declared plans are immediately going forward for the erection of two garages, to cost together about $300,000, and the purchase of seventy-five additional buses, at a cost of approximately $750,000. Ground has already been purchased on Iron Street, west of Grand-Kings Highway, where a repair shop and shelter for seventy buses will be erected. The other garage will be located in the West End and will accommodate 100 cars. The present garage at Chippewa Street and Nebraska Avenue, which was recently damaged by fire, has not yet been repaired.

The first line which will be opened up following the issuance of the permits is the Lindenwood line, running from Lindenwood to Broadway by way of Shaw Avenue and Russell Boulevard. This will be in operation in ten days, in accordance with the promise of the company to the people of Lindenwood and South Broadway, Mr. Mead stated. He promised that all the lines would be operating by the end of three months.

The Board of Public Service in approving the issuance of the permits to the Peoples Motorbus Company said in a prepared statement that the members believed the city of St. Louis needed more than one form of transportation and was large enough to support an adequate street car system together with a comprehensive bus service.

The board declared it had given due consideration to the claim of the United Railways that the granting of permits to the Peoples Motorbus Company would cause an immediate application to the Public Service Commission for an increase in fares. The members of the board said:

> We are advised that the issuance of any or all of the permits applied for by the Peoples Motorbus Company will be met by the reorganization committee of the United Railways with an immediate application for increase in fares, a withdrawal of certain non-productive street car lines, immediate discharge of large number of United Railway employees and the wiping out of the $3,000,000 due the city in the form of delinquent mill tax. These threats or promises have had careful consideration.
>
> The members agree that if St. Louis is to grow, and we are to realize our dream of 1,000,000 population, transportation facilities must be furnished which will carry our people to those districts located within the confines of our corporate limits, where they build homes and establish new communities, rather than forcing them to go out into St. Louis County along the now existing street car lines.

Both Sides Attend Hearing

The Board of Public Service took the applications of both bus companies under advisement following a very lively public hearing held on Aug. 29. At the hearing there was evidence of bitterness of feeling. In newspaper advertisements and in circulars spread broadcast the St. Louis Bus Company attacked the Peoples Motorbus Company as not operating under control of the Missouri Public Service Commission and with being owned "by Chicago interests." These ads also pointed out that the St. Louis Bus Company would be operated in conjunction with the United Railways with provision for an interchange of transfers.

Both sides recruited partisans for the hearing, but several speakers who favored the application of the St. Louis Bus Company in preference to that of the Peoples Motorbus Company were hissed and interrupted.

Stanley Clarke, representing the reorganization committee of the United Railways, was the first speaker. He outlined the plan under which the St. Louis Bus Company proposed to cooperate with the railway. This plan contemplated a charge of 10 cents to bus patrons with a charge of 7 cents to railway passengers and an extra 3 cents for a transfer to the buses. There was to be no charge to bus patrons who desired to transfer to street cars. Mr. Clarke stated that competitive bus service would delay if not prevent the reorganization of the railway.

He said the Peoples Motorbus Company had not been willing to enter into a transfer arrangement with the United Railways, but that when the plans for the reorganization are perfected the United Railways will go before the people with an ordinance for a transportation plan with street car and bus operating in one system, and a representative of the city on the board of directors of the system. Col. Albert T. Perkins, general manager of the United Railways, stated that the railway would ask the federal court and the Missouri Public Service Commission for permission to enter into the proposed transfer arrangement.

John A. Ritchie, Chicago, president of the Omnibus Company of America, which controls the St. Louis bus lines, and W. Frank Carter, attorney for the Peoples Motorbus Company, spoke for the Peoples Company.

Mr. Carter answered the charge that the Peoples Motorbus Company is controlled by Chicago people by saying that the St. Louis Bus Company was presumptuous in warning St. Louisans that the Peoples Motorbus Company is owned by "outsiders," when J. K. Newman and Sam W. Greenland, who are reorganizing the United Railways, and are back of the St. Louis Bus Company, only recently came to St. Louis. Mr. Carter stated that the Peoples Motorbus Company has $900,000 cash in St. Louis banks with which to buy new buses, etc., and that service would be installed immediately upon receiving the permits sought.

A meeting of the reorganization committee of the United Railways was called to be held in New York on Sept. 5 to discuss a definite plan for the reorganization prepared by J. K. Newman and believed by him to be acceptable to all financial interests and people of St. Louis. It is admitted that the action of the St. Louis Board of Public Service on Sept. 2 in granting the Peoples Motor Bus Company permits for eight new lines has complicated the work of the reorganization committee, but Mr. Newman feels the problem is not insurmountable and that a satisfactory solution can be worked out.

Colonel Perkins, general manager of the United Railways, states that receipts for eight months of 1924 fell off $525,000 compared with 1923. This he attributed largely to bus competition. The railway may ask the Missouri Public Service Commission for an increase in fares or permission to curtail or eliminate service on nonproductive lines.

Mayor Kiel says the city will oppose any effort to raise fares unless it is proved that the company faces financial disaster.

Another Bus Plea in New York

Gasoline-Electric Company Adds Application to Those Already on File—125 Miles Planned

Perhaps the most important event in traction affairs in New York during the week ended Sept. 6 was the filing of an application on Friday by the Service Bus Corporation for operating rights on twenty-two routes over 125 miles of city streets at a fare of 5 cents. Transfers are to be issued for 2 cents additional. All except one of the routes, which is to run to Jackson Heights, Queens, are in Manhattan. The Board of Estimate is scheduled to consider buses at its meeting Sept. 19.

Among previous bus proposals are those of the Fifth Avenue Coach Company, the Third Avenue Railway and the Brooklyn-Manhattan Transit Corporation.

Those connected with the Service Bus Corporation include: William Schall of William Schall & Company; E. M. Howe, president of the American National Omnibus Corporation; S. P. Goldman of Goldman & Unger, attorneys; William R. Willcox, former chairman of the Public Service Commission of the First District of New York, and Bernard Tameling of Tameling, Keen & Company, bankers.

Mr. Howe formerly was consulting engineer of the Tilling-Stevens Motors, Ltd., of London. The buses to be operated will be similar to the gas-electric buses of London and are manufactured under Tilling-Stevens patents.

Under the proposed service there will be seventy-eight points at which passengers may transfer from one section or route to another. The application provides for three main lines in Manhattan, running north and south. One of these is on the east side, over several avenues; another in the center of the city, and another on the west side. Ten of nineteen proposed crosstown lines will be south of Fourteenth Street.

Because of lack of time before the election of a new State Legislature next November, Mayor Hylan said on Sept. 2 that the proposed rapid transit public hearing set for Sept. 11 would not be held. At a recent meeting of the Board of Estimate it was decided to hold this September hearing in order to give civic organizations and others an opportunity to present their views upon the Mayor's pet project for the acquisition of $275,000,000 for subway expansion. Mayor Hylan now has learned that not only would such an expedient require an amendment to the State Constitution, but that a resolution providing for the submission of the question to a popular vote must be passed by two successive Legislatures, the first of which must take action not less than three months before the following State Legislature is elected. There is nothing new in these conditions, but the Mayor pointed out these obstacles, as one commentator said, as if they were recent discoveries.

John J. Cray, Fourth Deputy Police Commissioner, issued orders on Sept. 3 installing the "skip-stop" system on all bus and surface car lines. The order provides for the making of stops every two blocks instead of every block. The new regulations will go into effect on Sept. 21 for a trial period. Stops on the bus and car lines are to be made at the even numbered streets, except for such important intersecting thoroughfares as Twenty-third, Fifty-ninth and 125th Streets. In the downtown section of Manhattan "stop" signs will be used.

Fare Issue in Council Bluffs Goes a Step Farther

An appeal from the Federal District Court to the Federal Circuit Court of Appeals for the Eighth District was ordered by Judge Martin J. Wade and was filed recently with the clerk of the Federal Court in Council Bluffs, Iowa, in the rate raise case of the Omaha & Council Bluffs Street Railway. Judge Wade granted a temporary injunction on July 25 restraining the city from interfering with a fare raise to 7 cents. This temporary injunction will continue in effect during the appeal to the appellate tribunal.

The order of appeal follows the petition by attorneys for the city, who assigned ten errors. Among the errors assigned was the finding, by the court, as a matter of law, that the present schedule of rates as fixed by the ordinance of Dec. 16, 1897, was confiscatory of property without due process of law; that the finding was mandatory in effect and changed the situation of the parties rather than preserving the status quo; that the company and its grantors had been for twenty-six years operating under the original contract and had received the benefits of the contract and have now stopped to claim that such contract, with reference to rates, was void; that it fully appeared from the record that the rights of the railway were fixed and governed by a valid contract between the corporation and the city, wherein the rates of fares to be charged by the company were fixed and determined.

The city for some time now has been fighting the company in its efforts to put into effect a 7-cent fare for adults, or four tickets for 25 cents with a 3-cent fare for children and 5 cents for school tickets. For 1924 the company declared the income has been showing a gradual decrease while the expenses remain practically the same. The fare issue at Council Bluffs and the subsequent restraining order have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Safety Premiums in Richmond

President Wheelwright to Split Savings with Employees of the System on a 50-50 Basis

Safety premiums are to be awarded to the trainmen of the Virginia Railway & Power Company, Richmond, Va. Announcement to this effect was made on Aug. 21. The amount paid out for injuries and damages through the entire railway system of the company for the six months ended June 30, 1924, was about 5 per cent of the $2,400,000 gross earnings, or nearly $120,000 for the six months period.

The opinion of the management of the company, expressed through T. S. Wheelwright, president, is that if the company can get a thorough spirit of "team work" on the part of all car men in a concentrated effort to reduce accidents, this record can be greatly improved. In consequence Mr. Wheelwright has announced that any reduction below this 5 per cent of the gross earnings for the six months from June 1 to Dec. 1 will be divided between the trainmen and the company on a 50-50 basis. The distribution to car men will be based on the man-hours operated. In other words, if the amount is reduced in the six-month period to 3 per cent of the gross earnings, the 2 per cent saved will be divided 50-50 between the company and the car men. Mr. Wheelwright has said:

> It is the belief of the company that by a co-operative effort of this kind this or more can be readily accomplished. It will be a great satisfaction to every man who has taken part in it to know that he has done his full part in avoiding accidents and at the same time has earned a safety premium as a reward.
>
> Since the payments for injuries and damages are based upon a percentage of the gross earnings it stands to reason that the greater the gross earnings are the less will be the percentage paid out for account of accidents. It is, therefore, to the interest of every car man that he use due vigilance in accommodating the riding public and increasing the earnings of his car.

The safety premiums earned for the period will be distributed between Dec. 15 and 25. In case the percentage paid out for injuries and damages runs more than the 5 per cent there will, of course, be no distribution of premiums and the deficit will be marked up against the next six-month period so long as the plan is effective.

Rail-Less Operation Extended in Petersburg

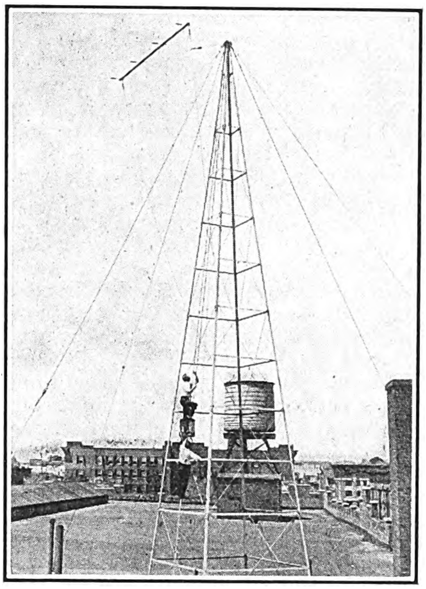
The Virginia Railway & Power Company plans to take up its line on Sycamore Street, in Petersburg, Va., and operate rail-less cars all the way through from the Walnut Hill suburb to the heart of the city, a distance of about 3½ miles. As soon as the bridge across the Appomattox River now under construction is completed, this rail-less service will be extended to Colonial Heights in the end of the city opposite Walnut Hill, adding about 1½ miles to this line of rail-less operation, for a total of 5 miles. The company commenced rail-less car operation in Petersburg on June 15, 1923, between Walnut Hill, a new and exclusive residential section, and a point down town where the rail-less cars connect with the railway system, to which passengers were transferred. The company is at present operating on a 12-minute headway. The fare on the trackless line is the same as on the railway, 6 cents cash with five tickets for 25 cents and free transfers.

Railway in New York to Broadcast from Its Own Station

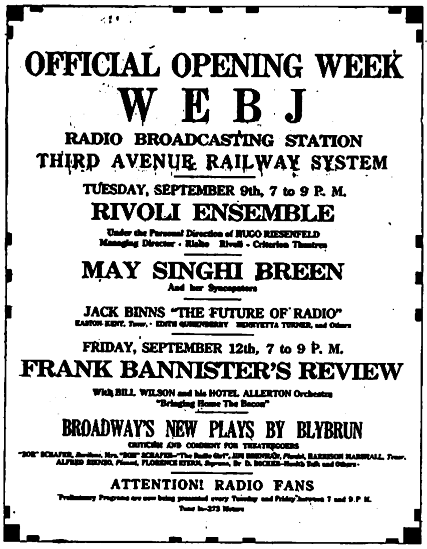
The Third Avenue Railway, New York, not only carries its patrons to and from work during the day, but also entertains them at night.

A radio broadcasting station has been erected on the roof of the company's carhouse at Third Avenue and 130th Street in that city, where, beginning Sept. 9, radio programs will be sent over the air.

The official name of the station is WEBJ. It was built entirely by the company's electrical staff under the direction of W. J. Quinn, chief engineer. Popular programs are to be broadcast every Tuesday and Friday nights on a wave length of 273 meters.



Antenna Tower on Roof of Carhouse



OFFICIAL OPENING WEEK

WEBJ

RADIO BROADCASTING STATION

THIRD AVENUE RAILWAY SYSTEM

TUESDAY, SEPTEMBER 9th, 7 to 9 P. M.

RIVOLI ENSEMBLE

Under the Personal Direction of HUGO RIESENFELD

Managing Director · Rialto Rivoli · Criterion Theatres

MAY SINGHI BREEN

And her Syncopators

JACK BINNS "THE FUTURE OF RADIO"

EASTON KENT, Tenor, · EDITH QUEENSBERRY HENRYETTA TURNER, and Others

FRIDAY, SEPTEMBER 12th, 7 to 9 P. M.

FRANK BANNISTER'S REVIEW

With BILL WILSON and his HOTEL ALLERTON Orchestra

"Bringing Home The Bacon"

BROADWAY'S NEW PLAYS BY BLYBRUN

CRITICISM AND COMMENT FOR THEATREGOERS

"BOB" SCHAFER, Baritone, Mrs. "BOB" SCHAFER—"The Radio Girl", [illegible], Pianist, HARRISON MARSHALL, Tenor, ALFRED [illegible], Pianist, FLORENCE STERN, Soprano, Dr D. BOCKER—Health Talk and Others.

ATTENTION! RADIO FANS

Preliminary Programs are now being presented every Tuesday and Friday between 7 and 9 P. M.

Tune In—273 Meters

Program for Opening Night at Railway Broadcasting Station

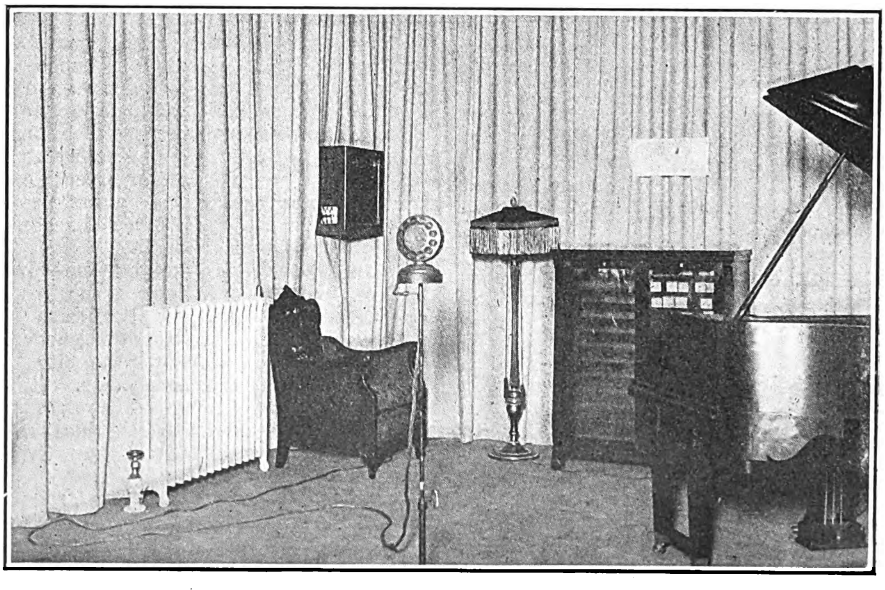
The station was under construction two months. The antenna towers rise to a height of 60 ft. above the roof. They are of the T type and the counterpoise system is used.

Garrow T. Geer, secretary of the railway company, is in charge of the radio operations. H. H. Bruno is program director and chief announcer.

While experimental programs have been sent over the air at intervals during August, the official opening occurs Tuesday night, Sept. 9, when Slaughter W. Huff, president of the Third Avenue Railway, formally introduces WEBJ to the radio public. Letters received by Mr. Geer from all parts of the East enthusiastically indorsing the experimental programs thus far given indicate that public interest has already been aroused by the plan.

The high spots of each week's program are announced by bulletins posted in the company's cars.

Talks on the electric railway industry and the problems of the Third Avenue Railway are to be interspersed on the programs at intervals to interpret the industry and the railway to the public.



Broadcasting Room of Third Avenue Railway, New York City

Chicago All Set

Surface Lines Prepared to Put Rerouting of Street Cars Into Effect on Sept. 14

Rerouting of street cars on thirty-five lines of the Chicago Surface Lines will go into effect on Sept. 14. This is fully a month in advance of the schedule made up some months ago.

The new scheme is designed to expedite the movement of all traffic and to relieve to a large extent the congestion in the Loop district. It is the most elaborate ever undertaken in this city. Both the city and the Surface Lines engineers have approved it. The cost to the railway will be $100,000.

Pamphlets containing all the information of the new routes are to be distributed well in advance of the schedule changes and a force of supervisors will be on hand at street intersections to render assistance until the public becomes familiar with the changes.

Transfer privileges will not be affected by the rerouting and transfers between cars operating on State Street and west side lines and turning back at Dearborn Street will be accepted at thoroughfares where the west side lines loop back.

The rerouting, it is predicted, will be of benefit principally in clearing up of traffic conditions on State, Clark and Wells Streets, so far as street car operation is concerned. Cars from the west side which now use State Street for looping back purposes will make the turns on Dearborn Street. State, Clark and Wells Streets will be essentially for through traffic. The changes will also do these things:

1. Eliminate 20 left-hand turns and 12 right-hand turns.
2. Increase available street space 30 per cent.
3. Reduce interference of street cars with each other at street intersections 27 per cent.

In announcing the date for putting the changes into effect, Guy A. Richardson, vice-president of the Surface Lines, said:

> It should be a matter of pride to Chicago that this city possesses the largest street car system in the world, both for miles of track in operation and number of passengers carried. It is recognized generally as one of the best equipped. Last year the total rides on the system were nearly 1,500,000,000, or considerably more than the total number of pieces of mail handled by the Chicago post office. During the last ten years there has been an increase of 1,000,000 a day in the number of riders carried.

The new schedule is being put into operation at least a month earlier than was at first intended, so that the new routes will be thoroughly established and all the kinks ironed out before the fall shopping season begins.

Negotiations at Chicago Held Up by Absence of Mayor

Chicago's plans for the municipalization of the traction lines of the city are vacationing with Mayor Dever. For weeks past each side has been awaiting "final" word from the other. Mayor Dever was confident that representatives of the Surface Lines would make a new offer which he could relay to the City Council for approval.

Four bankers representing the security holders for the Surface Lines have recently been reported in conference in an endeavor to reach a conclusion that will take into account the rights of the security holders and the desire of the Mayor that the lines shave the capital price of $162,500,000 set by ordinance. No announcement of any kind has followed these conferences.

The Mayor has stated positively on numerous occasions that the ordinance price set in 1907, which is now $162,500,000, including capital expenditures added since that time, will not be paid by the city. The representatives of the lines have stood pat upon the purchase price, although they have indicated a willingness to permit the Mayor to name a commission of engineers to revalue the lines at their present reproduction price. This offer the Mayor has refused, for that price, everyone admits, would exceed the price the lines are willing to accept.

Railway Service in Pomona Abandoned—Buses Will Operate

Permission was granted to the Pacific Electric Railway on Aug. 22 to abandon service in Pomona. This action was taken pursuant to a second and final hearing held before the California State Railroad Commission in Los Angeles, Cal., on Feb. 11, 1924. The order authorized the railway, on account of poor patronage of the local lines and continual losses in revenue, to remove its tracks and overhead equipment on Ganesha Park, West Second and Park Avenue, Holt Avenue and East First Street and Garey Avenue and Park Avenue lines. Removal of these lines was made conditional by the commission upon the filing of a certified copy of the resolution adopted by the City Council of Pomona, consenting to the relinquishment of the company's franchise affecting the lines to be abandoned.

It is contemplated that the tracks will be removed and service permanently discontinued within four weeks after the City Council acts favorably on the passage of the resolution granting the railway permission to proceed with the track removal. Passage of the necessary ordinance by the City Council will bring to an end a matter that has been under controversy for several years. The final decision of the commission clarifies considerably both the local street car transportation and street-paving problems that have been held up for some time in the city of Pomona.

Upon favorable action by the commission the city of Pomona on Aug. 20, 1924, awarded a bus franchise to the City Transit, Inc., for the purpose of serving all sections of the city of Pomona on a 5-cent fare basis. It is planned that the new bus system to supplant the abandoned car lines will be in operation not later than Sept. 15. The franchise is for a 20-year period as awarded to the City Transit, Inc., controlled by Joseph K. Hawkins, president and general manager, and W. E. Dean, secretary-treasurer.

The schedules call for 30-minute service, with more frequent service in the center section of the city. Service will be commenced with six buses, consisting of three 29-passenger, two 25-passenger city type and one 26-passenger de luxe sedan type buses, all of which will be operated on Mack chassis. It is the plan of the bus company to carry an indemnity and casualty insurance policy for $10,000.

Gasoline Motor Car Project Frowned Upon

The Red Bank & Keyport Railway, Red Bank, N. J., has been denied a franchise to run over the tracks of the defunct Jersey Central Traction Company. This is the outcome of a recent meeting held at Red Bank, where all the municipalities through which the proposed line was to run were represented and arguments were heard for and against the project. Herman Schlicting and E. Zimmerman, representing the new company, presented a petition signed by 3,000 persons. This apparently had no weight when it was shown that the Triangle Bus Company could have presented as many names attesting that it was giving satisfactory service over the route. The matter is expected to come up again.

Mr. Schlicting purchased the tracks of the Jersey Central Traction Company after that company ceased to operate and since then has devoted his time to the advancement of a plan to run gasoline cars, as outlined in the ELECTRIC RAILWAY JOURNAL for July 9, page 100. The tracks remain down in Red Bank, Keansburg, Atlantic Highlands, Port Monmouth, Belford and the intervening country.

Dispute Over Property of Line Being Dismantled

A dispute over the ownership of the old Cincinnati & Columbus Traction Company's bridge at Milford, Ohio, and several other bridges between Norwood and Hillsboro, formerly owned by the company, was brought into Hamilton County Common Pleas Court recently by Charles C. Harris, formerly manager of the Cincinnati, Milford & Loveland Traction Company.

Mr. Harris asserts that on or about Aug. 20, 1923, he purchased all of the bridges from the Joseph Joseph Brothers Company, which had previously purchased the structures, he said, from the Union Savings Bank & Trust Company, trustee of the property.

Joseph Goldberg, L. G. Van Ness, president of the Cincinnati, Georgetown & Portsmouth Traction Company, and William B. Mente, attorney, without any notice to him, Mr. Harris asserts, dynamited the Milford bridge on Aug. 8, 1924, causing it to be thrown into the river. On Mr. Harris' application, Judge Le Blond issued a temporary injunction restraining Messrs. Van Ness, Goldberg and Mente from removing any part of the bridges, from tearing them down and from interfering with his possession of them.

Messrs. Goldberg, Van Ness and Mente say that the bridges were included in their purchase of the right-of-way of the traction line.

"Payless" Officials Succeed in Alliance

The Stark Electric Railroad, operating 40 miles of track between Salem and Canton, Ohio, is believed to be one of the pioneer companies in the country with "payless" officials. With property valued close to $2,000,000, the company boasts a board of directors, a secretary and treasurer, a president and a general manager, none of whom receives pay for his services.

Two years ago Alliance business men purchased the line "for the best interests of the city." Bus and taxi business cut revenues considerably, so the board started action to secure money for rebuilding the line. With dividends practically eliminated, Secretary W. E. Davis, Treasurer S. L. Sturgeon and President M. S. Milbourne, along with the directors, agreed to serve without pay.

When Nelson H. Brown resigned recently as manager to accept a bank position in Buffalo, W. E. Davis stepped into his place, conducting the office as general manager without pay. During Mr. Brown's régime of less than a year city fares were boosted 1 cent and several other changes made to produce more profit. Through his efforts the Stark Electric linked with other electric lines in that section of the country for expanding long-distance freight shipping. The company is reported now on the road to recovery.

Weekly Pass in Bakersfield

The Bakersfield & Kern Electric Railway, operating in Bakersfield, Cal., and vicinity, with a supplementary service of three bus lines with transfer privileges, has been authorized by the Railroad Commission to install the weekly pass system. The company has been operating at a 5-cent fare.

In a decision just rendered the commission fixed a single fare, with transfer privilege, of 10 cents, authorized the sale of the weekly pass at $1 each, good for any number of rides during the seven-day period, and suggested a commutation ticket good for seven rides, with transfer privileges, at 50 cents each.

Will Replace Cars on Three Routes in Providence

Officials of the United Electric Railways, Providence, R. I., are preparing to file a petition with the Public Utilities Board asking for permission to replace trolley cars on the North Scituate and Chapachet lines and the Warren and Bristol lines with buses. The company feels that this will eliminate heavy losses sustained annually on these three lines. On the North Scituate route a loss is sustained every year of about $4,000. The Chapachet line loses $12,000, while the approximate annual loss to the company on the Warren and Bristol line is $47,000. A definite schedule will be worked out in due course of time, but it was stated that the bus lines will operate on the same schedule as the cars are now operating. The company plans to use the latest type of bus, modeled somewhat on the style of those now operating to Arctic, with a carrying capacity of 29 passengers.

News Notes

Paging the Women Again.—Utilities need women. So thinks Isabell Davie, chairman of the Women's Public Information Committee, Middle West Division, N. E. L. A., who has prepared an instructive pamphlet giving some suggestions and outlining the purposes for a women's organization. In "How Women Can Help to Promote Better Public Relations for the Utilities" the writer states that the movement to organize the women employees in the various utilities is becoming nationwide and needs the co-operation of all utility executives and the loyal participation of the women. Stress is laid on the necessity for the women becoming good speakers and for learning all there is to know about their utilities. What literature is available on the subject is mentioned in the pamphlet as well as the means of obtaining this material.

Wants Cessation of Inspection.—The Schenectady Railway, Schenectady, N. Y., has petitioned the Public Service Commission for a hearing to satisfy the commission that the present equipment of the petitioner is adequate and asking that the company be relieved from further observance of the order of the commission dated April 4, 1923, which provided that the company should procure certain additional equipment. The commission ordered the company to install six new interurban cars; three have been purchased; twelve new city cars were stipulated; ten have been put into operation. The company also states that old cars have been repaired so that on June 30 last 106 cars of all types had been overhauled, of which eighty-five are passenger cars. Before next winter the last of the cars will have been completely revamped.

Examination for Junior Engineer.—The United States Civil Service Commission, Washington, D. C., announces an examination for junior engineer on Oct. 8. It will fill vacancies in various branches of the government service at an entrance salary of $1,860 a year. Examination will be given in the optional subjects of electrical engineering and radio engineering. Full information and application blanks may be obtained from the United States Civil Service Commission.

Insurance Policies to Employees.—The Spokane United Railways, Spokane, Wash., will present its 430 employees who have been in the service six months or more with life insurance policies ranging in value from $500 to $1,000. The terms of the presentation state that after serving with the Spokane United Railways for a period of six months each employee will receive an additional policy for $500 of yearly renewable term insurance, effective July 1, 1924, the premium on which will be paid by the company. After one year's service this policy will be increased in value $100 and this yearly increase will continue until a total value of $1,000 has been reached. A secondary benefit is also provided by the company in the form of a plan whereby each employee receiving one of the insurance policies will be enabled to take out an additional policy for an amount equal to that of the policy presented by the company. This additional insurance plan will become operative only in the case that 75 per cent of the employees agree to take out this additional insurance.

Amended Proposal May Not Be Accepted.—Although the Tacoma Railway & Power Company, Tacoma, Wash., has amended its proposed new franchise so as to provide for a definite time of twenty-five years, Mayor A. V. Fawcett intimated that the new proposal will not be accepted when it reaches the Council. It is claimed that in amending the franchise the company is meeting objections raised in a month of discussion of the measure. The amended proposal specifies that the company "shall maintain the paving between the rails and for 1 ft. outside the rails and that wherever a street is paved the Tacoma Railway & Power Company shall pay to the city any increase in cost of such paving brought about by the location of car tracks."

Buses to Replace Cars in Sections of Salem.—Elimination of local railway service on parts of the Summer Street line and Seventeenth Street in Salem, Ore., and the establishment there of two buses have been proposed in an ordinance presented to the City Council by the Oregon Electric Company. The ordinance has the indorsement of a special committee of the Council and a majority of the property owners living on the streets affected. Officials of the company intend to remove the track on Summer Street and replace it with pavement. The work will be done under the direction of the municipality.

Extension Up Again.—Officials of the Sacramento Northern and the Western Pacific Railroads recently left for a tour of the country between Woodland, Cal., and Vallejo, to which point the electric line is planning to extend its tracks from Woodland. The tour gave rise to the suggestion that the Interstate Commerce Commission at Washington might permit the Western Pacific to make disposition of its securities to construct the proposed line from Woodland to Winters to Vallejo. Several months ago an announcement was made that the Western Pacific, which owns the Sacramento Northern, was taking steps to make this extension, but the matter has been under consideration by the Interstate Commerce Commission.

Opposes Bus Grant. — The license committee of the Leominster, Mass., City Council has taken under advisement a petition of John Pascarini of Lancaster to operate a bus line between Leominster and Clinton. The Worcester Consolidated Street Railway is opposing the petition on the ground that there is not sufficient business for both and claim that it should be given preference because of the taxes it pays the city.

Will Change to Fare Boxes.—Fare boxes will be placed in operation for the first time on two lines of the Scranton Railway, Scranton, Pa. The company announced the change was made as an aid to conductors in collecting fares. The company requests the co-operation of all its patrons.

Water Problem Defers Extension.—The San Diego Electric Company, San Diego, Cal., through Claus Spreckels, vice-president and general manager, has announced that the $1,000,000 extension to La Mesa will be deferred until the city's water problem is solved. The extension to La Mesa from the present terminus on University Avenue at East San Diego, out through Chollas Valley was assured some few years ago, in conference with Mr. Spreckles pending the completion of the Mission Beach line.

Fares Will Be Lowered.—Reduction in fares on all interurban lines entering Indianapolis, Ind., will be in effect during the Second Indianapolis Industrial Exposition, Oct. 4-11, under auspices of the Indianapolis Chamber of Commerce. This announcement was made recently by O. B. Iles, chairman of the executive committee. The reduction is on a basis of a fare and one-half for round-trip tickets. No certificates or validation of tickets will be required.

Bus Substituted.—Trolley service between Westboro, Mass., and Marlboro, Mass., on the Worcester Consolidated Street Railway, has been discontinued and a bus line has been put in operation by Terry F. Carlstrom.

Opposed to Higher Fare.—It is stated that the people of the Fairmount district of Eugene, Ore., will fight the 7-cent fare proposed by the Oregon Electric Company. A hearing for the fare increase has been set by the Public Service Commission to be held at Salem, and the first move of the Fairmount residents will be to have the hearing changed to Eugene, in order that a larger delegation may be in attendance. The fare at present is 6 cents. The local City Council has indorsed the increase.

Rendering Another Service. — The Connecticut Company, New Haven, Conn., by special arrangement with the Bridgeport Telegram Publishing Company, has installed on several of its Bridgeport railway lines automatic devices for delivering morning newspapers to its patrons.

Suit Dismissed. — A decree was handed down recently by Federal Judge Jeramiah Neterer, dismissing the suit of the Puget Sound Power & Light Company against the city of Seattle. This suit was brought on May 24 to make taxes paid for 1919 a lien on the city's street railway property, as an outgrowth of the seizure of the company's property and payment of the taxes in question. The company's suit against County Treasurer W. W. Shields and Sheriff Matt Starwich to restrain collection of the tax was dismissed on June 13 and the suit against the city filed instead. In the federal court decree the court dismisses the complaint "for want of equity and with costs," but without prejudice to the plaintiff's right to pursue further legal process. The company, after seizure of its property by the sheriff, paid under protest all the railway taxes for 1919, but claims the city should pay three-fourths of the amount, as it took over the railway lines March 31, 1919.

Will Use Disks for Fares.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., has ordered the coinage of 8,000,000 metal tokens, which will replace the present pasteboard tickets for trolley fares. The token is of white metal slightly smaller than a dime. When the tokens are adopted every conductor will start on a run with $2 in tokens with an extra barrel added to the cash container he wears fastened to his belt. They are designed so that if the proposed 8-cent flat fare is refused the company can sell four tokens instead of four strip tickets, as at present, for 25 cents. The disk will not be put into use until the commission has acted on the company's application, which is now pending, for an advance in fare.

Wants Higher Fare.—The Bangor Railway & Electric Company, Bangor, Me., has petitioned the Public Utilities Commission for permission to advance its single fares from 7 cents to 10 cents. A hearing is scheduled on the petition at Bangor on Sept. 5. The company gives as its reason for the advanced fares the fact that the income is insufficient to meet expenses owing to the dropping off of patronage and the increased demands for labor and taxes. The decrease in revenue in June of the current year was $7,000 and for the year 1923 was $3,400, while taxes and labor increased $13,000 in 1923.

De Luxe Routes for Trenton Company.—Rankin Johnson, president of the Central Transportation Company, a subsidiary of the Trenton & Mercer County Traction Corporation, plans to install four new long-distance bus routes. The new lines will run from Trenton to Lakewood and Atlantic City, to Delaware Water Gap, to Newark and to Lake Hopatkong, N. J. The company is now operating to Asbury Park, a distance of 50 miles. It has fourteen buses in service.

May Electrify Line.—It is reported that the Alabama Power Company, Birmingham, Ala., may secure the Ensley Southern Railroad and electrify it to Birmingport. Judge Walker in Chancery Court recently granted permission to tear up and salvage that portion of the line between Birmingport and Maxine, Ala., following a petition by Receiver Aldridge of the bankrupt road. Reports from Birmingham state that officials of the traction company would be interested in saving the territory through which the steam line operated from complete abandonment.

Trackless Cars Operating in Selma.—Trackless cars are now in operation in Selma, Ala., replacing the old electric railway cars, which have been abandoned. The new trackless cars are of the latest design. Each car has a seating capacity of 16 people. The cash fare is ten cents, while 16 tickets are sold for $1.

Council Agrees to Bus Franchise.—The proposed bus line to be operated by the Portland Electric Power Company, Portland, Ore., on East Thirty-ninth Street, will be routed as far south as Gladstone Avenue, according to an agreement between the company and members of the City Council. With this assurance from the railway, the Council agreed to vote for the franchise. The fare on the buses will be 8 cents, with transfer privileges to the railway lines. The buses will be the pay-as-you-enter type. Five cars, each with a capacity of 29 persons, will be used at first.

Learning About Electricity. — The Washington Committee on Public Utility Information is getting out a little pamphlet "Lessons in Electricity," written by E. H. Thomas, "for the free use of schools, editors and others interested." The first lesson has appeared, which tells something about what electricity is and the connections needed for utilizing it. Something about current is also explained, but more on this subject is promised.

Improvements in Baton Rouge.—The Baton Rouge Electric Company, Baton Rouge, La., extended its transportation service to North Baton Rouge early in August. The completion of this extention marks an epoch in the development of the city and means that there will be within a few blocks of the railway, enough home sites to take care of the normal growth of the city for some years to come. A recent survey made by the company revealed the fact that with the new line in operation 2,300 home sites are within easy distance of one of the three car lines. The company believes it necessary to spend approximately $337,000 during the year on the North Baton Rouge extension, rebuilding and paving between the tracks on east Boulevard and belt lines. New cars will be purchased and a new carhouse and service building are in prospect. When the extension is fully completed and all charges have been paid, it will probably represent an investment of about $162,000.

Will Hear Case of Preference Men.—On behalf of 60 railway men of Seattle, Wash., a petition has been filed in the Superior Court by Attorney Ernest J. Hover attacking the city ordinance giving former service men preference over all others in civil service ratings. Judge A. W. Frater signed an ordinance requiring the Civil Service Commission and D. W. Henderson, superintendent of the Seattle Municipal Railway, to show cause on Sept. 19 why the 60 trainmen should not be rated according to the grades won in an examination. Regardless of grades, 66 former service men have been placed ahead of Hover's 60 clients, most of whom were employed by the railway last winter when there were no eligibles on the civil service list. They took the examinations in May. Many of them are threatened with loss of their positions if the former service men are given preference. Pending the hearing, Judge Frater also restrained Superintendent Henderson from discharging the plaintiffs.

Foreign News

Paris Traffic Increases

More than 11 per Cent Gain in Passengers Carried and Gross Revenue in Calendar Year 1923

At the annual meeting the Société des Transports en Commun de la Région Parisienne, held on June 27, 1924, results of the calendar year 1923 were made public. The company operates all the electric railway cars and public buses in Paris and also has one or two small steam suburban lines and a line of small passenger boats on the River Seine. The total number of passengers carried in 1923 was 1,024,717,219, or an increase of 11.16 per cent over 1922. The receipts from passengers were 330,130,637 francs ($18,157,185), a percentage increase (in francs) of 11.11 over that of the previous year. In the exchange from francs to dollars in this article the value of the franc is taken as 5½ cents. There was an increase in the expenses of about 11.5 per cent, and the deficit from operation, as shown in the operating report, was 644,230 francs, as compared with 689,446 francs in 1922. Under its franchise the company does not suffer this loss. It is compensated whether or not the system as a whole is profitable.

The gross and net earnings of the company as a corporation are shown in the accompanying profit and loss account, and the table headed "Disposition of Credit Balance" shows that the company made a return of 8.85 per cent to its stockholders during 1923. A fourth table shows the division of the traffic between tramways, omnibuses and boats. As will be noted, this traffic is divided, approximately, electric tramways, 66.5 per cent, omnibuses 32.9 per cent, steam tramways and boats together, 0.6 per cent.

The company had, on Dec. 31, 1923, 1,874 electric motor cars, 888 trail cars, 1,264 four-wheel buses, 51 six-wheel buses, 56 motor boats and 19 steam locomotives, and it was building in its shops 468 motor cars and 100 trail cars.

FINANCES OF PARIS LINES FOR 1923
OPERATING REPORT

	Francs
Passenger operating revenues	330,130,637
Other operating revenues	3,571,898
Miscellaneous revenue	5,170,429
Total revenue	338,872,965
Operating expenses	339,517,195
Deficit from operation	644,230
Amounts payable to sinking fund and special war fund guaranteed by the Department of the Seine to the eight constituent companies, etc	39,250,000
Charges payable by the department on new capital	13,837,451
Total fixed charges payable by the department	53,087,451
Remuneration to the company under the franchise	9,748,424
Total of these two items	62,835,875
Deficit from operation (as given above)	644,230
Total deficit for year	63,480,105

PROFIT AND LOSS ACCOUNT OF COMPANY

	Francs
Receipts of the company (fixed by Article 23 of the franchise and made up of interest on guarantee fund required, premiums, etc)	9,748,424
Miscellaneous receipts and balance from 1922	192,958
	9,941,382
Expenses of company (fixed by Article 23 of franchise and including amortization of guarantee fund)	3,436,667
Amounts payable to department of the Seine	488,615
Balance for remuneration of capital	6,016,099
	9,941,382

DISPOSITION OF CREDIT BALANCE OF COMPANY

	Francs
5 per cent to legal reserve	324,781
6 per cent interest on capital	3,600,000
Bonus to board of directors	367,813
Extra dividend of 2.85 per cent on capital stock	1,710,000
Carried over to next year	13,504
Total	6,016,099

It will be seen that the remuneration to each share of stock was 8.85 per cent.

OPERATING STATISTICS, PARIS TRAMWAY, OMNIBUS AND BOAT SYSTEM FOR 1922 AND 1923

	Vehicle-Miles or Boat-Miles		Passengers Carried		Receipts in Cents per Vehicle-Mile
	1922	1923	1922	1923	1923
Tramways (electric)	56,715,777	60,422,110	622,405,302	681,068,216	18.6
Tramways (steam)	669,707	785,996	1,780,563	1,210,344	11.0
Total for tramways	57,385,484	61,208,106	624,185,865	682,278,560	18.5
Omnibuses, regular service	26,941,282	31,419,267	289,937,863	337,198,609	21.3
Special night service	63,794	68,144	206,579	305,229	37.0
Special theater service	1,267	*	1,705	*	*
Total for omnibuses	27,006,344	31,419,267	290,146,147	337,503,838	21.3
Boats	356,283	418,423	3,391,311	4,934,821	32.3
Grand total	84,748,112	93,045,796	917,723,323	1,024,717,219	19.7

* Not separately recorded in 1923.

New London Law to Govern Street Traffic

Under the terms of the Government-promoted London Street Traffic Bill, which passed Parliament early in August, the Minister of Transport is given authority to issue orders to control, regulate and facilitate street traffic. He will control the number of buses licensed, the routes, number of buses on different routes, etc. His orders become law unless disapproved by Parliament within a limited time. He will be assisted by an Advisory Committee composed of representatives of London local authorities and traffic interests concerned.

This law does not affect tramcars, Parliament having decided that the form of control adopted for other vehicles would be unjust for the tramways, as they are constructed and operated under statutory authority and cannot deviate from their routes.

The Act is temporary, but can be continued from year to year.

There is considerable difference of opinion among London politicians whether the Act will do much good or not, but all are agreed that some step is urgently needed to mitigate the chaotic congestion of London street traffic.

Seine Boats to Be Laid Up

When the Transports en Commun came into being it took over the fly-boats on the Seine as it flows through Paris. In the old days these fast little boats supplemented the then slower services on land, following much the same route. Today with improved services and higher speed of trams and buses little use is made of the boats save during the summer months. The service does not pay a profit, or would not if there was any considerable capital investment still to be taken care of in the sixty-odd boats capable of service.

It is probable that the plant will not be renewed when it actually wears out, and it is proposed to suspend the service entirely during four months of late autumn and winter. The municipal commission is of the opinion that they should be abandoned altogether, describing the service is inconvenient, dangerous and costly of operation and upkeep.

Unquestionably additional motor bus lines will be required to carry some of the traffic.

Signals Increase Track Capacity.—With a view to coping with increasing traffic on the Central London Railway, the automatic signal system is being improved so that it will permit a service of forty trains per hour, as against the present maximum of thirty. The carrying capacity of the railway will be increased 20,000 passengers daily.

Sheffield Will Try Buses.—The corporation of the city of Sheffield, England, plans to substitute buses for tramcars on one route where the tracks are worn out. It is estimated that renewal of the track and extension of the line will cost £25,000, while inauguration of buses will cost only £11,800, £11,300 for purchase of seven buses and £1,300 for dismantling the track and repairing the roadway with clinker asphalt. Residents along the route protested against the change, although more frequent service will be given with the buses and fares will remain the same. It is estimated that bus operation will be 3d. a mile less than the tramcar, largely owing to saving on capital expenditures. The city is now operating a large number of buses as an auxiliary to its tramway system. The application of a private company for a permit to operate 72 buses in the city was recently refused.

Financial and Corporate

Advance in Montreal Surplus

Sixth Report Shows Surplus of $548,695 Compared with $347,553 in 1923 and $187,947 in 1922

The sixth annual report of the Montreal Tramways Commission to the city of Montreal, Que., Canada, for the period of July 1, 1923, to June 30, 1924, shows that the gross receipts totaled $12,463,799. Of this amount passenger receipts were $12,131,181, collected from 200,035,062 passengers. A year ago the passenger receipts were $11,752,441 and receipts from all other sources brought the total for that year up to $12,056,355. The allowance made to the company for operating expenses, fixed at 26.47 per car-mile for motor cars and 19.22 cents for trailers, at a density of 8.5, totaled $6,257,443. But the actual operating expense was only $6,246,890, leaving a difference between the allowance and actual expenditure of $10,553. A year ago the allowance granted was $5,866,155 and the actual expenses and taxes were $6,099,993, which was $233,837 in excess of the allowance.

The company this year having kept its expenditures within the allowances, it was entitled to an operating profit of $48,555, being one-eighth of 1 per cent of the average value of the capital during the year, $38,843,816.

The total of the maintenance and renewals fund was fixed by the commission at $2,719,020. The actual expense for maintenance and renewal was $2,202,788. Considering the value of the properties and material discarded, scrapped and deducted from the capital value during the fiscal year, along with the direct charges, the actual expenditure was $2,232,420. This left a credit to the maintenance and renewal fund of $486,599, but deducting $377,466 as the value of properties and material discarded, the amount of the reserve at the end of the year was $109,133. Last year the maintenance and renewal fund was fixed by the commission at $2,740,778 and the actual expense was $2,618,874, leaving a reserve to the credit of the maintenance account of $121,903.

STATEMENT OF EARNINGS OF MONTREAL TRAMWAYS

Year Ended June 30	1924	1923
Gross receipts	$12,463,799	$12,056,355
Operating expenses and taxes	6,246,890	6,099,993
Operating profit	48,554	48,304
Maintenance and renewals fund	2,579,779	2,492,792
Interest on capital value	2,177,177	2,177,177
Interest on additions	175,918	164,973
Interest on working capital	5,351	2,530
Financing expenses	181,431	181,431
City's rental	500,000	500,000
Contingent reserve fund	....	41,597
	$11,915,103	$11,708,802
Surplus	$548,695	$347,553

The total increase in car-miles over the preceding year was 987,366 or 4.42 per cent. During the year the company paid to the city of Montreal $336,761 for snow removal, $302,618 for taxes, permits, licenses, etc., and $1,048,695 on account of the amount accumulated since Feb. 9, 1918, of the $500,000 yearly city rentals, leaving a total of $1,688,075 or 13.54 per cent of the gross receipts.

The report discusses the matter of unredeemed tickets, stating that at the demand of the commission the city of Montreal and the Tramways Company discussed the question of the balance of unredeemed tickets, but no agreement was reached. On Jan. 11, 1924, the commission ordered the company to create a reserve of $500,000 out of the difference between the tickets sold and the tickets collected. This decision was appealed from by the company and the matter is now before the Quebec Public Service Commission. Confirmation of this judgment would add a sum of about $180,000 to the gross receipts for the current year.

The accompanying table shows the statement of operations for the year ended 1923 and 1924. The surplus of this year has been paid in whole to the city of Montreal on account of the city rentals.

Financing of Arkansas Light & Power Company Arranged

Details of the expansion of the Arkansas Light & Power Company, Pine Bluff, were revealed recently when officials of the corporation filed a petition with the Arkansas Railroad Commission for permission to sell gold bonds, and filed an amendment to the articles of incorporation to permit an increase in the number of shares of capital stock in the corporation.

The petition to the Railroad Commission has been granted. Under the commission order, first lien and refunding mortgage sinking fund gold bonds, dated March 1, 1924, and maturing March 1, 1954, bearing 6 per cent interest, will be issued for $2,500,000. The Chase National Bank, New York, is financing the bond issue.

According to the amendment to the articles of incorporation the shares of stock in the corporation will be increased from 80,000 to 180,000 without nominal or par value. One hundred thousand shares will be common stock.

The petition to the Railroad Commission provides for the sale of 10,000 shares of new preferred stock immediately.

This bond issue will be used for two purposes. outstanding obligations, totaling $1,395,700, will be taken up and the remaining $1,104,300, will be used for improvements, extensions, and new connections.

The Arkansas Light & Power Company controls the Pine Bluff Company; the Jackson Public Service Company, Jackson, Wis., and the Vicksburg Light & Traction Company, Vicksburg, Miss.

Municipal Railway Goes Behind

Expansion of San Francisco System and Wage Increases Put Railway Behind $317,929

For the first time in its history the San Francisco Municipal Railway shows a cash deficit for the fiscal year 1923-24 just ended. This has been disclosed in a study just completed by the San Francisco Bureau of Governmental Research made from the monthly reports of the Board of Public Works.

The actual deficit is $13,179, although the theoretical deficit arrived at by the Bureau of Governmental Research is $317,929. The study also shows that the "operating ratio" has increased from 77.7 per cent in 1923 to 79.6 per cent during the past year.

The Bureau of Governmental Research recalls that during the past year the legislative body of the city, the Board of Supervisors, ordered through service on the Taraval line, over the objections of the City Engineer and the superintendent of the municipal lines, both of whom predicted heavy operating losses. At about the same time a wage increase for the platform men was approved by the Mayor and granted by the Board of Works.

The increase in passenger revenue —$179,302, as against $109,000 for the previous year—has been completely overcome by an increase of $207,000 in operating expenses. The profit to be expected by normal increase in traffic over existing lines, with little or no increase in service, has been wiped out by increased operating expenses.

The passenger revenue was $3,173,131, an increase, as stated, of $179,302; including miscellaneous revenues the operating revenue totaled $3,198,874. Operating expenses totaled $2,547,754, an increase of $207,388 over the preceding year. Every item of operating expense shows an increase except "equipment," which is made up principally of operating expenses on cars and their electrical equipment. The largest increase is $151,505 for "conducting transportation," which is made up almost entirely of conductors' and motormen's wages.

FUND EXPLAINED

The net amount set aside in the so-called depreciation fund was $311,845, a slight increase over the preceding year. The term "depreciation reserve" for this fund is a misnomer. Under the supervisorial policy of financing extensions it has been and is being appropriated and used for extensions, additions, betterments and other purposes as though it were a "surplus fund." The appropriations already made and the construction and equipment predicated against this fund exceed by about $500,000 the balance of $1,145,000 still remaining in the fund.

Income received as interest on securities in which depreciation fund balances are invested is credited to the Municipal Railway fund and not to the depreciation reserve. It is, therefore, taken account of as non-operating income. This revenue amounted to $43,-

758, a decrease from similar revenue of the preceding year. It is explained that it was this source of income for the preceding fiscal year 1922-23 that prevented an actual cash deficit in the operation of the system for the year. It should properly be credited to the depreciation reserve where it is earned. This would tend to build up in small measure the depletion and diversion of this fund from the purpose for which it is intended.

NON-OPERATING INCOME

The statement shows non-operating income in the form of a compensation insurance fund dividend for the fiscal year 1922-23, but none for the fiscal year just closed. The city carries its own compensation insurance, creating a reserve fund for the purpose by payments out of railway revenues, at the same rate as though this insurance were carried with the state insurance fund. The practice has been to declare a dividend at the time when a dividend is declared and paid by the state fund and at the same rate.

Interest on and redemption of Municipal Railway bonds are carried out of revenues. These debt charges were $396,212 for the year. With their payment an actual cash deficit of $13,179 is shown.

The so-called "charter comparison charges," estimated by the bureau as approximately $304,750 are not paid by the system. They represent expenses, principally state and municipal franchise and gross revenue taxes, that the system would have to pay were it privately owned and operated. Under the charter the city is required to show these in its accounts. If the Municipal Railway system had to pay these charges such payments would increase the actual cash deficit to a total of $317,929.

TOO OPTIMISTIC

It is explained that, on the other hand, under the usual financial practice of privately-owned systems, the debt would not be retired and thus the item of $200,000 actually paid from Municipal revenues for the redemption of debt could be considered as an offset to these taxation charges which it does not pay. This would reduce the theoretical deficit to approximately $218,000 for the year.

In commenting on the results one of the San Francisco papers said that the most encouraging period for the Municipal Railway was its highly successful beginning when it made large profits from traffic from developed territories and competitive short hauls, and served as a development factor in building up new areas and creating new wealth and new traffic. This authority said that the initial success of the road, which led to the fallacious belief that it is a "gold mine" that could be tapped, will probably prove to be its greatest handicap.

Ten-Year Comparison of Connecticut Roads

Despite a large increase in population in Connecticut in the last decade and increased fares to users of trolleys, net revenues do not disclose gains that would appear to be commensurate with the efforts which the railways have made to furnish adequate service. This is attributed to the more general ownership and operation of the private automobile.

Capitalization of the railways has decreased by approximately $12,000,000 in the ten-year period. The dividends paid have slumped greatly. The notable exception in this is the Bristol & Plainville Tramway, which increased its dividend disbursements from $30,000 in 1913 to $90,750 in 1923. This company's assets grew from nearly $1,000,000 to almost $2,500,000. Assets of the companies increased only slightly in ten years. A striking contrast to the general trend with respect to earnings is presented, however, in the case of the Bristol & Plainville Tramway. That company has maintained its fare charge at 5 cents for the entire period and for the ten years its passenger returns have almost doubled. Only three companies paid dividends in 1923.

PASSENGER REVENUES OF ELECTRIC RAILWAYS IN CONNECTICUT

	1913	1923
Bristol & Plainville......	$99,449	$185,438
Connecticut Company...	7,904,805	13,860,912
Danbury & Bethel.......	139,444	167,950
Groton & Stonington.....	....	170,659
Hartford & Springfield...	215,365	351,323
New London Street Ry...	48,026	....
New York & Stamford....	364,023	519,951
Norwich & Westerly.....	225,991	....
Rhode Island Company..	4,901,335	....
Shore Line Electric Ry....	281,133	89,970
So. Manchester Elec. Ry..	....	....
Waterbury & Milldale....	....	91,071
Lordship Park..........	....	10,241
New York, New Haven & Harford, West Thompson Line............	....	10,665
	$14,178,571	$15,458,180

CORPORATE FACTS OF ELECTRIC RAILWAYS OPERATING IN CONNECTICUT

	Capitalization		Dividends		Assets	
	1913	1923	1913	1923	1913	1923
Bristol & Plainville........	$375,000	$825,000	$30,000	$90,750	$978,000	$2,406,352
Connecticut Ry. & Lt. Co..	17,110,100	17,120,100	684,804	770,404	43,203,570	33,404,980
Connecticut Company.....	40,000,000	40,000,000	150,000	....	48,147,660	60,603,979
Danbury & Bethel........	620,000	320,000	....	....	842,640	1,416,537
Hartford & Springfield.....	570,000	785,000	5,700	....	1,840,641	1,945,103
New London St. Ry........	80,000	....	....	......	771,882	....
New York & Stamford.....	500,000	500,000	....	....	2,114,174	2,180,574
Norwich & Westerly......	1,100,000	....	....	....	2,388,189	....
Providence & Danielson...	1,000,000	....	10,000	....	1,625,023	....
Rhode Island Company....	9,865,500	....	581,130	....	14,987,023	....
Shore Line Electric Ry.....	1,000,000	1,000,000	....	....	3,292,868	7,387,737
West Shore Railway.......	80,000	80,000	4,000	4,000	217,799	218,107
Waterbury & Milldale.....	....	103,900	....	....	....	413,566
Groton & Stonington......	685,000	481,000	....	....	....	1,021,301
Lordship Park............	....	....	....	....	....	73,975
	$73,025,600	$61,215,000	$1,465,634	$865,154	$110,634,456	$110,072,211

Revenue Passengers Decrease in Washington

According to figures of the Public Utilities Commission experts, the Washington Railway & Electric Company and the Capital Traction Company of Washington, D. C., lost almost 5,000,000 revenue passengers during the first six months of the current year compared with the corresponding period of 1923. The Capital Traction Company suffered the larger financial loss. It carried 2,433,967 fewer passengers than during the first six months of last year. The Washington Railway & Electric Company carried 2,124,707 fewer passengers than during the first six months of 1923. Despite its large loss in the total number of passengers carried, the Capital Traction Company, according to the commission's accounts, earned a return of 7.23 per cent on its valuation. The Washington Railway & Electric Company's return was 4.40 per cent, a reduction of 0.65 under the first six-month period of 1923.

Brooklyn Reorganization Plan Regarded as Model

According to the *Wall Street Journal* the nature of the reorganization plan under which the Brooklyn-Manhattan Transit Corporation succeeded the Brooklyn Rapid Transit Company, with the success which attended its operation, has attracted wide attention among students of corporate management and reorganizations. Requests for copies of the plan have been received from colleges and universities in various parts of this country and one from the University of Oxford, England, for purposes of study. *The Wall Street Journal* says that in the opinion of many the plan will serve as a model in important reorganizations in the future. It will be recalled that features of leaving undisturbed certain underlying issues, reinstating others and the provision for raising new funds among stockholders were placed in operation with record dispatch and with entire satisfaction to all parties participating in the reorganization.

Under the plan the new company secured $26,000,000 new funds which, in addition to providing for cash requirements of the reorganization, provided $5,000,000 for the immediate requirements of the rapid transit lines. Probably the most significant feature of the reorganization, however, from the point of view of future stability, was the authorization of a prior lien mortgage enabling the company to finance future capital requirements.

Recent income statements have revealed the earning power of the property, and the inauguration of preferred dividends three months ago attracted attention of investors and brought the common stock under consideration as a potential dividend payer. Particularly large volume of trading in new 6 per cent bonds, secured by practically all the rapid transit and power house properties of the system, caused an advance in market prices from a low this year of 72¾ to a present level around 79. Estimated net earnings in excess of

$4,000,000 for the year indicates a power to earn interest charges on $92,698,000 Rapid Transit security 6s approximately 1.6 times. Bonds are entitled to the benefits of a cumulative sinking fund of ⅔ per cent per annum.

Current market prices and range in 1924 and 1923 for new 6 per cent bonds, preferred and common stocks follow:

	Current	1924	1923
Rapid Transit 6s of 1968	79¼	79½-72¾	74⅝-65⅛
Preferred	68	70¼-48¾	49⅞-34½
Common	25¼	29½-13½	14½- 9¼

Miami Lease Settled

The Miami Street Railway, after much consideration, has been leased to the Miami Beach Railway for a period of thirty years. The lease provided for the continuation of the 5-cent fare and the new company will build one substation and if necessary others. The extension of the several tracks has been completed and within a short time the company will be running cars over these lines. From July 1, 1924, the company will pay the city $12, this being the contract in force up to that time. From June 30, 1925, to Dec. 31, 1925 the company will pay the city $1,250. For the year 1925 the company will pay the city $2,500. For the year 1927 the company will pay the city $3,500. For 1928, $4,500, for 1929, $5,500. Payments to be made after that date will be made by agreement or arbitration. These settlements are to be made for each five-year period. The Miami properties are under control of the American Power & Light Company.

Bright Outlook for Street Railway Properties in Canada

According to the *Financial Post* of Toronto, Canada, railway operation in the Dominion of Canada is getting back to a normal status and systems that went behind in the war-time stress are now earning their interest charges and dividends. Although complete figures for 1923 are not yet available, the improvement is noted in the contrast between the year 1921, when the net operating revenues amounted to $8,500,000, and in 1922, when they were $5,000,000 greater.

The *Post* says that many Canadian street railway systems have passed from private ownership into the hands of the public, but that the tendency has practically ceased. Rather is it inclined to think the movement in the future will be in the other direction, with publicly owned street railways gradually sold to syndicates of capitalists. Not only is this movement true of the railway properties but public ownership of every utility is subsiding in Canada.

By the use of a diagram the *Post* shows the growth of the railways in the number of passengers carried, number of miles operated and gross earnings. The number of miles operated in 1902 was 700; in 1912, 1,250; in 1922, 1,725. In 1902 fares totaled 125,000,000; in 1912, 450,000,000; and in 1922, 740,000,000. The gross earnings in 1902 were $6,000,000; in 1912, $13,000,000; in 1922, $49,600,000.

$245,884,653 of Securities Were Approved in California in Year

During the twelve months ended June 30, 1924, the California Railroad Commission passed upon applications involving the issue of $245,884,653 of stock, bonds, notes and other evidences of indebtedness by California utility corporations. The commission authorized during this period $243,869,746 of securities and dismissed requests involving $2,014,906. There were pending before the commission on June 30, 1924, applications for the issuance of $13,874,250 of securities.

During the fiscal year ended June 30, 1923, $151,045,555 in applications for the issuance of public utility securities were passed upon by the commission, of which $144,860,030 were authorized.

The grand total of securities authorized by the commission since it took over this duty in March, 1912, is $1,747,149,641. Of this amount $1,015,901,766 was for extensions, additions and betterments, $287,908,065 was for refunding of obligations, $137,136,592 was for collateral, $295,381,551 was for reorganization and $10,821,665 was for miscellaneous purposes.

Of the securities authorized for the fiscal year ended June 30, 1924, 79.11 per cent was for additions and betterments, 3.71 for refunding, 4.76 for collateral and 12.42 per cent for reorganization purposes. The amounts were, respectively, $192,920,725 for additions and betterments, $9,050,528 for refunding, $11,599,000 for collateral and $30,299,492 for reorganization and readjustment purposes.

A table showing classification of securities authorized during the last two fiscal years follows:

Class	Year ended June 30, 1924	Year ended June 30, 1923
Steam railroad .	$5,500,800	$13,959,100
Elec. railways ..	42,059,092	475,000
Gas and electric companies	124,008,650	95,935,157
Water companies	12,318,910	24,494,163
Telephone and telegraph companies	55,952,250	935,495
Warehousemen ..	279,000	5,714,010
Carriers by water	1,977,900	1,144,000
Automotive companies	1,773,143	2,203,105
Totals	$243,869,746	$144,860,030

Validity of Kansas City Bonds Upheld

In an opinion of Judge Kimbrough Stone of the Federal Court it is held that the $28,000,000 in first mortgage bonds of the Kansas City Railways are valid. Judge Stone said:

> I have concluded that the claim of the stockholders is not well taken, that the bonds issued under the first mortgage and the first mortgage are void. In my opinion the stockholders are estopped to make this claim.
>
> I have not had time, because of other pressing matters, to determine the Armour and second mortgage claims, and therefore, will not make an order in the stockholders' matters until I can do so in the other matter. I feel sure now that this will not be until some time in September.

The contention of stockholders and also of the attorney for personal damage claimants was that the first mortgage bonds were invalid because the company's bond issue exceeded its issue of capital stock, contrary to the laws of Missouri.

Milwaukee Northern Has 900 New Owners

During the past ten weeks the Milwaukee Northern Railway, Milwaukee, Wis., operating the fast electric passenger and express line between Milwaukee and Sheboygan, has gained more than 700 new preferred share owners, most of them regular or occasional customers of the road. When the last of the preferred shares now being offered direct to the public have been sold, the company will have gained more than 900 new home shareholders.

It was on June 18 that the company placed $200,000 of its 7 per cent cumulative preferred shares on sale, direct to its customers and other home investors, through the securities department that serves the Milwaukee Electric Railway & Light Company and its associated utilities. That issue was bought up quickly. There was a demand for more. So it was decided to let the securities department offer the remaining $400,000 of the company's preferred shares in the same way, in order to get as many customer owners as possible. Up to Aug. 18, 378 men and 283 women had purchased $450,000 of the $600,000 total of the company's preferred shares. It is expected that the last of the shares will be sold by Sept. 15.

An advertisement published recently in the papers in the territory which the road serves contained among other things these facts about the road and the accompanying recommendation of the shares:

> Milwaukee Northern has paid preferred dividends regularly since 1911. It has given good service. The volume of its business has grown steadily year after year with the growth of population and wealth in the rich territory it serves. Since the Milwaukee Electric Railway & Light Company bought the road in July, 1922, its service has been increased, speeded up and made even more attractive.
>
> The price of each share is $100, payable all cash or $5 down and $5 a month per share. Shares paid for in full draw 7 per cent dividends from the day you buy them. Seven per cent interest is allowed on monthly payments, credited on the last one. Either way, buyers get 7 per cent on every dollar invested, from the start. Original buyers, in case of need, can have the shares resold through the securities department, on short notice, at $100 each, less $1 a share resale charge. Cash dividends of $1.75 per share are paid January 1, April 1, July and October 1, each year, by checks mailed to shareholders. The shares, while they last, will be on sale at the securities department, and at the Milwaukee Northern's local offices in Sheboygan, Port Washington and Cedarburg.
>
> We recommend these shares as a safe investment for idle money, and as a safe way to get 7 per cent interest on current monthly savings. You are invited, if interested, to call, or write, or telephone and let us send a circular or a salesman to explain these investments. Mail orders will be filled by registered letter.

Income Bond Interest Payment Declared.—The Third Avenue Railway, New York, has declared an interest payment of 2½ per cent on the adjustment mortgage fifty-year 5 per cent income gold bonds, payable on Oct. 1, 1924, this being approximately the amount earned for the six-month period ended June 30, 1924.

Financial Magazine Discusses Tractions.—The *Magazine of Wall Street* for Aug. 16, 1924, has an article of more than two pages entitled "Are Electric Railways on the Road to Prosperity?" The article quotes a number of salient facts based on recent statistics as published in this paper and elsewhere and concludes that in general electric railway securities are worthy of consideration by investors. This is particularly true of the rapid transit systems, the surface lines in large cities and the large interurban railways.

Lines Discontinued.—The Worcester Consolidated Street Railway, Worcester, Mass., on Sept. 6 planned to discontinue the Worcester and Spencer, Clinton and Hudson, Grafton state hospital to Marlboro center and North Grafton post office to Grafton lines. The action is another effort to decrease expenses, jitney competition having recently reduced the revenue so that these lines are not paying propositions. The company has been curtailing service for the past few months when an award of 10 per cent per hour increase in the wages of 1,200 employees was granted by a board of arbitration. Several other suburban lines deemed unprofitable have been discontinued and many suburban and city cars have been converted into one man cars.

Seeks Partial Abandonment in Seneca Falls.—The Geneva, Seneca Falls & Auburn Railroad made application on Aug. 28 to the Public Service Commission for approval of a declaration of abandonment of a portion of its route on Stevenson Street in the village of Seneca Falls. The road operates from Geneva, N. Y., to Waterloo, Seneca Falls and Cayuga Lake Park. The directors of the company on April 18, 1923, adopted a declaration of abandonment. The petition merely states that the route sought to be abandoned is no longer necessary for the successful operation of the road and the convenience of the public.

Suspension of Railway Service Feared.—J. M. Scott, assistant passenger traffic manager of the Southern Pacific System, has announced that ten cars will be withdrawn from operation in the Willamette Valley in Oregon. This curtailment of service, together with the abandonment of about half of the electric train service of the "Hill Lines," presages a complete cessation of interurban electric service in the Willamette Valley. A canvass of the valley was taken and notice was given of the likelihood of railway suspension unless the public gave better support to the railway. It was expected that with the increase in population traffic would increase, but the apparent preference of the people for the bus and the private automobile resulted in a steady decrease in traffic.

$77,859 Deficit in St. Louis in July.—The income statement of the United Railways, St. Louis, Mo., for July shows a deficit in the net income of $77,859, compared with a surplus of $34,753 in July, 1923. The gross operating revenue for July, 1924, was $1,540,305 and the operating expenses $1,262,679. This left a surplus of $277,626, compared with a surplus of $421,505 in July, 1923, when the gross operating revenue was $1,658,458 and the operating expenses $1,236,952. The gross income in July, 1924, was $159,929, from which $237,785 is to be paid in interest charges on the various securities and receiver's certificates and miscellaneous debts, leaving a deficit of $77,859.

Increase in Interest Rate Sought.—An increase in the interest rate on the perpetual consolidated debenture stock of the Winnipeg Electric Railway, Winnipeg, Man., is being sought by the directors of the company. A letter has been sent to the shareholders asking for approval of such action. In 1909 the shareholders authorized the issue of this stock bearing interest of 4½ per cent and executed a trust securing it. Under the provisions of the trust deed three issues of the debenture stock were made. The first was sold to the public, the second was made in 1914 and used as collateral security for certain temporary financing, and the third was issued and deposited as collateral for $3,250,000 of 6 per cent twenty-year general mortgage and collateral trust bonds issued in 1923.

Legal Notes

CONNECTICUT.—*Definition of Preferred Claims, After the Insolvency of a Street Railway.*

The railway in question, the Danbury & Bethel Street Railway, consisted of two parts, one a street line operated by the company, the other an interurban line, 15 or more miles in length, operated under contract by the Connecticut Company. The Danbury & Bethel Street Railway went into the hands of the receiver Oct. 30, 1917, and it was claimed that interest on its bonds for six months prior to the receivership was paid out of current earnings which should have been applied to current expenses. The claims considered in this case were claims of creditors who furnished supplies prior to the receivership, that of the Connecticut Company under its operating contract and that of the New Haven Railroad, for part of the cost of the erection of a bridge, a portion of the cost for which was assessed against the street railway under the statute authorizing the construction of the bridge. The court declared as legal principle that a railway mortgagee impliedly agrees that current debts of the company shall be paid out of the current receipts before he has any claim on such income, and where such earnings are devoted to the payment of interest before current expenses are fully paid, the mortgaged property is chargeable with the restoration of such funds, but where there has been no such diversion, there is no charge on the corpus. On this basis the court allowed preference to the claims of certain furnishers of supplies and to part of the claim of the Connecticut Company, but placed the claim of the New Haven Railroad in the class of the general claims. (Flint vs. Danbury & Bethel Street Railway, 125 Atlantic Rep., 194.)

KENTUCKY.—*Motorman Meeting Automobile Held Not Required to Sound Gong.*

A motorman meeting an automobile in a street is not required to sound a gong or warning, where there is room for the automobile to pass without injury. The requirement in regard to the use of the gong is primarily for the protection of those using cross streets, where they cannot see the car approaching. The law imposes upon the automobile driver the same duty to keep a lookout for those ahead as it does upon the operator of an interurban electric car. (Louisville & I. R. Co. vs. Bedfords Adm'r, 262 S. W. Rep., 941.)

KENTUCKY — *Company Responsible for Strike Breaker Injured While Learning to Run Car.*

An agency sent several hundred men to operate cars during a strike, and one was injured while receiving instructions from another, in the car yards of the company, while learning to run a car. The court held that these two men were not fellow servants of the agency or of the company and that the company was responsible. [262 Southwest Rep., Lewis vs. Louisville Railway, 1095.]

MISSISSIPPI. — *Motorman Responsible for Not Turning Off Controller After Trolley Break.*

A trouble man, an employee of the railway company, was operating an empty car through the streets when a trolley break cut off power. The man applied the brakes but left the controller on, and the car empty when he went forward to see what the trouble was. Later, when he heard the power was to be turned on, he returned to the car, but very slowly, until he noticed it start. He was then injured while trying to reach the controller to turn it off. The court held that the company was not responsible. (Meridian Light & Power Co. vs. Dennis, 100 Southern Rep. 581.)

NEW JERSEY — *Franchise Obligation to Repair Street Must Conform to City's Improvement Policy. Public Service Commission Has Not Jurisdiction.*

The railway company in question was organized in 1872, and agreed to maintain the roadway in the track area in as good condition as the rest of the street. The court decided that if this is not done the city has the option to make repairs at the company's expense on proper notice. The subsequent appointment of a public service commission with jurisdiction over certain matters connected with electric railways does not affect this question of paving, as it is not within the administrative competency of the commission. [City of Burlington vs. Burlington Traction Company, 124 Atlantic Rep., 857.]

NEW YORK.—*Absence of Guard at Subway Station Not Negligence, Unless Platform Overcrowded.*

Unless a subway platform is overcrowded and the crowding caused the injury to the passenger boarding the car, there was no need for the carrier to have any guard there. Where a passenger alleges she was injured because of the space between the platform and the car, she must also prove that such space was greater than necessary. [Farmer vs. Interborough Rapid Transit Co., 205 N. Y. Supp., 479.]

NEW YORK.—*Damages Collectible by Guardian.*

In an action by a father for injuries to his infant son, the plaintiff is permitted to recover for the loss of the services of his son during minority, less the cost of supporting him had he not been injured, and expenses for medical treatment and increased care and maintenance prior to trial, but could not recover cost of prospective medical treatment or the increased care and maintenance during minority. [Clarke vs. Eighth Avenue Railroad, 144 N. E. Rep., 516.]

IOWA. — *City's Consent Not Necessary for Spur Track on Street of Interurban Railway.*

Subject to regulation, under the Iowa law, an interurban electric railway has the right, without the consent of the city, to construct and maintain a spur track for interurban railway freight purposes across a street at right angles, provided it has the consent of abutting property owners. (Interurban Railway vs. City of Des Moines et al., 199 Northwest Rep., 355.)

IOWA. — *Railway Responsible for Assessment for Paving Adjoining Highway.*

The railway in this case occupied a right-of-way 15 ft. wide abutted on each side by a highway, and it was assessed as an abutting property owner. Its contention was that the pavement was a detriment rather than an advantage because on its completion a competing line of motor buses sprang up, that the valuation on which the assessment was based was too large, and that it was not the owner of its right-of-way but held only a limited easement. The court held that an assessment was proper, but confirmed the reduction in the amount fixed by the District Court. (Waterloo, C. F. & N. Ry. vs. Town of Cedar Heights, 199 Northwest Rep., 313.)

RHODE ISLAND. — *Injury of Passenger in Narrow Devil Strip When Crossing Street.*

The distance between two passing cars on a certain street in Providence is only 15 in. A man, attempting to cross this street, was stopped by a long line of automobiles and waited in the devil strip where he was caught between two cars. As it was evident that the accident would not have happened if either car had sufficiently slackened its speed, the company was held responsible. (Leary vs. United Electric Railways, 125 Atlantic Rep., 217.)

Personal Items

Managements Separated at St. Louis and East St. Louis

W. H. Sawyer, president of the several electric railway and the light and power properties of East St. Louis and Alton, Ill., has resigned as president of the East St. Louis Light & Power Company and vice-president of the Alton Gas & Electric Company. The East St. Louis and Alton power properties, following out plans made by the North American Company some time ago, are to be consolidated with the Union Electric Light & Power Company of St. Louis, Mo., of which Louis H. Egan is president. This makes the light and power properties on both sides of the Mississippi a single unit as to operation and management. Mr. Sawyer continues his connections as president of the East St. Louis Railway, the East St. Louis & Suburban Railway and associated electric railways.

George W. Welsh, chief engineer of the East St. Louis Power Company, will act as assistant to Mr. Sawyer, while John L. Mitchell, former assistant to Mr. Sawyer, remains as manager of the light department of the East St. Louis Light & Power Company. In this connection Mr. Welsh will be assistant to Mr. Sawyer as president of the East St. Louis & Suburban Railway, the East St. Louis Railway and the St. Louis & Belleville Electric Railway and will also be superintendent at East St. Louis for the receivers of the Alton, Granite & St. Louis Traction Company.

The changes are in line with the policy of the North American Company to unify management of the St. Louis and East St. Louis power companies, centralizing around the new super-power plant at Cahokia.

The North American Company has controlled the Union Electric Light & Power Company for years and last fall took over the control of the East St. Louis & Suburban Railway and its subsidiaries and the East St. Louis Light & Power Company and the Alton Gas & Electric Company.

Head of Pacific Claim Agents Started as Trainman

S. A. Bishop, general claim agent of the Pacific Electric Railway, Los Angeles, Cal., was elected president of the Pacific Coast Claim Agents' Association at the fifteenth annual convention of that body held recently in Spokane. He succeeds P. O. Solon, claims attorney for the Key System Transit Company, Oakland, Cal.

While serving as general claim agent with the Pacific Electric Lines, Mr. Bishop has conducted many committee activities as chairman and has been affiliated with large associations in southern California in campaigning for eliminating or diminishing the constantly increasing number of grade crossing accidents. Mr. Bishop has untiringly carried on this campaign throughout the various organizations of the Pacific Electric Railway by meeting trainmen from time to time at staff meetings, making numerous speeches at the various safety committee meetings held each month by the company, and resorting to many novel plans to impress upon trainmen the need for playing safe at all times. This work he has carried on consistently since he was appointed general claim agent of the Pacific Electric Railway, Los Angeles, Cal., on Oct. 1, 1908. He joined the Pacific Coast Claim Agents' Association in 1910.

Mr. Bishop was born at Brownsville, Tenn., on July 21, 1874. He has been located on the Pacific Coast since 1893. Upon coming to California in that year he entered the service of the Market Street Railway, San Francisco, then a subsidiary of the Southern Pacific Company. He served at first in the operating department as conductor and as motorman. Later he was advanced into the claim department under the supervision of D. R. Sessions, general claims attorney of the Southern Pacific Lines (Pacific System) in 1899. He next went to the Pacific Electric Railway.

Thomas J. Brown of Charleston, Mo., was appointed by Governor Arthur M. Hyde chairman of the Missouri Public Service Commission on Aug. 30 for a term expiring on April 15, 1929. He succeeds Merrill E. Otis of St. Joseph, Mo., who resigned on Aug. 15, last, to take up practice of law in St. Louis. Mr. Brown has been a member of the Public Service Commission since July 12, 1923. His law firm, Russell, Brown & Joslyn of Charleston, has represented the Missouri Pacific Railroad in various matters. His promotion to the chairmanship leaves a vacancy on the commission. It is possible that the post will not be filled until the new governor takes charge in January.

Obituary

Clarence E. Learned, superintendent of inspection of the Boston Elevated Railway, Boston, Mass., died on Aug. 27. Mr. Learned went with the West End Street Railway in 1888 and in 1897 became superintendent of inspection. He had been second vice-president of the American Electric Railway Transportation & Traffic Association and was a past-president of the New England Street Railway Club. Mr. Learned was born March 5, 1858, in South Boston. He was educated in the South Boston and South End Grammar Schools. From 1876 to 1888 he was employed in turn by a banking house, a grain company, the Boston & Hingham Steamboat Company as traveling passenger agent and by the Boston *Herald*.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Germany's Revival

Hope and Financial Soundness Have Replaced Despair and Inflation Among the Teutons

No other country in the world today is, from the economic viewpoint, so interesting as Germany. She occupies the spotlight in Europe. What is to be her future? is the question that every one in the Old World is asking. E. J. Mehren, vice-president of the McGraw-Hill Company, Inc., says that no one can answer that question. Mr. Mehren, who has just returned from Europe, says, however, that even the casual visitor to Germany can say:

> Germany has made tremendous strides since the war; she is showing extraordinary recuperative power—against tremendous handicaps; she has worked a financial miracle since November of last year, and, finally, no nation that shows Germany's potential strength can be permanently kept down, can be crushed.

Mr. Mehren says that there is not buoyancy of spirit, but there is a deep-founded confidence that the nation is not going to pieces. He reviews some of Germany's difficulties, but says that a nation that under present handicaps has recovered as she has done will rise despite the obstacles that a commercially minded world is likely permanently to place upon her.

As Mr. Mehren sees it, the great German economic miracle was wrought in the closing months of 1923 and the early part of 1924. Since November, 1923, legally, and about Jan. 1, actually, the rentenmark has stood at 23.8 cents to the dollar. That achievement marked the turn. It showed the return of administrative strength in the German government. It restored business to a sound basis. It killed speculation and the orgy of spending. It restored the incentive to save and therefore to work. It marked the end of the crisis in the economic and social disease and the beginning of recovery. As Mr. Mehren sees it, Germany is beyond the crossroads and has chosen rightly. The future is long and difficult, but there is health where there was disease, there is hope where there was despair.

New Gasoline-Electric Car Tested in St. Louis, Mo.

A new type gasoline-electric passenger coach designed primarily for use on branch lines of steam railroads has completed trial runs in the proving yards of the St. Louis Car Company, St. Louis, where it was built. The car combines features of the railroad coach, street car and bus. It is the result of three years of co-operative engineering study and experiments. H. L. Hamilton, president of the Electro-Motive Company, Cleveland, Ohio, who helped to design the new car, is confident of its ability to operate continuously at a very moderate cost per car mile.

The new car resembles a Pullman coach. It is divided into an engine room, passenger compartment and smoking room. A 200-hp. six-cylinder gasoline engine is used to run a generator which supplies current to a set of motors geared to the axle. The usual control levers govern the operation of the car. The maximum speed of the vehicle is 60 m.p.h.

Creditors of Car Truck Corporation Seek Consents

The creditors' committee of the Stafford Roller Bearing Car Truck Corporation, named at a meeting at the office of Wisner & Walsh, Chicago, on Aug. 27, at which approximately $18,000 of the general indebtedness claims against the company was represented, has recommended to the creditors a plan as follows:

1. That claims of unsecured creditors be assigned to J. S. Stearns, or to some one acceptable to him, to be used in bidding at the public sale of the company's property at Lawton, Mich.
2. That Mr. Stearns use the claims so assigned in bidding at the public sale up to $60,000, but not beyond that sum.
3. That in case the claims are so used in settlement of the bid Mr. Stearns is to provide enough cash to pay secured and preferred claims, the costs of the receivership and the organization of a new company, and to reimburse himself for such outlays of cash through the sale of stock of the new company or in stock.
4. That a new corporation be organized with a capital stock of $150,000 of 7 per cent cumulative preferred stock (as to dividends and assets in liquidation) of the par value of $10.00 per share, such preferred stock to have full voting power, and additional common stock to be authorized and issued as determined by Mr. Stearns.
5. That the preferred stock be exchanged at par for claims assigned. The balance of the preferred stock not used as above set forth to be issued for corporate purposes as the board of directors shall determine.
6. That the board of directors consist of three members, one of whom shall be named by the creditors' committee.

The agreement is contingent upon 75 per cent in amount of the creditors, other than J. S. Stearns and Stearns Motor Works, consenting to the arrangement.

It was decided not to bid beyond $60,000 for the property because the committee felt that if a competitive cash bid of $60,000 was made unsecured creditors would net 50 per cent of their claims, and the committee felt that this should be accepted in preference to stock. The members of the creditors' committee are Kenneth L. Van Auken, Edward Wray and H. E. Wynn.

74,924 Sq.Ft. of Exhibit Space Sold

The exhibit at the meeting of the American Electric Railway Association at Atlantic City starting on Oct. 4 will break all records. Last year, the record year, 75,681 sq. ft. of space was occupied by manufacturers with an exhibit of their products. It is still five weeks until the convention. The total space sold to date for exhibit purposes is 74.924 sq.ft. Of this space more than one-quarter will be bus products.

ELECTRIC RAILWAY MATERIAL PRICES—SEPT. 2, 1924

Metals—New York

Copper, electrolytic, cents per lb.	13.562
Lead, cents per lb.	8.00
Nickel, cents per lb.	28.00
Zinc, cents per lb.	6.587
Tin, Straits, cents per lb.	52.50
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b vessel, Hampton Roads	$4.15
Somerset mine run, Boston	2.075
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	1.375
Central, Ill., screenings, Chicago	1.55
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.80
Tie plates (flat type), cents per lb.	2.50
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb.	3.75
Steel bars, cents per lb.	2.10
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.80
Sheet iron (28 gage), cents per lb.	3.50
Sheet iron, galvanized (28 gage), cents per lb.	4.60
Galvanized barbed wire, cents per lb.	3.50
Galvanized wire, ordinary, cents per lb.	2.55

Waste—New York

Waste, wool, cents per lb.	15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12-18
Colored	9-14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$1.037
White lead (100 lb. keg), cents per lb.	11.625
Turpentine (bbl. lots), per gal.	$0.91
Car window glass (single strength), first three brackets, A quality, discount*	84.0%
Car window glass (single strength), first three brackets, B quality, discount*	86.0%
Car window glass (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4-6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.75
Rubber-covered wire, No. 14, per 1,000 ft.	$6.55
Weatherproof wire base, cents per lb.	18.50

Paving Materials

Paving stone, granite, 4x8x4, f.o.b.	
Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.48
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	53-54
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.25
Light copper, cents per lb.	9.50
Heavy brass, cents per lb.	6.50
Zinc, old scrap, cents per lb.	4.00
Light brass, cents per lb.	5.50
Lead, cents per lb. (heavy)	7.00
Steel car axles, Chicago, net ton	$18.25
Cast iron car wheels, Chicago, gross ton	18.25
Rails (short), Chicago, gross ton	18.25
Rails (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	9.75

Rolling Stock

Citizens' Traction Company, Oil City, Pa., through its subsidiary, the Citizens' Transit Company has purchased and received delivery on a new Mack shock-insulated bus, with a capacity of 25 passengers. It will be put into service between Franklin and Rocky Grove, Pa.

Los Angeles Railway, Los Angeles, Cal., has received its first six-wheel double-deck Moreland bus, built after plans made by the Moreland organization and built at the Burbank factory. Four similar vehicles are under construction for the railway.

City of Detroit, Department of Street Railways, Detroit, Mich., will receive sealed proposals in quadruplicate, until Sept. 9 for 50 double-deck buses, with the option to the purchaser of buying 25 or 50 additional buses within nine months. The bids are to be made in strict accordance with specifications and blueprints on file in the office of the Department of Street Railways and the bidder must state the approximate date he can make delivery, as this will be a determining factor in the awarding of the contract. The contract is to be subject to the confirmation of the Common Council. The right to reject any or all proposals, or to split the contract is expressly reserved by the Department of Street Railways. Frank Meyer, Jr., is purchasing agent.

Trenton & Mercer County Traction Company, Trenton, N. J., has placed an order with the Fageol Company for three double-deck buses of the sight-seeing type. They will have a capacity of 64 passengers each.

The Washington Railway & Electric Company, Washington, D. C., filed with the Public Utilities Commission on Aug. 28 an application for permission to convert 10 of its cars into the one-man type. It is planned to equip them with automatic rear exits which have been installed on the one-man cars now in operation. The cost of changing the 10 cars into the one-man type is estimated at $28,240. Seventy of this type are now in operation.

Track and Line

Saginaw Transit Company, Saginaw, Mich., has completed the laying of 4,600 ft. of double track on East Genesee Avenue. The company has under way a track job to complete 3,755 ft. of single track on Washington Avenue, also 2,650 ft. of single track on Fourteenth Street. The jobs are all renewal work. The rail is 100-lb. A. R. A. type A, on a 2-in. sand cushion and a 6-in. concrete base, using white oak ties and continuous joints.

Portland Electric Power Company, Portland, Ore., has reconstruction projects under way in its electric railway department that will cost more than $200,000. The principal project under way is the complete reconstruction of the double-track line on Gladstone Avenue on the Woodstock line, at a cost of $102,000. Work on this contract will be completed in September. The second large contract is for the reconstruction of double track and paving on the Richmond line on Clinton Street, which will cost about $70,000. Other work includes double-tracking and track relaying elsewhere.

Monongahela-West Penn Public Service Company, Fairmont, W. Va., is constructing additional passing side tracks and additional electrical blocks will be installed to insure safety. This work is in line with the announcement of half-hour passenger service on the Fairmont and Clarksburg interurban.

Texas Interurban Railway, Dallas, Tex., has announced that upon the completion of its new line between Dallas and Denton, 37 miles, construction will be started on an extension of the road from Denton to Gainesville, 20 miles. The line between Dallas and Denton will be placed in operation early in October, it is stated.

Los Angeles Railway, Los Angeles, Cal., is reconstructing track on Fifth Street between Los Angeles and San Pedro Streets. Similar work is being done on Wall Street between Santa Barbara and San Pedro Streets. Track is being installed on Sixteenth Street with 127-lb. rail.

Key System Transit Company, Oakland, Cal., will double-track its line into the Lakeshore Highlands because of the growth of business in that section.

Power Houses, Shops and Buildings

Municipal Railway of San Francisco, San Francisco, Cal., will construct a second story to its carhouse on Seventeenth Street, estimated to cost $150,000. Bids will be received by the Board of Works on Sept. 17.

Los Angeles Railway, Los Angeles, Cal., has awarded a contract to Willard-Brent Company to construct the sixth automatic substation. The new building will be 57 ft. long and 49 ft. wide of brick construction.

Boston Elevated Railway, Boston, Mass., plans to construct a lobby building, including boiler house and garage, as the first unit of its $200,000 project. The contract has been awarded to Walsh Brothers. The architect's estimate was $80,000. The company has also awarded to McDonald & Imhof the contract for the garage and boiler plant at Forest Hills, referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 2. The engineer's estimate was $90,000.

Trade Notes

Eric Wilburn Smith, central station salesman and assistant manager of the General Electric Company, St. Louis office, has joined the staff of Ray D. Lillibridge Inc., engineers and general advertising agents, New York City. Mr. Smith will devote himself particularly to furthering the interest of this agency's clients in the electric light and power industry of the country. After working in the motor and transformer department of the Union Electric Light & Power Company of St. Louis and the testing and engineering department of the Lynn Works of the General Electric Company, Mr. Smith joined its sales organization, specializing first in motors and later in central station work.

Gibb Instrument Company, Bay City, Mich., manufacturer of electric welding equipment, announces the appointment of D. A. Clements as representative in Missouri and southern Illinois, with headquarters at 4167 Washington Avenue, St. Louis.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has opened a downtown office at 1202 Keenan Building, Pittsburgh, and will meet publication representatives there afternoons (except Saturdays) from 2 to 4.

O. S. Tyson & Company, Inc., has been incorporated by Oscar S. Tyson and L. W. Seeligsberg to conduct an advertising agency at 50 Church Street, New York. Mr. Tyson, president of this organization, recently resigned as vice-president of the Rickard & Company advertising agency. Mr. Seeligsberg, vice-president and treasurer of the new company, has for the past year been operating an agency under his own name. He was formerly with the McGraw-Hill publications. The new company will specialize on the advertising and sales promotion of materials and equipment sold to the industrial field and on market analysis.

Sangamo Electric Company, Springfield, Ill., has appointed Reginald M. Campbell as special representative, to co-operate particularly with the central stations and other public utilities throughout the country. His permanent headquarters will be at the New York office of the Sangamo Electric Company, 50 Church Street, New York City, N. Y. Mr. Campbell is favorably known in connection with his work for the Ohio Brass Company over a long period of years. For several years past he has served the Habirshaw Electric Cable Company.

New Advertising Literature

Wagner Electric Corporation, St. Louis, Mo., has issued a thirty-five page folder entitled The Pow-R-full starterless motor. This bulletin, No. 133, contains many diagrams and charts.

Roller-Smith Company, New York, N. Y., has issued Bulletin No. 100, "Electrical Instruments for Signal System Testing"; Bulletin No. 200, "Portable, Direct Reading Rail Bond Testers"; Bulletin No. 430, "Direct-Current Switchboard Instrument"; Bulletin No. 550, "Relays Direct Current."

Ohio Brass Company, Mansfield, Ohio, has issued catalog No. 210, covering all the details of the complete line of Imperial headlights. It includes information on arc and incandescent illumination.

Nichols Lintern Company, Cleveland, Ohio, has issued a new bulletin entitled N-L for Safety. It describes the Lintern electromagnetic sander and the light-weight signal lanterns.

New York, Saturday, September 13, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 11

Increasing the Capacity of Existing Streets—For Whom?

EVERY once in a while somebody posing as a traffic expert, a city planner, or a consulting engineer of some sort, attracts a little attention to himself by announcing with an air of wisdom that the capacity of existing streets would be vastly increased by eliminating the trolley car. Seldom are remarks of this kind based on actual experience or careful investigation. Frequently they are based on self-interest. Only a little thought is needed to show how erroneous they are. Without doubt the elimination of the trolley would increase the capacity of the streets for motor vehicles, but certainly it would greatly reduce it for general transportation purposes.

Traffic counts made at points of congestion in various cities show that the electric railways are carrying three or four times as many passengers as all other vehicles put together. Of the total passenger traffic, the proportion which the railways carry has been found recently to be about 93 per cent in Los Angeles and Montreal, 89 per cent in Baltimore, 83 per cent in Houston, 80 per cent in Madison, and about 75 per cent in Chicago and St. Louis. Obviously these are not special cases, because cities of various sizes located in different parts of the country are included in the list.

To handle the bulk of the traffic by electric railway, however, requires only about one-tenth of the total number of vehicles using the streets. In Atlanta, street cars were found to be only 9 per cent of the total number of vehicles, in Chicago and St. Louis approximately 10 per cent, in Baltimore 12 per cent, and in Montreal and Los Angeles, where the proportion of passengers carried was the highest, the cars constitute about 25 per cent of the total number of vehicles. To carry the entire traffic by other means than the electric railway would require from thirty to fifty times as many vehicles in the streets if the present average loading of automobiles continued. As a method of relieving traffic congestion, such a proposal is obviously an absurdity.

These figures are a matter of record, having been published in this paper and elsewhere. Yet there are a number of persons who, through ignorance or by intent, overlook these facts and continually advocate the removal of the trolley car from the streets. They forget that for two months last summer a large part of New Jersey tried to get along without railway service. Although it was the dullest season of the year and an extensive bus system was in existence partially to fill the gap, the experiment was an utter failure. All vehicles using the streets were unbearably crowded, while many thousands of people either stayed at home or patronized the steam railroads. Owners of private automobiles refused to drive them in the cities. For the greater part of the general public, the streets were much less useful than when the trolleys were running. Half a dozen other cities have had practically the same experience.

Removing tracks from the streets would make possible the operation of a greater number of motor vehicles to be sure. But it would take away the transportation medium upon which at least three-quarters of the people depend. Furthermore, if all the people were served by other means of surface transit the confusion and congestion of traffic would be far worse than at present. Most electric railway men are familiar with these facts, but the layman is not so well informed on the subject. When theorists undertake, therefore, to advocate the removal of tracks, it is a good time for the railway to tell the public the truth of the case.

Hand Brakes Should Be Kept in Good Condition

THE importance of efficiently maintaining hand-brake equipment, even though it is used only as an auxiliary to the air-brake equipment, is stressed in an article in this issue by J. S. McWhirter of the Third Avenue Railway, New York City, on the installation and use of hand brakes for air-brake cars. Since on such cars the hand brake is seldom used in regular service there is a tendency either to allow this equipment to become inefficient or else to ignore it entirely. On such cars when the brake is needed at all it usually is needed urgently. At such times there is no opportunity to find out if the equipment will work properly.

Accidents are reported frequently in which a car gets away on a grade and, being unable to stop, it either leaves the rails or collides with some object near the bottom of the descent. In nearly all such cases there is ample time to apply the brakes by hand, provided they are in satisfactory condition. On the contrary, when emergency stops are made to avoid collisions the element of time is very important. Should the air brake fail probably no type of hand brake could avert the collision. Properly designed and installed hand-brake equipment, however, will enable operators to return disabled cars to the carhouse with safety, and in the storage of cars, particularly on a grade, the hand-brake equipment is necessary.

Mr. McWhirter's article brings out forcibly the necessity of providing full braking pressure throughout the entire range of piston travel. On many cars in service the chain is entirely wound up before the maximum piston travel is obtained. In such cases, of course, if long piston travel is necessary in order to give the required brakeshoe pressure, the hand brake is useless.

A hand brake is a necessity on cars provided with air brakes, and in considering its use as an auxiliary to the air-brake equipment, careful consideration should be given to the type of brake employed and to its proper installation. Those responsible for its maintenance also should make certain that it is kept in such condition as to provide an effective means of stopping the car when occasion requires its use.

Making Competitive Interurban Service More Attractive

TO INCREASE patronage on interurban railways that face acute competition from steam railways, buses or private automobiles, their traffic managers must needs consider every phase of the service problem. Comparative running times, frequency of car movements, comfort, rates of fare, local transfer and connection facilities—these are some of the major elements considered consciously or unconsciously by the passenger who can make a choice between transportation agencies. In a word, the service must be good enough that it sells itself to the would-be traveler, else he will turn to a competitor.

A specific instance in mind is a double-track interurban line joining two cities 40 miles apart. A trunk line steam railroad provides excellent service between the centers of these towns, its trains making the run in from an hour to an hour and a half. The interurban takes a little over two hours. As to fares, those on the electric line are about 30 per cent less than those on the steam road. The interurban sells 100-mile books at the rate of 2½ cents per mile, and these have been a decided help in securing patronage. On the other hand, the steam railroad has comparatively low commuter rates which naturally attract the regular riders.

In its favor the interurban has cleanliness, punctuality and convenience to the business sections of the two towns. The local and limited services, of two to four cars per hour, are well scheduled. Of course the intermediate territory furnishes a considerable share of the riding, especially on account of the large delivery district.

The real difficulty with the road is that while the 31 miles of its own system are covered in about an hour and a quarter, the remaining 9 miles in the two terminal towns add another hour and render the service of little value to the busy man who considers his time valuable.

The problem, of course, is not an unusual one, as it will be found on most interurban lines. With the inevitable growth of cities vehicle congestion on the streets will grow worse and these congested conditions will extend over a constantly widening area. There is no solution entirely satisfactory except entrances to one or both cities over private right-of-way. The ultimate good of the interurban railway lies in providing such an entrance either over an elevated railway, a short subway or possibly over tracks of some steam road from which trackage rights can be secured.

Where such a private right-of-way is not practicable, every effort should be made to expedite movement of the interurban cars over the city tracks. The city schedules should be arranged to give them priority over city cars by leaving just ahead. Possibly, where the run within the city is long, arrangements can be made so that the interurban cars can pass one or more city cars. The customary delay at the city limits where crews are changed can be avoided by allowing the interurban crew to run the car through the city streets. The interurban car should stop inbound only to discharge passengers and outbound to receive them.

Admittedly the conditions are not favorable for high speed, but if the service is to be made attractive these and similar expedients should be adopted to save the time of the traveler. Details of this sort were of less importance in the old days, but with modern competition they must be looked into. Though it may be difficult to make such changes, there are roads that have conditions like those described and have met them. Then, with consistent publicity, the service has been sold to the public and the patronage built up to make a profit for the owners.

When the Public Pays the Wage Increase

AN INTERESTING point was brought up in the final argument of the Boston Elevated Railway arbitration proceeding, concluded recently after hearings lasting nearly a month. The company wanted a reduction in wages of 5 cents per hour, and the men countered with a demand for an increase of 20 cents, together with numerous perquisites, including two weeks' vacation with pay and double pay for overtime. The stand taken by H. Ware Barnum, counsel for the company, was that with an increase in the cost of living of 60 per cent and in carfare of 100 per cent it was unfair to the car-riding public for the men to demand still more wages at the present time, since they now receive more than 100 per cent above the base rate.

On the Boston system, with public control, any change in net profits or losses is reflected directly back to the communities it serves. General Manager Dana declared in his testimony that unless there is a decrease in the carmen's wages there will be a deficit of $732,000 at the end of the fiscal year June 30 next, even under present conditions. The men's proposal for vacations alone would increase this deficit by $650,000. In view of the fine showing the present management has made under public control, having virtually wiped out a large deficit in five years and having subsequently made material fare reductions, such a setback would be particularly unfortunate.

For the men, Mr. Vahey countered that they should not be discriminated against, even though it may be necessary to make an assessment on the communities served. He held that there is no doubt the people's representatives are willing to pay an assessment that would provide a living wage for the employee.

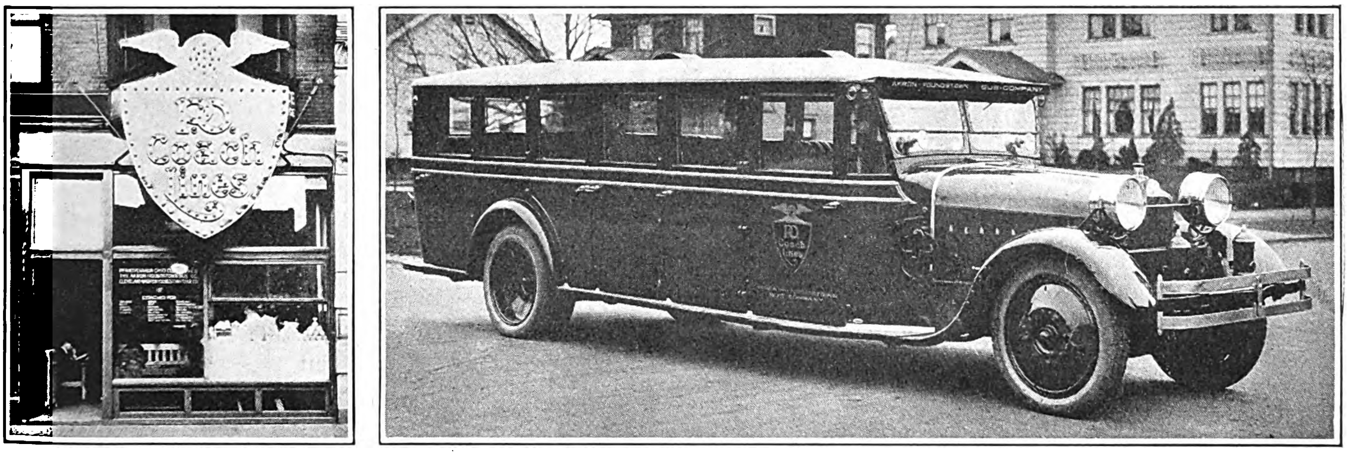
Of course if the people are willing to stand assessments to pay high wages to those in favored industries it is their privilege to do so, as in this case, with state control of operation, the owners of the property are guaranteed a fixed return on their investment. But it will be remembered that there was much opposition several years ago when an assessment was made on the municipalities to cover operating deficits of the same railway.

If the statute by which public control was established is used for the purpose of giving large wage increases to favored groups of employees, it will become nothing more nor less than class legislation. It is to be hoped that the arbitration board will decide the case on its merits and not because the public can be made to pay. On account of the somewhat unusual situation the decision will be of particular interest to railway men.

Co-ordinating Interurban Service

Bus Lines Operated by the Pennsylvania-Ohio Electric Company Parallel Its Interurban Railway Lines—Operation Successful as a Means of Providing de Luxe Service—Maintenance of Coaches Performed in Company's Garage—Contract Simplifies Tire Problem

RADIATING out of Youngstown, Ohio, the bus lines of the Pennsylvania-Ohio Electric Company offer to the traveler going to or from Warren, Sharon or Akron transportation service in modern, attractive buses. The routes to Sharon, Pa., and Warren, Ohio, parallel the interurban railway lines operated by the same company. Both branches of this dual system furnish high grade service; the interurban, with new cars fully as attractive as the buses, does not duplicate the effort of the bus, nor does the bus duplicate that of the cars. Each offers a type of transportation to a class of riders distinctively its own. The electric railway gives what amounts to suburban service to the little municipalities through which it passes. The bus renders a high-speed de luxe service at a higher fare than the interurban fare, but which corresponds with the service rendered. By these two means of transportation both classes of riders, the through passenger who prefers a high-grade ride regardless of the fare and the local passenger with whom the fare is an important item, are served.



Left—Illuminated Shield of the Pennsylvania-Ohio Coach Lines Advertises the Waiting Room at the Central Square, Youngstown, Ohio. Right—23 Sedan Type Buses Operate Over Three Routes Extending from Youngstown to Akron, Warren and Sharon

Buses Appeal to a New Class of Riders

Scheduling bus operation follows closely the methods used in railway practice. A half-hourly headway throughout the entire day was established on the Youngstown-Warren line at the start. Designed to eliminate competition, it was thought that this headway would be adequate even after competitive buses were removed. However, the service built up a business which could not be handled on a half-hourly schedule and the headway was decreased. An analysis showed that there were two classes of riders between the two towns. The working class, a group of men employed in the mills, and the salesman and shopper class make up the passengers. It is the latter class—salesmen and shoppers—who ride the buses, desiring a comfortable ride regardless of the price. The fact that this second class of riders also prefers automobile or equivalent transportation has resulted in the success of the coach company.

The peak period for bus transportation starts a little before noon and extends until 6 p.m. For a while the headway was 15 minutes in this period, but within the last few months it has been changed to 20 minutes during the afternoon. This was necessary because of the decreased riding as a result of the business depression which is showing effects on the steel industry in the adjacent valleys. The flexibility of the bus was demonstrated, as it was possible to make the change in service without elaborate changes in running time and track sidings such as are usually necessary on single-track railway lines.

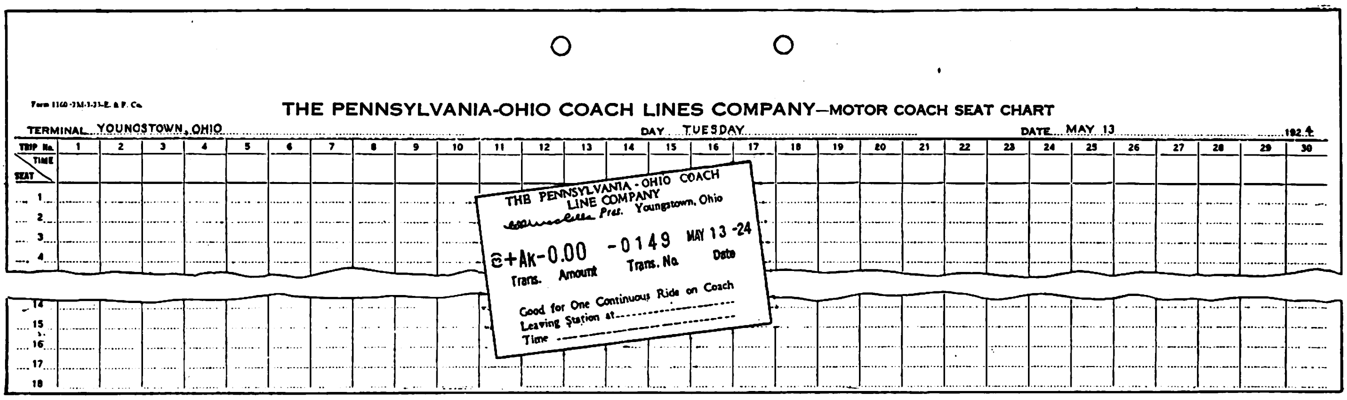
By watching the report of the transportation department showing the passengers carried by each bus on each trip, it is possible to stabilize the load factor by taking off or adding a trip any time when conditions warrant such a change.

Before bus operation was attempted conditions on the interurban lines were bad. It was found that although the company was giving too much service the people were not riding. Careful checks were made of conditions to determine the cause. At that time five competitive buses were operating between Youngstown and Warren. The type and number of passengers carried by these lines were observed and similar checks made of the steam railroad passengers. This latter check disclosed that people would wait for a steam train rather than ride the electric line. Sometimes the wait would be almost as long as the entire running time of the trip on the interurban. Moreover, the steam road fare was considerably higher than that charged on the interurban line. The buses were also carrying a heavy load at a fare in excess of the interurban fare. These two facts convinced the railway management that there was a class of people who wanted a service other than that being furnished by the electric railway.

Coaches Used to Give a New Service

To obtain this patronage better equipment than that used by the competitive bus lines would have to be placed in service at a fare much higher than either the competitive bus fare or the interurban fare. Entry into the bus business was made Aug. 1, 1922, prior to the passage of the Ohio bus law, which now requires a certificate of necessity and convenience before bus operation can be started. To meet competition with a coach service which would leave nothing to be desired in the way of adequate transportation accommodations, a sedan type of body was employed, mounted on a White Model 50 chassis. This body was designed to include the latest practices found in motor bus construction.

With this equipment all competition on through lines was eliminated within two months, or by Oct. 1, 1922.



Form 1160-3M-1-23-E. & F. Co.

THE PENNSYLVANIA-OHIO COACH LINES COMPANY—MOTOR COACH SEAT CHART

TERMINAL YOUNGSTOWN, OHIO DAY TUESDAY DATE MAY 13 1924

THE PENNSYLVANIA-OHIO COACH LINE COMPANY
Pres. Youngstown, Ohio

ε+Ak-0.00 -0149 MAY 13-24
Trans. Amount Trans. No. Date

Good for One Continuous Ride on Coach
Leaving Station at
Time

TRIP No.
TIME
SEAT
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
1 2 3 4 14 15 16 17 18

A Record of the Number of Tickets Sold for Each Trip Is Kept in the Ticket Booth at Each Terminal. The Ticket Is Issued by a National Cash Register and Is Filled Out by the Agent

While the company felt certain it knew the reason for the increased riding on the bus line, a check was made of passengers to find out why they preferred it. The majority of the many riders interviewed in regard to this question gave as their opinion that inasmuch as the route was through the country it was far more pleasant to ride on the bus. A second reason was that they objected to waiting on a siding for an opposing car to pass. While in many places the buses do not travel at as high a rate of speed as the interurban cars, the fact that waits occur at sidings and at several street corners in the small towns annoys the passengers to such an extent that they become disgusted with the interurban car service.

After bus service had been rendered for a year and two months new interurban cars of the latest design were placed in service on two of the interurban lines, the one to Newcastle and the other to Sharon. A better schedule was inaugurated with an increased car mileage of 25 per cent. This improved service immediately showed results by increased riding on the railway, and had it not been for the industrial depression which became apparent in January, 1924, the riding this year would have shown a decided increase over that of last year. As it is, the coach business on the Sharon line shows a decided decrease over last year and the interurban business to a lesser extent than it would if it had not been for the new cars. This condition is what would be expected inasmuch as the bus service is at a higher rate of fare than on the cars and the regular patrons would be inclined to curtail expenses by using the cheaper means of transportation.

One of the principal factors in the success of the bus operation is that reserved seats may be obtained in any of the buses as much as three hours in advance of the time of departure. A seat chart is kept in the ticket office at Youngstown. As the tickets are sold, a notation is made on the chart to indicate that a seat is reserved. At the time the ticket is issued it is stamped with the date, leaving time and point of departure of the coach. No more passengers are booked for the trip after 18 tickets have been sold. Those desiring transportation must therefore wait for the departure of the next bus. By this reserved seat method each passenger is assured of a seat. It has become the practice for passengers to make arrangements for return transportation immediately upon arrival in Youngstown. The chart used is large enough to accommodate all of the runs leaving the Youngstown terminal in one day and merely indicates the number of seats available on each bus; that is, 18, with no designation as to which seat is reserved. While passengers must wait for the following bus on the Warren or Sharon line after one has been completely sold out, this would cause considerable inconvenience to the passengers on the Akron line, which operates on an hourly schedule. On this run an extra bus follows the regular if the overload is sufficient to warrant the additional expense.

The tickets are issued by means of a National cash register, the time of departure and destination points being written on the proper blank lines by the ticket agent. An interesting feature of the ticket vending machine is that it tabulates the receipts for each day for each of the three routes out of Youngstown, also indicating the number of tickets sold.

Although the Sharon and Warren lines of the interurban are paralleled by the bus routes, the interurban line to Newcastle, Pa., has no corresponding route. This is because the line has never suffered bus competition, and the patronage clearly indicates that adequate transportation is being furnished. With the Ohio bus law in effect, and the question of bus routes in the hands of the Public Utility Commission, there is little chance of the commission granting to any bus operator the privilege of operating between Youngstown and Newcastle. The railway company does not feel that it is necessary to install bus service between these two towns at the present time.

Figures indicate that the interurban bus operation as conducted by the Pennsylvania-Ohio Electric Company is successful and is satisfactory from the standpoint of operating income. The cost of operation is about the same as for city bus operation. With the high state of development reached by the Pennsylvania-Ohio Coach Lines Company, operating expenses, including depreciation, taxes and interest on the investment are approximately 27 cents per mile. It has been found that the desirable business is terminal-to-terminal traffic, with a 50 per cent load factor necessary for successful operation.

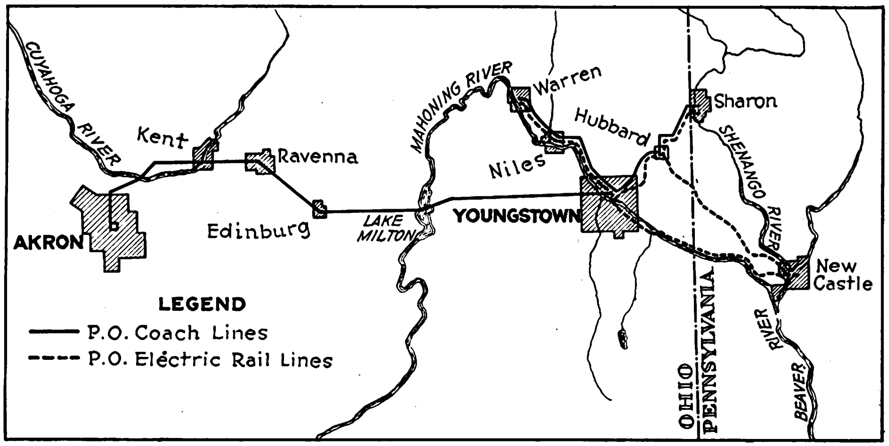
LUXURIOUS VEHICLES FACTOR IN SUCCESS

Distribution of vehicles over the routes has been made with a view toward supplying an emergency bus should the occasion demand. Assigned to the Youngstown-Warren line are nine buses with a seating capacity for 18 passengers each, while six buses are scheduled. On the Youngstown-Sharon line three buses of the same capacity are available, while the base schedule requires only two. Because the Youngstown-Akron line is 50 miles long, eleven 18-passenger buses are available, although the base schedule only requires six. On account of the necessity of maintaining headways, a bus is available at all times at each end, in order that it may pull out on time, should the incoming bus be delayed. One of the features of the Youngstown-Akron line is the establishment of a rest or comfort station at Lake Milton, 1½ hours ride out of Youngstown, and a 1-hour ride out of Akron. A 5-minute layover is made at this lake in order to break the ride up into two parts so as to relieve the strain on the passengers and the driver.

In designing the bus an attempt has been made to have it appear as much like a private automobile as possible. This principle has been carried out in the body design, while the exterior has been painted a dark blue. It is felt that extremely gaudy colors are not suitable inasmuch as a man would not have the same colors on a private automobile. The insignia of the P-O Coach Lines Company is in red and gold on the front door on each side of the bus. While conspicuous enough, it is not overly pretentious. The interior is finished with the latest appointments, with genuine blue leather upholstering on the seats and Pullman car carpet on the floor. The hardware is of polished aluminum. The whole vehicle gives one the impression of a luxuriously appointed private automobile.

A glass partition separates the driver's vestibule from the body proper. It is arranged to slide open in order to aid ventilation. The driver's compartment contains only the driver's seat, no provision being made for carrying passengers in this space. The space to the right of the driver's seat is often used for carrying hand baggage or small packages which are the property of the passengers. Ample baggage carrying accommodations are provided at the rear by an inclosed dust-proof compartment projecting beyond the body. On the short Warren and Sharon routes the usual amount of hand baggage is accommodated in the space adjacent to the driver's seat. On the Akron line, however, fully two-thirds of the passengers carry hand luggage and it is an important detail of the service to furnish accommodations for this amount of baggage. A check is given by the driver when the hand baggage is received from the passenger and deposited in the luggage carrier at the rear.

To maintain the high grade of service, such as is rendered by this type of vehicle, it has been found necessary to have the body rebuilding done at the plant of the body builder—Bender's, in Cleveland. Consequently a number of the buses have made one or two trips to Cleveland since operation started in order to be completely rebuilt and reconditioned for service. No hard-and-fast rules exist to determine the time for rebuilding or the reason why some buses need more attention than others. The characteristics of the service and the type of passengers may have considerable to do with the wear and tear on the coach body, but it appears that some bodies require more attention than others.



Two of the Bus Routes Parallel the Interurban Lines of the Same Company. However, the Bus Route to Akron and the Interurban to New Castle, Pa., Have No Supplementary Service

GARAGE FACILITIES WITHIN BUSINESS DISTRICT OF YOUNGSTOWN

Within a few blocks of the business district of Youngstown is located the garage of the Pennsylvania-Ohio Coach Lines Company, which is entirely separate from the garage used by the Youngstown Municipal Railway city bus service. The building used by the interurban bus line was formerly an auditorium used by the city of Youngstown for exhibits and entertainments. Only one-half of the space is used for maintaining the buses, the other half being used by the road and line departments of the Pennsylvania-Ohio Electric Company. These departments of the railway have several motor-driven vehicles which are used in conjunction with the usual track and line maintenance.

Maintenance work on the buses is directed by the superintendent of the garage, who has jurisdiction over the foremen and the regular garage repair men. The details of maintenance and inspection include no unusual features. A bus is not torn down at any predetermined regular period, but general overhauling takes place when something goes wrong or when the general inspection shows that some unit should be changed. An indication that it is time to replace the engine is given by the oil consumption. When this increases to a point where only 50 miles are made per quart of oil the engine is removed and either rebored or fitted with new piston rings.

The performance of buses is very carefully watched by the superintendent of the garage not only for the oil consumption but in regard to gasoline consumption and general performance of the vehicle. The record form used is ruled so as to make it convenient to tabulate the miles per day, gasoline consumption, oil consumption, battery changes, tire changes and other details of operation.

TIRE REPAIRS AND BUS REBUILDING ARE DONE OUTSIDE

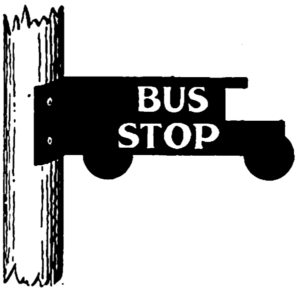
No attempt is made to rebuild any of the units within the garage. Although assembling the various units and installing them in the chassis is part of the garage work, all of the rebuilding is done by outside specialists who have facilities to do a better job and far cheaper than would be possible in the garage.

Tires and tire maintenance are handled through the General Tire & Rubber Company, with which the coach line has a contract. A detail of this agreement includes complete care of tires at a flat rate per mile of use. This rate is based on the yearly mileage as established by the buses and decreases or increases inversely as the mileage. The tire company's agent in Youngstown provides a service truck and makes tire changes on the rear wheels when the coaches pull into Youngstown. If a front wheel tire is punctured it has been necessary in the past for the driver to place the spare in service. However, within the last few months arrangements have been established through the tire agency in Youngstown with tire agencies in the intervening towns, so that a driver may call up for help from the nearest service station. The driver is not encouraged to make tire changes inasmuch as it soils his uniform and is apt to try his patience.

Additional accommodations for the bus passengers have been provided at Youngstown, Ohio, with the opening of a new station a few doors north of the former union bus depot. This new waiting room is operated by the P-O Coach Lines Company. Waiting room privileges are leased to independent lines which form connecting links in the chain of bus operation through northern Ohio.

Distinctive Sign to Mark Bus Stop

WHEN the Middlesex & Boston Street Railway recently commenced bus operation, one of the first difficulties anticipated was the lack of any self-evident indication of the existence of a bus route on a particular street. The presence of electric railways is always shown by the tracks in the streets and the trolley wire overhead. On the other hand a stranger in town has no way of telling whether or not a bus line is operated by the point where he may be standing. To overcome this difficulty the railway plans to place signs such as shown in the accompanying illustration on convenient telephone or telegraph poles wherever stops are to be made along its bus routes. These are simply stamped out of metal at the railway shop in a shape roughly similar to that of a bus and painted red with yellow letters. An L-shaped piece of $\frac{1}{8}$-in. steel is used to give rigidity.



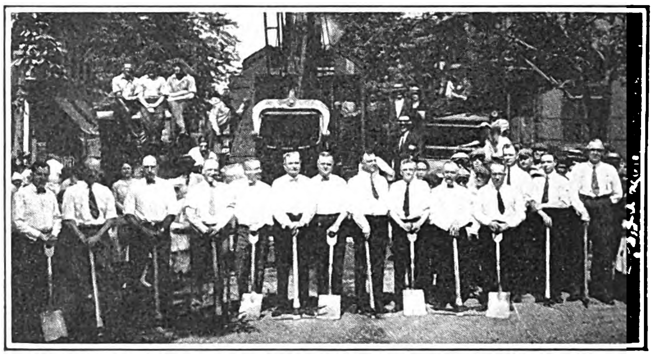
This Simple Sign Indicates the Presence of a Bus Route

New Line at Reading, Pa.

Locally Owned but Operated by Existing Railway—Road Will Cost About $30,000 Less than Expected and Be in Operation Ahead of Time Scheduled

AN EXAMPLE of what may be accomplished when a municipality, its public utilities and the people they serve work together for the greatest benefit of all is now taking place in Reading, Pa., a city of 125,000 population. The example consists of the construction of an extension to the street railway system of the Reading Transit & Light Company. It is almost 3 miles in length and extends into a rapidly growing section of the city.

An interesting feature of the project is that it has been completely financed by a company organized among the people of the territory to be served. A local bank was made the depository for stock subscriptions and its president and treasurer accepted similar offices in the new company. A committee of citizens attended to all the details of obtaining a franchise from the City Council and a charter from the state. There was a public ground breaking, at which the Mayor and members of City Council turned the first spadeful of earth.



Mayor, Members of City Council and Transit Companies' Officials at the Start of Ground Breaking Ceremonies for New Street Car Line in Reading, Pa.

A motion picture of the ceremony was made free of cost and shown in the leading theaters of the city for two weeks.

The road is being built at cost by the Reading Transit & Light Company, which has leased it from the owner, the Northeastern Street Railway, for a term of 999 years, at a rental equivalent to 7 per cent interest on the cost of the road, which was slightly in excess of $200,000. The cost is equal to the amount of stock outstanding, not a share being issued beyond what was necessary to pay the cost.

Since the Reading Transit Company is paying 7 per cent on the cost of the road, it was to its interest to do the job at a low cost and get it finished as rapidly as possible, especially since the rental went into effect when the lease was executed on July 1. It is expected now that the road will cost about $30,000 less than first estimated and be in operation the latter part of October instead of by Christmas. When the line is completed, in another few weeks, there will be another public celebration, with probably the Mayor operating the first car over the new line.

Getting Full Value from Hand Brakes on Air-Brake Cars

As an Auxiliary to Air-Brake Equipments the Hand-Brake Parts Should be Designed and Maintained so that Full Braking Pressure, Equivalent to that Supplied by the Air-Brake Cylinder, Will Be Available Throughout the Entire Travel of the Piston

By J. S. McWhirter

Superintendent of Equipment Third Avenue Railway System, New York City

WHEN deciding on the proportion of levers and other brake-rigging parts in connection with the use of hand brakes on electric railway cars, the problem must be considered from one of two distinct angles, depending on whether the hand brakes are used as the sole means of braking the car or they are installed on cars provided with air brakes, the hand-brake mechanism being used only as an auxiliary to the air-brake equipment. On account of their quick application and ease of operation, air brakes have become the standard means of braking electric railway cars. This article covers only the design of that type of hand brake used as an auxiliary to an air brake.

The necessity for a hand brake for emergency use on cars equipped with air brakes arises from the fact that the air brakes occasionally become inoperative because of burst or broken air pipes, frozen air, disabled compressor equipment and power supply failures. Hand brakes are also required when disabled cars are being towed over the road and when cars are left in storage or become stalled, especially on grades. Provision must be made so that a disabled air-brake car can be handled with absolute safety, and to insure this a wide braking range is necessary.

On account of the very great difference in the initial force available to make a satisfactory brake application by either of the two methods, the one using human effort and the other using the power developed by a motor-driven compressor, the speed of application by hand as compared with that when using air must necessarily be sacrificed in order to obtain the braking power and range of action required.

In the design of a hand-brake layout for use as an auxiliary to an air brake, the arrangement of the levers between the brake cylinders and the brakeshoes is of little consequence except in so far as it affects the results to be obtained with the air brake. If the arrangement is such that satisfactory results can be obtained with the air brake, the application of hand-brake pull to the brake cylinder push rod, equivalent to that obtained from the air, will produce corresponding results It is important to design the brake rigging between the cylinder and the shoes so that full piston travel will be secured without fouling of the rigging members. If they foul before the full piston travel is obtained, the working range of both hand and air brake is affected. A release spring should be provided for the release of the hand brakes, and it should be independent of the means provided for the release of the parts of the equipment operated by air pressure. It is essential that the pressure applied by the hand brake shall remain uniform throughout the entire travel of the air cylinder piston. In this respect hand air brakes in use on many of the cars throughout the country today have proved unsatisfactory.

It can be said, with credit to the industry, that there is a desire on the part of the managements of a majority of the roads throughout the country to maintain hand brakes in good operating condition, and that an effort is being made to do so. Many of them fail in their effort, however, solely because they are struggling with hand-brake equipment of an improper design and with which it would be impossible to obtain satisfactory results. When failures occur many operating men have a tendency to place the blame for this failure on the mechanical department. On the other hand, the mechanical department sometimes charges the failure to the operating department on the theory that the hand brakes are never tested or used and that consequently they get out of order through disuse.

A hand brake which has been correctly designed and installed with adequate consideration of its use as an auxiliary to the air brake equipment will not become inoperative through disuse when properly maintained, and when operated in an emergency will give the service that is expected of it. Unfortunately there is, however, a property to be found here and there on which the value of the hand brake has been discounted to the point where it has been allowed to become wholely inoperative. In a few cases the operation of cars is permitted on which the hand brakes have been disconnected. To jeopardize the lives of passengers, employees and others by placing such cars in service, especially where they are operated in single units, is a condition which should not be allowed under any circumstances.

HAND BRAKES SHOULD OPERATE WITH MAXIMUM PISTON TRAVEL

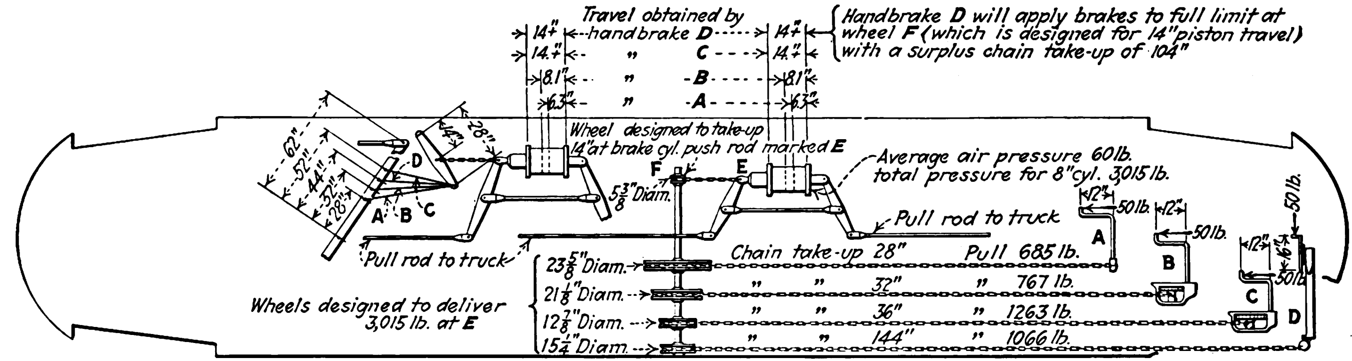
As examples of the calculation and consideration which should be given to the proportioning of the various brake-rigging parts of hand brakes when applied to air-brake cars, two diagrams illustrating typical brake studies are shown. The first of these is for a car equipped with an 8-in. brake cylinder and the second for an installation with a 12-in. brake cylinder. In the design of air-brake equipment, the usual practice is to provide for a maximum piston travel of 12 in. In order to prevent the hand brake from going out of commission as a result of excessive piston travel, or, in other words, to design a hand brake with a wider working range than that of the air brake, it is recommended that in the design of the hand brake provision be made for a total piston travel or travel of the brake cylinder push rod of not less than 14 in.

The question may arise as to the necessity for providing a working range of 12 in. for the air brake and 14 in. for the hand brake, where the cars are equipped with slack adjusters which automatically keep the piston travel between 4 in. and 5 in. Also where cars are not equipped with slack adjusters it is the general practice to set the maximum piston travel at not more than 6 in. to 7½ in. The answer is that in spite of careful maintenance slack adjusters will occasionally get out of order and permit of excessive piston travel.

To simplify the diagrams the complete proportioning of parts has been worked out for a design employing sheaves. However, at the left in each diagram is shown an arrangement employing levers. The first point to be considered in the sheave design is to provide a wheel which will take up 14 in. of chain at the brake-cylinder pushrod. Experience has shown that a wheel of 5⅝ in. diameter is the smallest that can be used to give the necessary satisfactory operation. Referring to the first diagram, which is for an 8-in. brake cylinder with an average air pressure of 60 lb., the total pressure will be 3,015 lb. at the brake-cylinder pushrod. This is one of the constants of the problem. The other is the pressure applied at the brake handle. In this brake study the latter has been assumed at 50 lb.

FOUR TYPES OF HAND BRAKES CONSIDERED

The study has been made for four different types of hand brakes, designated by the letters *A*, *B*, *C* and *D*. Type *A* is the ordinary staff hand brake, *B* is a geared hand brake similar to the Peacock size A-B, *C* is a geared hand brake similar to the Peacock size E, and *D* is for the Peacock staffless brake. Now with 50 lb. applied to the brake staff of each of these types of brakes, it is found that the pull delivered to the hand-brake chain is respectively 685 lb., 767 lb., 1,263 lb., and 1,066 lb. The maximum chain take-up for the different types of brakes is 28 in., 32 in., 36 in. and 144 in. respectively. By knowing the pull on the brake chains and the total pressure at the brake cylinder, the necessary diameter of the sheaves to deliver 3,015 lb. at the brake-cylinder pushrod can be calculated. The diameters of the sheaves necessary to give this pressure are 23⅝ in. for the type *A* brake, 21⅛ in. for the type *B* brake, 12⅞ in. for the type *C* brake and 15¼ in. for the type *D* brake.


Travel obtained by
14+" handbrake D 14+"
14.+" " C 14.+"
8.1" " B 8.1"
6.3" " A 6.3"
Handbrake D will apply brakes to full limit at wheel F (which is designed for 14" piston travel) with a surplus chain take-up of 104"
62"
52"
44"
32"
28"
14"
28"
D
A B C
Wheel designed to take-up 14" at brake cyl. push rod marked E
F
E
5⅝" Diam.
Average air pressure 60 lb. total pressure for 8" cyl. 3,015 lb.
Pull rod to truck
Pull rod to truck
12"
50 lb.
12"
50 lb.
12"
16"
50 lb.
50 lb.
A
B
C
D
Chain take-up 28" Pull 685 lb.
" " 32" " 767 lb.
" " 36" " 1263 lb.
" " 144" " 1066 lb.
23⅝" Diam.
21⅛" Diam.
12⅞" Diam.
15¼" Diam.
Wheels designed to deliver 3,015 lb. at E

Note:- By using a 20" handwheel in place of the 16" wheel on brake *D*, a pull of 1,333 lb. is obtained on the brake chain, and the diameter of the sheave wheel can be reduced to 12¼"

Hand Brake Layouts for Cars with 8-In. Brake Cylinders

Type of Hand Brake	Designated by Letter	Pull Delivered by Hand Brake	Braking Power at E	Maximum Chain Pull Obtained by Hand Brake	Chain Pull Required by Hand Brake for 14 In. Push Rod Travel	Maximum Travel of Push Rod at Point E	Surplus Chain Take-Up	Deficiency of Chain Take-Up	Remarks
Ordinary staff.......	A	685 lb.	3,015 lb.	28 in.	62 in.	6.3 in.	.....	34 in.	55 per cent less than required
Peacock, size A-B....	B	767 lb.	3,015 lb.	32 in.	55 in.	8.1 in.	.....	23 in.	42 per cent less than required
Peacock, size E......	C	1,263 lb.	3,015 lb.	36 in.	34 in.	14.+ in.	2 in.	.....	5.8 per cent more than required
Peacock, staffless.....	D	1,066 lb.	3,015 lb.	144 in.	40 in.	14.+ in.	104 in.	.....	260 per cent more than required

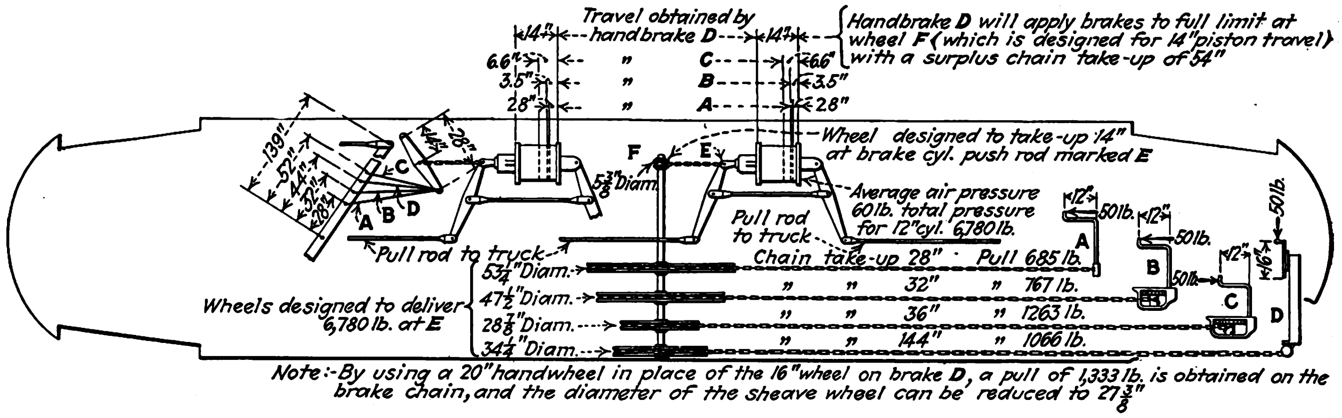
SOME HAND BRAKES HAVE INSUFFICIENT CHAIN TAKE-UP

The next and most important part of the problem is to determine what movement of the brake-cylinder pushrod will be obtained when the entire length of chain has been taken up by the various types of hand brakes. In the first case, with the type *A* brake, the chain take-up of 28 in. will provide a maximum travel of the pushrod of but 6.3 in., beyond which point the hand brake is useless. In order to obtain 14 in. travel of the brake-cylinder pushrod, a total chain take-up of 62 in. would be required. Thus the use of this type of brake will result in a deficiency of 34 in. in the amount of chain take-up, or 55 per cent less than what is required.

Similar calculations and analyses for the other three types of brakes have been made and are included in the table with each diagram. With the type *B* brake it is found that there is a deficiency of chain take-up of 23 in., which is 42 per cent less than that needed. With the type *C* brake there is a surplus of 2 in. of chain take-up or 5.8 per cent more than is required. With the type *D* brake there is a surplus of 104 in. in chain take-up, which is 260 per cent more than the requirement. It is thus seen that the type *C* and type *D* brakes are the only ones that could be used with this particular equipment and provide the safety of operation that is necessary for a hand brake to be used as an auxiliary to the air-brake mechanism.

The length of the brake handle used in these calculations has been taken as 12 in. and the diameter of the hand wheel with the type *D* brakes as 16 in. Of course a different length of brake handle or a different diameter wheel will give different results. Thus, with a 20-in. hand wheel in place of the 16-in. wheel, a pull of 1,333 lb. is obtained on the brake chain and the diameter of the sheave can be reduced to 12¼ in. The pressure of 50 lb. assumed on the brake staff has been decided on as satisfactory for the braking of a light car. The various sheave diameters obtained, of course, only illustrate theoretical conditions, as it would be impossible to install sheaves of a diameter as large as that found necessary in the majority of these studies.

The second diagram illustrates a similar study made for a car equipped with a 12-in. brake cylinder. In this case, an average air pressure of 60 lb. gives a total pressure at the brake-cylinder pushrod of 6,780 lb. The study has been made for the same four types of brakes and the accompanying tabulation shows the results that will be obtained. With the type *A* brake the maximum travel of the pushrod is but 2.8 in., and there is a deficiency of chain take-up of 111 in., which is 80 per cent less than that required. With the type *B* brake the maximum travel of the pushrod is but 3.6 in. and the deficiency of chain take-up is 92 in. or 74 per cent. With the type *C* brake the maximum travel of the pushrod is 6.6. in., the deficiency of chain take-up is 40 in. or 53 per cent, and with the type *D* brake there is a surplus chain take-up, after giving the maximum travel of 14 in. at the brake rod, of 54 in. or 60 per cent more than is required. It is thus seen that only the last type of installation could be used satisfactorily with this air-brake equipment.


Travel obtained by
14"
hand brake D
6.6"
3.5"
2.8"
C
B
A
"
14"
6.6"
3.5"
2.8"
Handbrake D will apply brakes to full limit at wheel F (which is designed for 14" piston travel) with a surplus chain take-up of 54"
Wheel designed to take-up 14" at brake cyl. push rod marked E
139"
52"
44"
32"
28"
14"
28"
C
A
B
D
F
E
$5\frac{3}{8}$" Diam.
Pull rod to truck
Pull rod to truck
Average air pressure 60 lb. total pressure for 12" cyl. 6780 lb.
Wheels designed to deliver 6,780 lb. at E
$53\frac{1}{4}$" Diam.
$47\frac{1}{2}$" Diam.
$28\frac{7}{8}$" Diam.
$34\frac{1}{4}$" Diam.
Chain take-up 28" Pull 685 lb.
" " 32" " 767 lb.
" " 36" " 1263 lb.
" " 144" " 1066 lb.
12"
50 lb.
12"
50 lb.
50 lb.
12"
16"
50 lb.
A
B
C
D

Note:-By using a 20" handwheel in place of the 16" wheel on brake D, a pull of 1,333 lb. is obtained on the brake chain, and the diameter of the sheave wheel can be reduced to $27\frac{3}{8}$"

Hand Brake Layouts for Cars with 12-In. Brake Cylinders

Type of Hand Brake	Designated by Letter	Pull Delivered by Hand Brake	Braking Power at E	Maximum Chain Pull Obtained by Hand Brake	Chain Pull Required by Hand Brake for 14 In. Push Rod Travel	Maximum Travel of Push Rod at Point E	Surplus Chain Take-Up	Deficiency of Chain Take-Up	Remarks
Ordinary staff.......	A	685 lb.	6,780 lb.	28 in.	139 in.	2.8 in.	.....	111 in.	80 per cent less than required
Peacock, size A-B....	B	767 lb.	6,780 lb.	32 in.	124 in.	3.6 in.	.....	92 in.	74 per cent less than required
Peacock, size E......	C	1,263 lb.	6,780 lb.	36 in.	76 in.	6.6 in.	.....	40 in.	53 per cent less than required
Peacock, staffless....	D	1,066 lb.	6,780 lb.	144 in.	90 in.	14.+ in.	54 in.	.....	60 per cent more than required

The point that should be stressed in connection with this brake study is that no hand brake is safe for operation as an auxiliary to the air-brake equipment of a car which will not develop the full braking power, as provided by the air, brakes, throughout and beyond the travel of the piston. Every operating official should have a check made of the hand-brake equipment of his air-brake cars, in order to determine if it is adequate and safe, and should settle to his own satisfaction the following two questions:

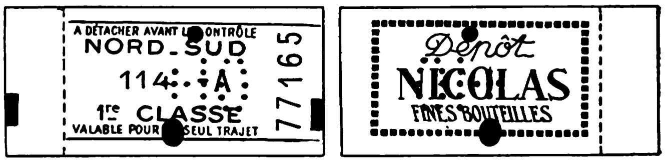
1. Is the hand-brake equipment, for which I am responsible, adequate and safe under all conditions, including long piston travel? If not, am I properly safeguarding the property intrusted to me by the owner?
2. What is my position from the standpoint of negligence, in case of an accident resulting in the loss of human life, which could have been prevented with a hand-brake equipment of proper design?

A simple test to determine the working range of a hand brake is to slack off the brakeshoes sufficiently to permit a piston travel of 12 in. or more at the brake cylinder and then to apply the hand brake. If the pushrod cannot be pulled beyond the maximum travel of the piston the hand brake does not meet the requirements as outlined.

The two studies presented are those which have come under the writer's supervision in connection with the installation of hand brakes on cars of the railway with which he is connected. It appears, however, that a more exhaustive study with recommendation in regard to hand-brake equipment could be made with profit, and it is suggested that perhaps this might be a subject for consideration of the American Electric Railway Engineering Association, since it has a material bearing on both the safety and economy of electric car operation.

Paris Subway Tickets Carry Advertising

IN CONFORMITY with a general disposition on the part of the French post office, county and municipal authorities, use is being made of every possible small advertising space. Telegrams carry an advertisement of somebody's soap and postage stamps have a flier attached calling attention to a bottled water. The Paris subway's first-class tickets now carry the advertisement of a whole line of bottled goods on the reverse side, as shown in the accompanying illustration.


A DÉTACHER AVANT LE CONTRÔLE
NORD-SUD
114 A
1re CLASSE
VALABLE POUR UN SEUL TRAJET
77165
Dépôt
NICOLAS
FINES BOUTEILLES

Front and Back of Paris Subway Ticket Showing Advertising

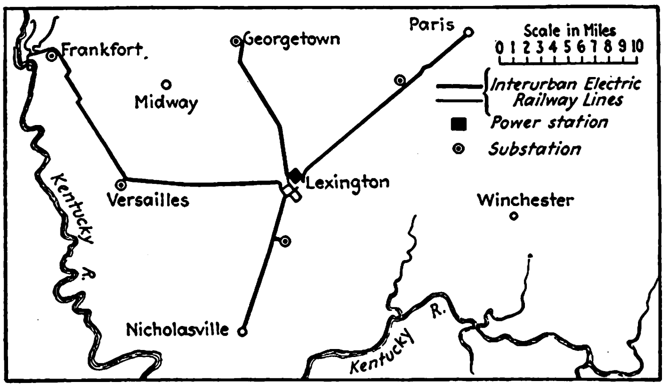
Effect of Automobiles on Interurban Traffic

Twelve Years' Records from Lexington Show that with Greatly Increased Motor Travel Railway Lines Are Holding Their Own

ALL realize that the tremendous increase in the number of private automobiles has had an influence on the demand for electric railway transportation, but in very few instances have any statistics been compiled as to just what this influence is, or even the extent of automobile travel, except for counts in isolated cases on individual streets. There has been particular lack of data in regard to the extent of private automobile competition with interurban roads.

An exception to this condition exists in the case of the interurban lines extending out of Lexington, Ky., as operated by the Kentucky Traction & Terminal Company. There are four of these lines, as shown on the accompanying map. The highways leading out from Lexington to the cities served are paved with asphalt, the communities served are largely agricultural and prosperous, and the number of private automobiles in proportion to the population is large.

Three tabulations have been made by the Kentucky Traction & Terminal Company of the automobile traffic passing over the main highways parallel to the four divisions shown on the map. One of these traffic counts has only recently been completed, having been made on June 27 and 28 for the period from 6:30 a.m. to 6 p.m. and the average of these two days was taken; they were considered typical as regards traffic. A corresponding count extending over two days was made in August, 1921, and still an earlier one extending five days in August, 1912. In consequence, the company has records for each of these three years for two days in summer which are considered typical as regards the number of automobiles and number of passengers carried by them. The figures, with the corresponding figures of railway traffic, as based on the averages for the months mentioned, are given in the accompanying table, except that on the Paris division it was impossible to make a check this year because the road was torn up and the traffic was diverted. The comparison of the automobile figures on the Paris division between 1921 and 1912 does not differ greatly from those on the other divisions, as shown below:



Interurban Lines Extending Out of Lexington, Ky.

PARIS DIVISION

	Automobiles	Passengers
August, 1921	779	1958
August, 1912	120	411
Increase 1921 over 1912, per cent	550	375

It will be noted from the large table that for the three divisions where statistics are given the railway gross revenue for 1924 as compared with 1912 is less by 6 per cent and the number of passengers by 28 per cent, while the number of trips per day increased 8 per cent. This increase in number of trips is owing to the use of one-man interurban cars, the company being one of the pioneers in the use of the light-weight interurban safety car.

The total increase in travel on the three lines shown, including both electric railway and automobile, is very noticeable. Practically all of this increase has gone to the automobile, the railway just about holding its own in regard to traffic. To what extent this will continue in the future it is impossible to say.

REVENUE, PASSENGER AND AUTOMOBILE DATA, KENTUCKY TRACTION & TERMINAL COMPANY

	Railway Statistics				Automobile Statistics		
	Average Passenger Revenue per Day	Average Passengers Carried per Day	Average No. Single Trips Operated per Day	Average Number Passengers per Trip	Average Automobiles per Day	Average Passengers per Day	Average Passengers per Automobile
Versailles Division							
June, 1924, average	$192.13	726	33	22	1,181	2,654	2
August, 1921, average	232.56	1,297	26	46	598	1,405	2
August, 1912, average	217.64	1,509	30	50	71	246	3
Increase* 1924 over 1912, per cent	*11.7*	*52.0*	9.0	*56.0*	1,560	978	*33.3*
Increase 1924 over 1921, per cent	*17.3*	*44.5*	27.0	*52.3*	97	88	....
Increase 1921 over 1912, per cent	6.7	*14.1*	*13.3*	*8.0*	742	470	*33.3*
Georgetown Division							
June, 1924, average	141.03	748	32	23	751	1,586	2
August, 1921, average	112.16	606	24	25	442	1,066	2
August, 1912, average	147.16	812	28	29	41	108	3
Increase* 1924 over 1912, per cent	*4.1*	7.9	14.2	*26.0*	1,731	1,368	*33.3*
Increase 1924 over 1921, per cent	25.7	23.4	33.3	*8.0*	69	48	....
Increase 1921 over 1912, per cent	*23.8*	*25.4*	*16.6*	*13.8*	977	888	*33.3*
Nicholasville Division							
June, 1924, average	127.36	763	32	23	882	1,876	2
August, 1921, average	123.59	646	22	29	502	1,191	2
August, 1912, average	126.76	800	30	27	59	170	3
Increase* 1924 over 1912, per cent	0.4	*4.6*	6.7	*14.8*	1,395	1,004	*33.3*
Increase 1924 over 1921, per cent	3.0	18.1	45.0	*22.2*	75	57	....
Increase 1921 over 1912, per cent	*3.5*	*19.2*	*26.6*	7.4	752	600	*33.3*
Summary—Versailles, Georgetown and Nicholasville Divisions							
June, 1924, average	460.52	2,237	97	68	2,814	6,116	2
August, 1921, average	468.31	2,549	72	100	1,542	3,662	2
August, 1912, average	491.56	3,121	88	106	171	524	3
Increase* 1924 over 1912, per cent	*6.3*	*28.6*	7.9	*35.8*	1,545	1,067.1	*33.3*
Increase 1924 over 1921, per cent	*1.7*	*12.3*	25.0	*32.0*	82.4	67.0	....
Increase 1921 over 1912, per cent	*7.1*	*18.4*	*18.2*	*6.0*	801.7	598.8	*33.3*

Note 1. The same dates were used in making up the interurban data for comparison with automobile checks.

Note 2. Interurban rates in effect month of August, 1912—Cash and ticket fares 0.02 per mile; mileage books 1.5 cents per mile. Rates in effect August, 1921—Cash and ticket fares 0.03 per mile; mileage book 0.03 per mile. Rates in effect June, 1924—Cash fare 3.25 cents per mile; ticket rate 0.03 per mile.

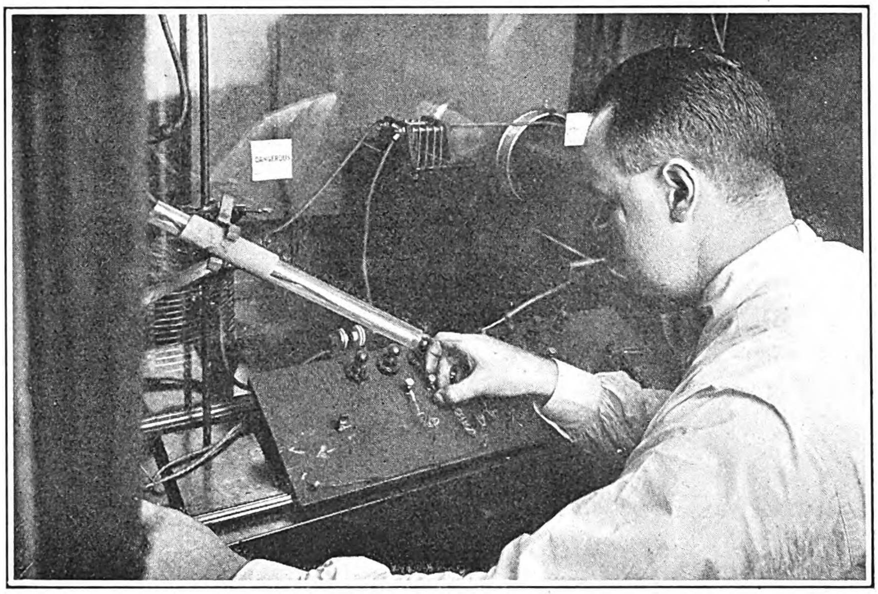
* *Italic* indicates decrease.

Modernizing Employment Methods

Based on Experience in Many Differing Lines of Industry, Some Factors that Must Be Taken Into Account in Selecting Men Are Pointed Out—General Interviews and Physical Examination Do Not Give an Indication of Reactions of the Man When Operating Vehicles Under Traffic Conditions

By Dr. A. J. Snow

Department of Applied Psychology, Northwestern University
Consulting Psychologist to John Lucas Company, A Stein & Company,
Hart, Schaffner & Marx, National Association of Taxicab Owners



A Test for Reaction in Emergency

Inclosed in a small darkened cabinet, the subject is required to carry out certain instructions when startled by a sudden electric flash

ANALYSIS of the qualities required in employees for various classes of work makes it possible to rate applicants in accordance with their physical and mental fitness for the particular job to be filled. Such an analysis soon shows that the general "sizing up" of an applicant in an interview is a very unreliable method of selecting men to handle vehicles in congested city streets. "Intelligence," which is used as a general term by employment department heads to indicate mental alertness in an interview, has been shown to be no fair measure of an applicant's qualifications for certain types of work, particularly where this calls for regular performance of routine duties.

Although an electric railway motorman or a bus or cab driver must possess "intelligence" to a degree which assures proper interpretation and execution of orders, and must also possess good "judgment," it has been shown by tests in other industries that general "sizing up" in an interview is no accurate measure of these qualities, and also that the employment of applicants in routine work for which they are too highly developed may result in a high rate of labor turnover.

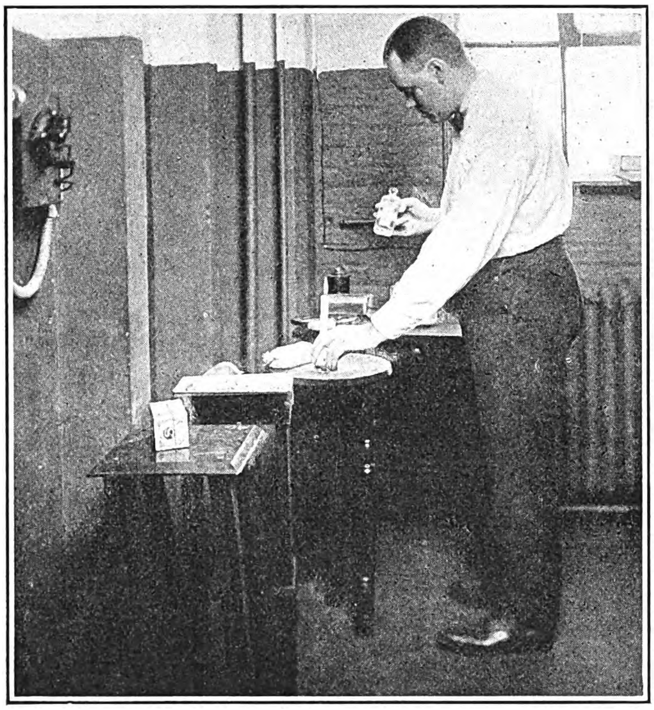
General Interview Is Misleading

It may come as a matter of surprise to many employers that intelligence is by no means the great requisite in selecting men for every job. Ask most superintendents or personnel managers what kind of man they would prefer for any position and they will answer at once: "The most intelligent man I can get for the money," the necessary technical training being assumed, of course. But if you question the employer further as to just what sort of intelligence he wants to hire, you are likely to get little more than a surprised stare. He hires the "most intelligent" man, and a few weeks later either the man quits or he makes a costly error which results in his discharge. Then the employer says that he "got fooled" on that man. He wasn't so intelligent after all. I do not assert that such employment mishaps can be eliminated entirely by applying psychological principles to hiring. But I have no hesitation in saying that they can be cut down to such an extent as to make large savings in labor turnover.

There are many places in almost every line of industry where too much intelligence is certain to promote a high turnover of labor. Take the motorman, for instance. Only after a thorough study of his job can all of the requisites to fill it be determined. But it must be apparent offhand that a very high degree of intelligence is not only unnecessary but actually proves a source of loss to the employer. A highly intelligent man will not remain permanently at the controller. Sooner or later the company will have to train a new man for his place, at whatever expense might be attendant upon such an operation. I am certain it will be agreed that a motorman or bus driver needs (1) enough intelligence to understand ordinary instructions, (2) a strong sense of caution and responsibility and (3) quick comprehension of dangerous situations and instant muscular reaction to them. Possibly other requisites would be revealed after study, but suppose we assume the foregoing to be complete.

How many employers could interview an applicant and determine whether he possessed the above qualifications? Certainly a prospective employee could not be assumed to have all of them merely because he gave evidence of being "highly intelligent." Suppose, for instance, the man appears to be very alert mentally. If he is too alert there may be danger that the routine and constantly recurring duties of the motorman's job will fail to hold his attention. His mentality, being considerably beyond the requirements of his work, easily wanders away from it and a bad accident is the result. A mind, however, which is just about equal to the job has to be concentrated upon it and constitutes a much better type of mind to hire for that motorman's place. Of course if the alert man possesses good powers of concentration the danger is largely eliminated. But as I have said before, feeling himself fitted for a better paying position, he is unwilling to remain a motorman long and soon seeks a change from the place which his employer had trained him to fill.

Now suppose the intelligent man were habitually or by nature careless. There can be no dispute as to his undesirability as a motorman. He would not be on his guard in dangerous traffic. His stops and starts would be rough and he would have a tendency to be careless in regard to the safety of passengers. In a hundred ways he would unconsciously fail to heed the safety rules laid down by the company. And a person can be highly intelligent and at the same time entirely lacking in caution. Can any of this be determined by an interview?



The Caution and Judgment Test

The method in which the subject transfers a group of familiar objects to the three small tables shown indicates both his sense of caution and the judgment which he is capable of exercising.

The third quality of quick reaction to dangerous situations is one which is ingrained in a man. If he hasn't got it you can't do much about it. Furthermore, you can't discover whether he has it merely by talking to him. He may be highly intelligent and lack this reaction altogether, or be stupid in many ways and have it to a high degree. At any rate, the man who reacts slowly or improperly to dangerous situations is certainly unsafe in control of any conveyance in which human beings are riding. Confronted with a sudden emergency, he fails to utilize the safety devices that are provided for just such situations, and on questioning he says, "The brakes or the reverse didn't work." And let me repeat, his bearing in the employment interview does not reveal this. It is imbedded deep in his nervous system. It shows up only by a test under conditions similar to but not identical with those he will encounter on the job.

Encouraging advances have recently been made in devising methods of testing applicants for these specific qualities. The object, of course, is to weed out misfits at the start—to select men whose mental and nervous make-up is such that they will have low accident records. One particular field in which considerable work along this line is being done at the present time is that of taxicab operation. The National Association of Taxicab Owners, during the last six months, has been working out a series of tests which already have proved their utility in determining whether a man is safe to trust at the steering wheel of a motor car. The results obtained have checked with remarkable accuracy against the accident records of several hundred of these men who have been professional chauffeurs for a number of years in Chicago. It has been found to make no difference whether the subject of the test has ever driven a car or not. The qualities which he needs—intelligence, caution and quick nervous reaction to the needs of emergencies—are not attributes which come with training. Either the man has them at the start or he hasn't them. The experienced man, if he is a misfit, is as likely to show up poorly in the test as the green man. If he does so, his record card will usually show that he has a poor accident record. When the green man shows up poorly he had better not be hired; he will accumulate a bad accident record, with consequent expense to his employers.

CAUTION AND JUDGMENT CAN BE MEASURED

In some of these tests which have been carried on in Chicago the factor of intelligence was determined by methods which correspond in a general way with the United States Army intelligence tests, but which were adapted to what was considered the requirements of the transportation business. The results reveal whether the man has good memory, perception, attention, learning, arithmetical knowledge, reasoning powers and ability to follow directions.

One of the accompanying illustrations shows a method of testing the driver's caution and judgment. He is given a set of widely varying objects to transfer from one place to several other locations as quickly as he can, arranging them in the new places as he thinks best. It may be said that the manner in which the objects are handled and placed reveals to a surprising degree the quality of the candidate's judgment and detects any tendency toward carelessness. Many men appear to be careful enough when under the eye of a superior, but the test indicates whether he is so constituted by nature.

As shown in the illustration, the apparatus seems simple enough. The kitchen table in the far corner bears miscellaneous objects met with every day. The round-topped table nearest it carries a lighted candle and is so balanced that it will not support a heavy object on one side without upsetting. The next table bears a pan of water and the one in the foreground has rickety legs which prevent it from remaining level and cause it to fall over easily. The subject is instructed to take the objects from the kitchen table and place them upon the three other tables as quickly as possible and in any arrangement he chooses. In the illustration he has already put a package of butter upon the very rickety table and an electric light globe in the pan of water; he has put a sack of salt beside the lighted candle and is laying an egg upon this table with one hand, while in the other he holds a bottle marked "gasoline" as he tries to determine a proper resting place for it. Other objects on the far table must be similarly transferred to the three others.

Some subjects have been known to put the eggs upon the very rickety table, the salt in the pan of water and the gasoline bottle directly beside the lighted candle. The locations selected for the various objects and the time taken to place them determine the grade given the subject in this test.

TESTING FOR REACTION IN EMERGENCY

In the illustration on page 387 the subject is tested for quick action in an emergency. He is seated in a small closed cabinet before a group of apparently complicated apparatus that is marked "dangerous" by conspicuous tags. The cabinet is dark and he is required to carry out instructions by the light of a small pilot lamp. His left hand and left foot press down upon contact keys that keep electrical circuits closed (merely to indicate to the observers that he is retaining the proper position). His right foot also rests upon a contact key. He is instructed to insert the ends of the coiled wires into the binding posts shown, and then if anything unusual happens to remove his right foot from its contact key and quickly stamp down on a brake pedal which is pointed out to him. At the same time he must turn a small switch at the right of the board, but continue to hold down on the contact switches with his left foot and hand.

As he proceeds to insert the wires in the binding posts a brilliant arc suddenly leaps across the gap in the glass tube shown in the illustration. At the same time arcs also pass between the ends of the wires above his right hand and from a wire just above his left hand and he receives a slight electric shock. The time between the starting of these arcs and the completion of the instructions given for the right foot and hand indicate the time required to act in the emergency. Failure to keep the left hand and foot in the proper position also indicates whether or not the subject is able to retain control of all his muscles when the emergency occurs.

Out of the hundreds of Chicago chauffeurs who have taken these tests 90 per cent of those who made poor grades were found to have unfavorable accident records upon the personnel cards of their employers. Conversely, those who made good marks were found to have clean accident scores. Unquestionably, could the men who had the bad records have been eliminated by such a test before they were hired their employers would have been saved many thousands of dollars in damages and lost time. A final check is now being made among a group of 5,000 drivers preparatory to disseminating the methods of testing among the membership of the National Association of Taxicab Owners.

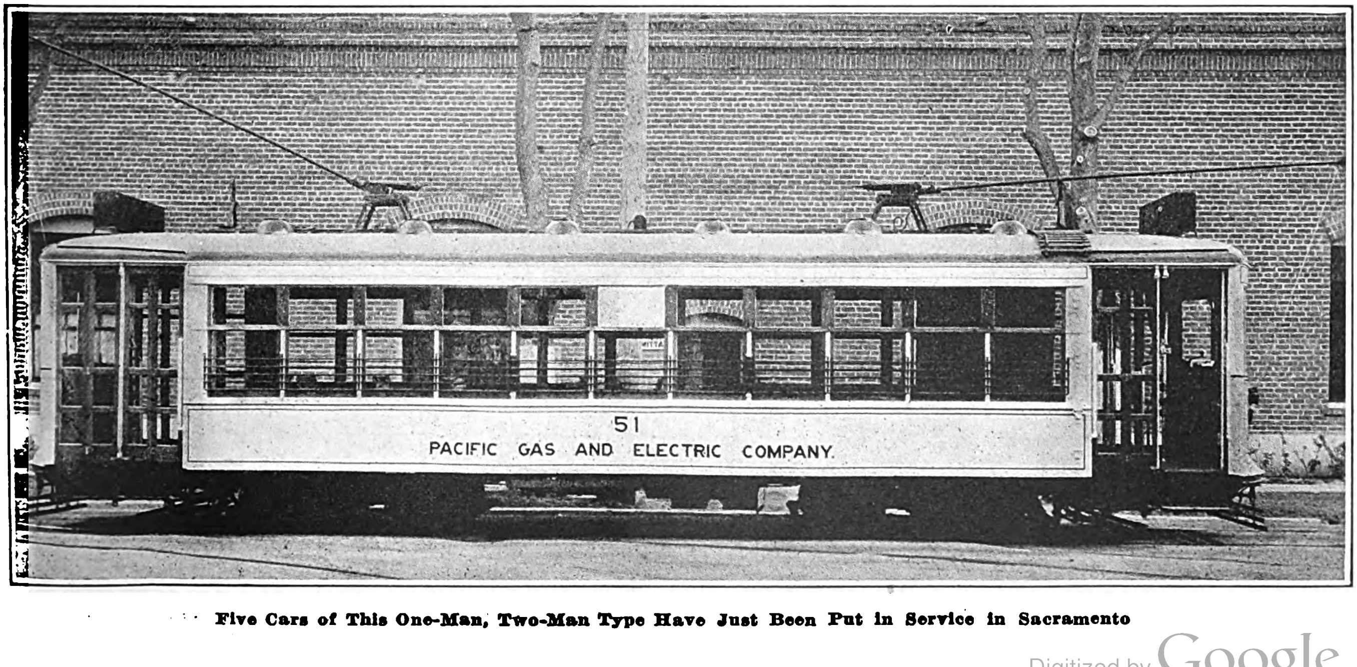
Railway operators already have recognized the principle of scientific employment to the extent that they already test for general health, eyesight, hearing, etc. By extending such examinations to include the specific mental and physical characteristics desired in platform employees, they can cut down their accident records and labor turnover still more.

One word of caution is advisable. Such work must be carried out by experts who have given the subject of psychological selection of employees careful study. Most failures in the application of such methods are directly attributable to the employment of amateurs or novices in this work. Where proper experience is brought to bear in devising methods of selecting men for certain specific employment requirements results in a wide range of industries have been most gratifying.

Sacramento's Latest Type Cars

A NEW type of street car for Sacramento, Cal., has recently been put in operation by the Pacific Gas & Electric Company. These cars weigh 24,000 lb. and are of the largest type yet used in Sacramento. They are of the standard double-truck type, equipped with General Electric motors and Westinghouse air brakes. It is possible to operate them either as one-man or two-man cars. They cannot be started while passengers are boarding or leaving.

The front doors can be operated either independently or together at the option of the motorman. The rear doors are also controlled by the motorman. An auxiliary valve on the outside makes it possible for a street col-



Five Cars of This One-Man, Two-Man Type Have Just Been Put in Service in Sacramento

lector to operate the rear doors on a busy corner, permitting entrance from the front and rear at the same time. The seating arrangement has been designed to allow generous aisle spaces, the seats for half the length of the body on either side being longitudinal and the remainder of the cross type.

The cars were manufactured by the American Car Company, St. Louis, and were delivered in Sacramento four months from the time of ordering. The five cars cost $56,650.

3,000-Volt Locomotives for South African Railway

Designed for Use on Narrow-Gage Line Three 75-Ton Units Are Coupled Together to Haul 1,430-Ton Freight Trains

A LATE development in main-line railway electrification is that of the Glencoe to Pietermaritzburg section of the South African Railway. The section which is being electrified will have to deal chiefly with the hauling of heavy mineral traffic down to the coast. The track has a route mileage of 171 miles traversing very hilly country with long and difficult grades. It reaches an altitude of 5,000 ft. above sea level and runs down to the 2,200 ft. level at Pietermaritzburg. In this latter portion of the line there is one grade which drops more than 1,350 ft. in a distance of 14½ miles.

The catenary overhead contact wire carries 3,000 volts d.c. with track return. The power is converted at substations along the line, which are supplied by a three-phase overhead transmission system at 88,000 volts, 50 cycles.

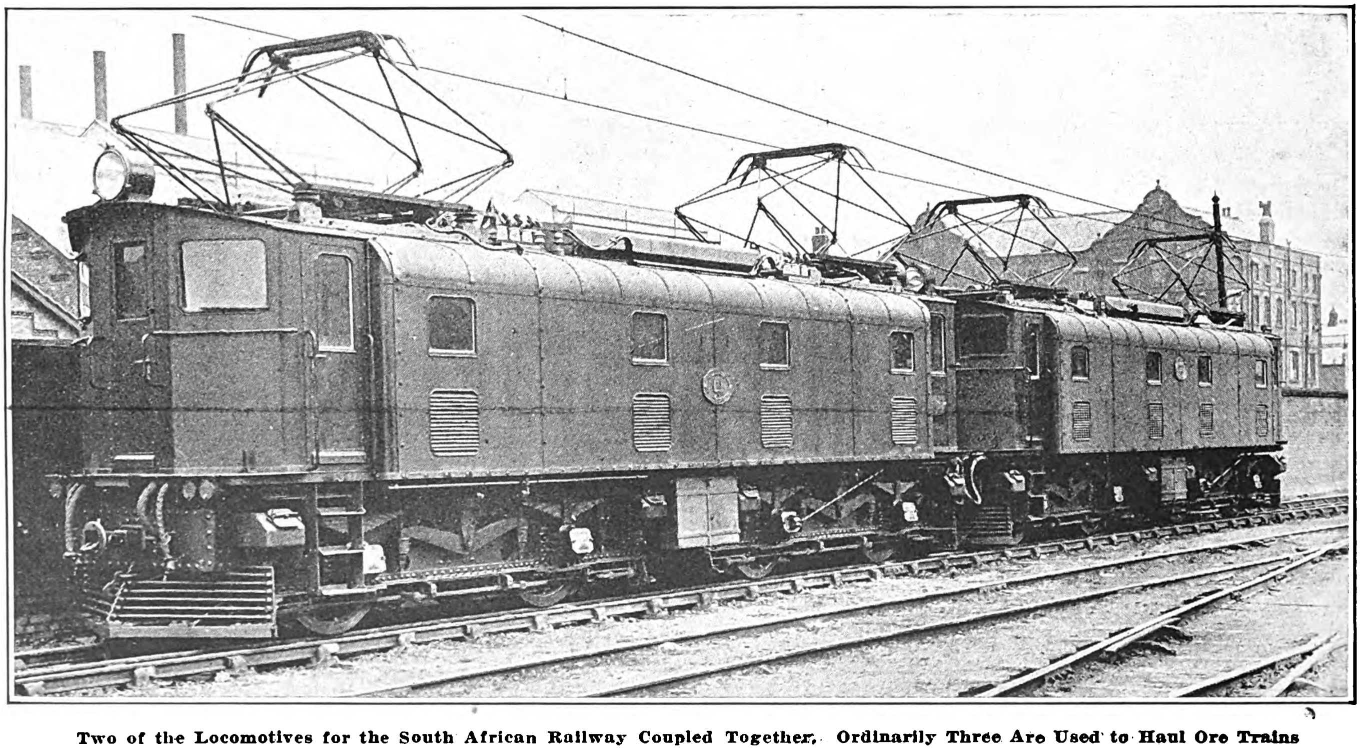
In connection with this project the Metropolitan-Vickers Electrical Company, Ltd., is supplying 78 combined passenger and freight locomotives. In view of the limitations of the track, such as the gage, which is 3 ft. 6 in., a minimum radius of curve of 300 ft., the loads per axle, and the very heavy trains that have to be dealt with, a single locomotive unit is unsuitable. Consequently, three engines are coupled together, driven in multiple, and controlled from one driver's cab. In normal working three locomotives haul a freight train of 1,430 short tons to Pietermaritzburg, and on the return trip one of 700 short tons. Wherever control of speed on a down grade is necessary, this is done by the regenerative action of the locomotive alone.

The leading dimensions of the locomotive are:

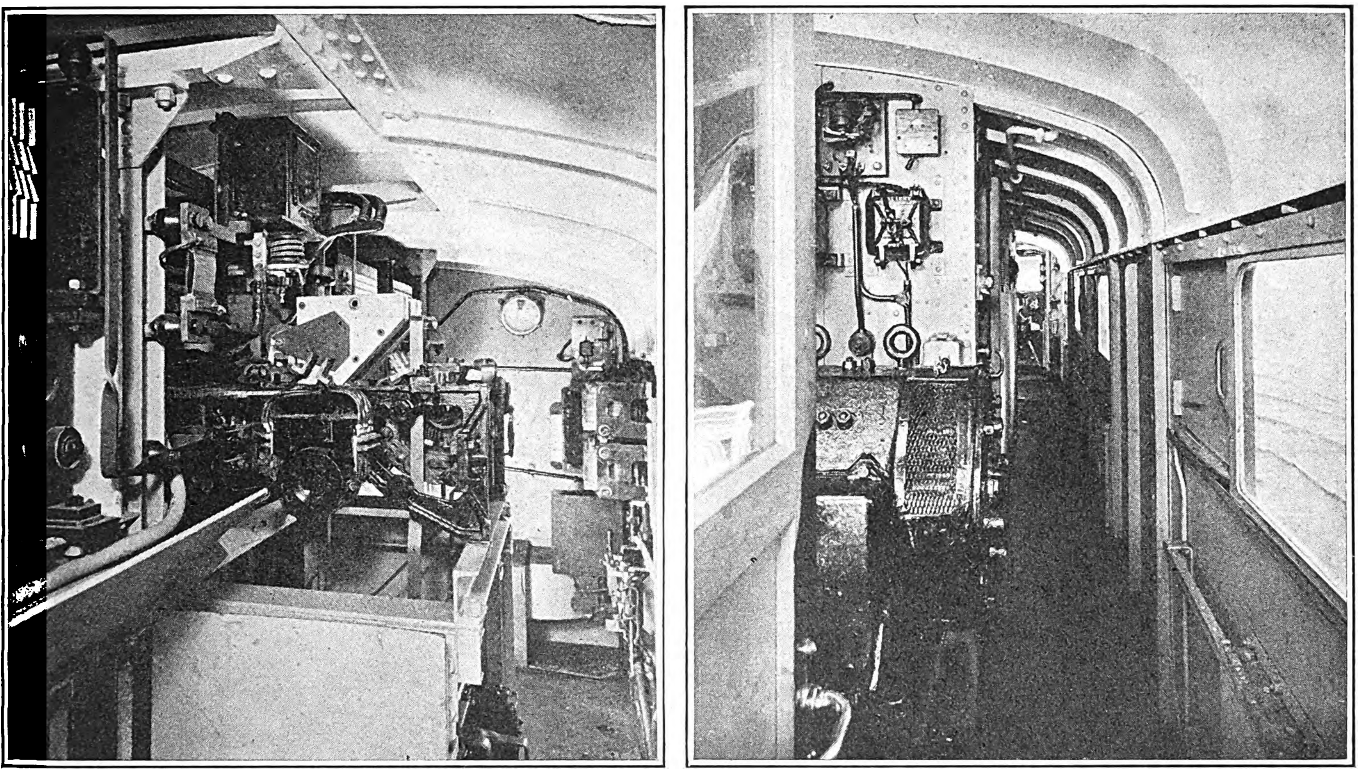
Weight per driving axle	37,300 lb.
Weight in working order	149,200 lb.
Weight of mechanical portion	88,250 lb.
Weight of electrical portion	60,950 lb.
Type of locomotive	AA + AA
Gage	3 ft. 6 in.
Motor equipment	Four 300-hp. motors
Total motor rating, one hour	1,200 hp.
Tractive effort at one-hour rating, full field	21,200 lb.
Tractive effort, maximum	40,000 lb.
Tractive effort, continuous, full field	16,400 lb.
Speed at one-hour rating, full field	21.5 m.p.h.
Speed at continuous rating, full field	23 m.p.h.
Maximum safe speed	45 m.p.h.
Traction system	3,000 volts d.c.
Brakes	Compressed air
Over-all length	43 ft. 8 in.
Overall-height of body (pantograph down)	12 ft. 11.3 in.
Over-all width of body	9 ft. 2.25 in.
Diameter of driving wheels	4 ft. 0 in.
Fixed wheelbase	9 ft. 3 in.
Total wheelbase	30 ft. 11 in.
Distance between truck centers	21 ft. 8 in.

The body of the locomotive containing the electrical equipment and auxiliary gear is supported by two four-wheel trucks coupled together at their inner ends by an articulating joint. The buffing and draw gear, which is of the central type, is mounted directly on the trucks.

The body of the locomotive is divided into five compartments. There is a driver's cab at each end. In the center is situated the high-tension compartment containing all the high-voltage control gear. The spaces between the high-tension compartment and the cabs at each end are occupied by the auxiliaries, which include two motor-generator sets, each coupled to a blower; a compressor; exhauster; reservoirs containing air for the brakes, low-tension control gear and pantographs, and low-tension switches; and contactors for controlling



Two of the Locomotives for the South African Railway Coupled Together. Ordinarily Three Are Used to Haul Ore Trains



In the View at Left of the High-Tension Chamber the Cam Switch Group Can Be Seen. At Right, View Along the Corridor. The Motorman's Cab May Be Seen at the Far End. In the Foreground Is the 16-Kw. Motor-Generator

the auxiliary gear. The sections of the roof above these compartments and the clerestory roof above the high-tension compartment are easily removed to lift out the heavy machinery and control gear.

The vacuum brake system is used on all the rolling stock, but the locomotive brakes are operated by compressed air.

The four main motors are of the series type, two connected permanently in series, thus having 1,500 volts per commutator. They are rated at 300 hp. with full field on the one-hour test basis, corresponding to a speed of 21.5 m.p.h. with a gear ratio of 17/75 and 48-in. wheels. The magnet frame is cast in one piece and is octagonal in shape. The suspension of the motor is carried out by means of the axle bearings and a nose which is supported on rubber springs held in the suspension bracket on the truck transom. The motor has four poles with interpoles; a tap is made on the main field to give reduction in excitation. The motors are arranged for forced ventilation. Air enters at the commutator end through a flexible duct leading from the blowers and flows in parallel paths through the machine, leaving by means of openings at the pinion end.

Each locomotive has two pantograph collectors which are pneumatically operated through an electrically operated valve controlled by a two-way switch in the driver's cab. The driver has complete control over all pantographs from one cab.

Current is led through to the main equipment by way of the main control switches in the high-tension compartment. The switches are pneumatically operated and have a normal contact pressure of 140 lb. These switches are arranged in two groups of 10 and 11 respectively, along the longitudinal center line of the locomotive. These switches are operated by a double-ended piston carrying a rack which engages on a pinion fixed to the end of the cam shaft. The cam groups are used for the motor combination, forward and reverse, motoring and regenerating, and the weak field connections.

Arranged above the unit switches are the resistance frames. They are of the cast-grid three-point suspension type and the pressed-steel type, the latter being used for the stabilizing resistances and for the earlier steps of the accelerating resistance.

The high-tension compartment also contains electromagnetic contactors for starting up the motor-generator sets, the auxiliary fuse groups, which are of the expulsion type, motor overload and over-voltage relays, stabilizing resistances and switches, and all other high-voltage gear.

The master controllers have three independent drums on one central spindle. These drums are used for the motor combinations, series and parallel in forward, and series in reverse, acceleration and regeneration respectively. Complete mechanical interlocking is adopted, no blow-out coils are required since the control is on a 100-volt circuit. The control equipment can be completely isolated by a multi-point cut-out switch which is connected between the main terminal boards and the control equipment.

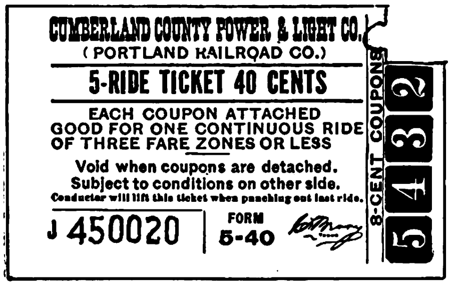
Complete lighting is installed and is supplied from the 100-volt circuit which is fed by generator in parallel with a 100-volt battery.

There are two motor-generators of 16-kw. and 28-kw. capacity respectively. The motors of both are similar, in having two distinct windings connected to a commutator at each end of the armature, the two being connected in series externally. The motor fields are in series on the low-tension side of the armatures and also with the series fields of the generators. The two motor-generators are connected in series to the 3,000-volt circuit.

The 28-kw. set is used for exciting the fields of the main motors when in regeneration, and the 16-kw. set is used for supplying the control circuits, lights, exhauster, compressor and cab heaters and exciting the larger generator and maintaining the battery on charge through an automatic battery cut-out switch.

Tickets Used by 95 per Cent of Pay Passengers

AN UNUSUALLY large proportion of the passengers of the Cumberland County Power & Light Company, Portland, Me., use tickets in paying fares on the street cars. The cash fare is 10 cents and the tickets are sold five for 40 cents. Transfers are free. Cash fares are paid largely by visitors in the city, which accounts for the fact that in winter tickets are used by approximately 97 per cent of the revenue passengers, as compared with about 93 per cent in summer. The plan of selling tickets has been in force for some four years with varying rates of fare, in each case a considerable reduction being obtainable through the purchase of tickets. The type of ticket shown in the accompanying illustration, is transferable and is good until used. Distribution is obtained by sale on the cars and at the company's office, which is at the principal transfer station in the center of the city.



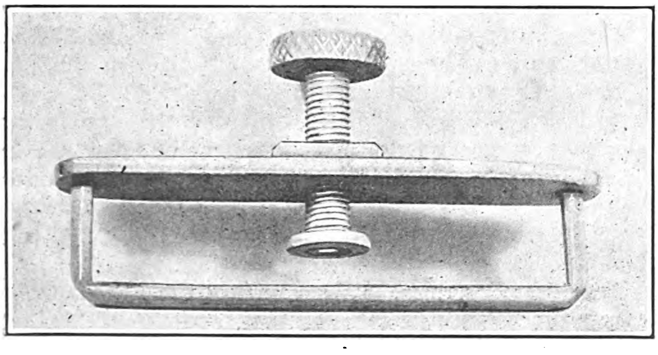
CUMBERLAND COUNTY POWER & LIGHT CO.
(PORTLAND RAILROAD CO.)
5-RIDE TICKET 40 CENTS
EACH COUPON ATTACHED
GOOD FOR ONE CONTINUOUS RIDE
OF THREE FARE ZONES OR LESS
Void when coupons are detached.
Subject to conditions on other side.
Conductor will lift this ticket when punching out last ride.
J 450020
FORM
5-40
8-CENT COUPONS
5 4 3 2

This Type of Ticket Is Popular Among the Car Riders in Portland, Me.

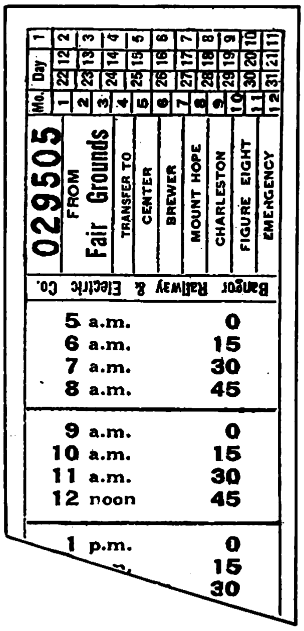
When presented for fare the conductor cancels one of the five numbered spaces with a special punch. The ticket fares are not recorded on the register, so that it is impossible to keep an accurate check on the operators' returns. It is stated, however, that with such a large proportion of ticket users there is little likelihood of loss to the company on account of dishonesty of the operators. Since most of the railway service is given with one-man cars, the extensive use of tickets has been of considerable assistance.

Diagonal Tear-off Transfer Used in Bangor

A CONVENIENT form of tear-off transfer is in use on the lines of the Bangor Railway & Electric Company, Bangor, Me., where all cars except those on the Old Town line are one-man operated. This transfer has on the left-hand side a column in which are listed all the hours from 5 a.m. to 12 p.m. inclusive. These are divided by horizontal lines into groups of four. In a parallel column, on the right hand side, the figures 0, 15, 30, and 45 are printed in groups of four opposite the hours.



This Device Holds Transfers in Place and Acts as a Cutting Edge for Tearing Them Off



1	2	3	4	5	6	7	8	9	10	11
Day	12	13	14	15	16	17	18	19	20	21
	22	23	24	25	26	27	28	29	30	31

Mo. 1 2 3 4 5 6 7 8 9 10 11 12

029505
FROM
Fair Grounds
TRANSFER TO
CENTER
BREWER
MOUNT HOPE
CHARLESTON
FIGURE EIGHT
EMERGENCY

Bangor Railway & Electric Co.

5 a.m.	0
6 a.m.	15
7 a.m.	30
8 a.m.	45
9 a.m.	0
10 a.m.	15
11 a.m.	30
12 noon	45
1 p.m.	0
	15
	30

The Bottom Figures on This Transfer Show the Time of Issue

The time limit of the transfer is indicated by the last numbers at the bottom, the remainder of the transfer being torn off. A diagonal cutter has been arranged so that an adjustment as close as fifteen minutes is possible. Schedules are arranged so that the cars of the several lines meet at the transfer points. The time shown on the transfer is therefore the time when the issuing car is due at the meeting point.

Transfers are held in place under a thin piece of steel, about $\frac{1}{16}$ in. wide and $\frac{1}{16}$ in. thick, clamped fast by a set screw. The edge of this steel acts as a cutter when the transfers are torn off. No punching need be done when the transfers are issued and they can be torn from the pad without the operator looking at it. This arrangement has been found very useful on one-man cars.

Each route operated by the railway has a transfer of a different color, purple, green, white, yellow, brown and red being used. The fact that the a.m. transfers are shorter than the p.m. transfers makes it easy to distinguish them at a glance and has prevented abuse of the transfer privilege.

The Readers' Forum

British and Continental Rail Standards

EDGAR ALLEN & COMPANY, LTD.
SHEFFIELD, ENGLAND, Aug. 14, 1924.

To the Editors:

With your permission, I would like to make a few comments on the paper by Mr. d'Hoop, chief engineer of the Brussels Tramways, before the recent International Tramways Congress in Paris and printed in abstract in your issue of July 19.

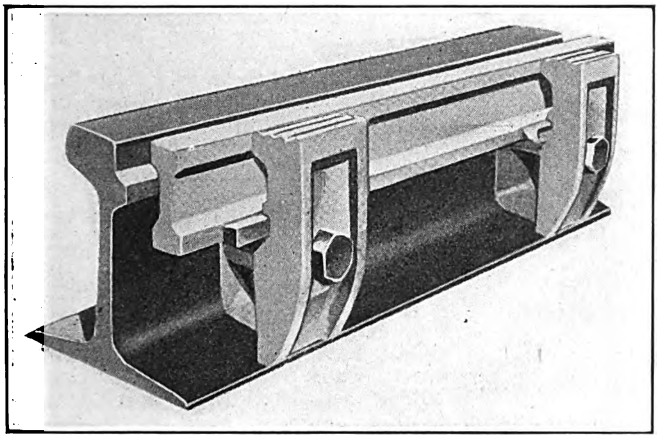
In the first place, I do not agree with the remark: "The differences between the requirements of rails for electric railway and for steam railroad service are not realized by the manufacturers."

It is not the rail makers alone who determine the sections. These are decided by the standard committees of the different countries where they exist, and they are responsible for the various alterations which are made in the sections.

In this country the manufacturers are represented upon the standard committee, and there is no doubt that this has helped to evolve better sections. I send you a drawing on which I have placed the three sections recommended by Mr. d'Hoop, which are those elaborated by the Technical Commission of the Swiss Railways, together with a comparison of three French standard sections, which are very near to these, also one English section, B.S.S.8, which is the only one comparable.

The use of the flat top rail of course requires cylindrical wheels. There is no doubt that they give excellent results or France would not have adopted them.

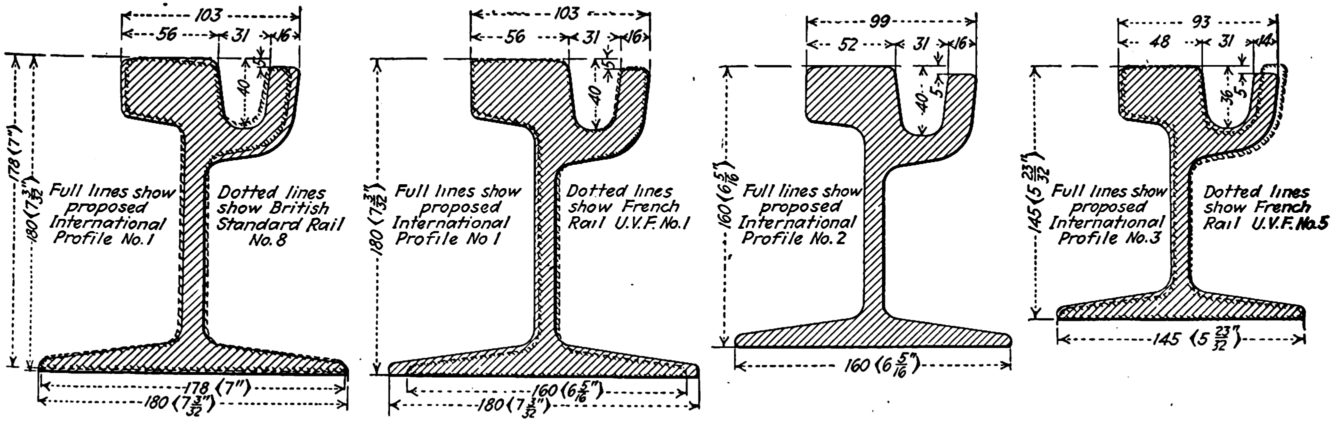
In this country the present British standard has a radius of 12 in. on the running edge, a dimension which has been evolved after some years of trial. The early sections were coned 1 in 21 and afterward altered (although not standardized) to a 12-in. radius, which was considered to be the approximate curve of the rails after a few years wear.


Reversible Guard Bolted to Rail

The London County Council, however, had adopted a 6-in. radius head, which was thought to be too great by the generality of the engineers, and the standard to it is a 9-in. radius, similar to that shown on No. 8.

There are certain dimensions which Mr. d'Hoop does not consider of importance to standardize, but I consider that the depth of the groove and thickness (or depth) of the head of the rail (or running surface) is very important, and both groove and tread should be in relation to each other.

The English Board of Trade regulations affect tramway rails to a very great extent, and it is only during the last two or three years that the deep groove, as shown on No. 8, has been accepted, much to the advantage of tramways generally, as the life is greatly increased.


103
56
31
16
5
40
178 (7")
180 (7 3/32")
Full lines show proposed International Profile No. 1
Dotted lines show British Standard Rail No. 8
178 (7")
180 (7 3/32")
103
56
31
16
5
40
180 (7 3/32")
Full lines show proposed International Profile No 1
Dotted lines show French Rail U.V.F. No. 1
160 (6 5/16")
180 (7 3/32")
99
52
31
16
5
40
160 (6 5/16")
Full lines show proposed International Profile No. 2
160 (6 5/16")
93
48
31
14
5
36
145 (5 23/32")
Full lines show proposed International Profile No. 3
Dotted lines show French Rail U.V.F. No. 5
145 (5 23/32")
Comparison of Proposed International Standards with Existing French and British Standards

In this country the width of the groove is very rigidly insisted upon, which is not the case in other countries.

With regard to guard rails, Mr. d'Hoop suggests that these vary considerably, but in this country manganese steel is chiefly used. I inclose a photograph showing a guard rail, known as Holt's, of which we have supplied over 60,000 ft. This guard is rolled in manganese steel in lengths of 20 ft. and attached to the rail, either in the first instance or when the guard of the rail is worn off. This guard can be reversed four times, but one reverse is usually sufficient as the manganese rail will outlast the ordinary rail and can be further used without any reversing. In one test case, taken after 4 years, it was found that the guard could be refixed in its old position, although 1,332,000 cars had passed over the one edge.

The rail joint question is the most important on a street tramway, and the practice of welding has increased very greatly during the past few years, but there is no standard. Various types are being used according to the engineers' ideas, very much as in your country. The various articles upon this question which appear in your issues from time to time are most interesting.

The rail sections used here have been "legion." We ourselves have made points and crossings to about 200 different sections, exclusive of American types, and these would probably double this quantity. But all countries have now greatly reduced their sections, and England, France, Germany and the United States have certain standards.

In this country there are now only three sections, viz., No. 6, which is 6½ in. deep (165.10 mm.), No. 7 and No. 8, 7 in. deep (177.80 mm.), with their corresponding curve sections. These sections have enabled us to reduce the cost of castings and to keep a stock of the principal radii, which in this country are 100 ft., 150 ft. and 200 ft. for side loop use. For equilateral points, or switches, the chief standard is 200 ft. radius. The above are considered to be the standard, but there are also certain others which are used but not standard, viz., 75-ft., 250-ft. and 300-ft. lateral radius, also 240-ft., 300-ft. and 360-ft. equilateral radius.

Finally there is no doubt that it would be of great assistance and economy if one set of standard rails was used generally, but that is hopeless, each country having its own regulations. Consequently, the English rail mills confine themselves to English sections.

It would be very interesting and very useful to have a comparison made of all the different standards. Possibly, in course of time, it may be done.

FRED BLAND,
Director, Tramway Department.

American Association News

Revisions of Convention Program

SINCE the publication of the program for the Atlantic City convention of the American Electric Railway Association and affiliated associations in the issue of ELECTRIC RAILWAY JOURNAL of Aug. 30 a number of features have been added and the positions of others have been transposed.

In the American Association the reports of the committee on community section, company section and individual membership, C. E. Morgan chairman, and the committee on company and associate membership, R. P. Stevens chairman, will be presented at the meeting Thursday morning, Oct. 9, immediately following the election of officers.

The addresses by Messrs. Harris and Hoyt will be given at the session to be held Tuesday evening, instead of Tuesday and Thursday mornings. The full program for this evening session follows:

Tuesday Evening, Oct. 7

GENERAL EVENING SESSION

Ballroom, Million Dollar Pier, 9 p.m.

Mme. Josephine Lucchese, coloratura soprano

Charmant Oiseau....................David
(LaPerle du Bresil)—Flute obbligato.

ADDRESS — "Financing of Electric Railways," by J. P. Harris, vice-president Union Trust Company, Cleveland, Ohio.

Mme. Josephine Lucchese, coloratura soprano.

Southern Fantasy......Arranged by Luck

Address—"Relation of Municipal Officers to the Utility," by Mayor William A. Magee, Pittsburgh, Pa.

Mme. Josephine Lucchese, coloratura soprano..

Mad Scene.......Lucia..........Donizetti
(Flute obbligato)

Informal dancing.

ENGINEERING ASSOCIATION

In the Engineering Association program the reports of the committee on buildings and structures, N. E. Drexler chairman, and the special committee on car and carhouse wiring, H. H. Adams chairman, will be transferred from Monday afternoon, Oct. 6, to Tuesday afternoon, Oct. 7. In their place the committee on way matters, H. H. George chairman, and the committee on welded rail joint research, W. W. Wysor chairman, will report on Monday afternoon.

The meeting of purchasing agents and storekeepers scheduled for Tuesday, Oct. 7, at 2 p.m. will be held at the Marlborough-Blenheim Hotel, since it was found impossible to secure a meeting room on the pier. The address at this meeting on the topic "What the Purchasing and Stores Departments Can Do in Building Up Good Will for the Company" will be given by W. H. Sawyer, president East St. Louis & Suburban Railway.

T. & T. ASSOCIATION

At the symposium to be held Tuesday by the Transportation & Traffic Association the program will be as follows:

Tuesday Afternoon, Oct. 7

2 TO 5:30 P.M.

ADVERTISING AND PUBLICITY SYMPOSIUM

"It Can Be Done," by W. H. Sawyer, president East St. Louis & Suburban Railway.

"Selling Transportation by Boosting Your Home Town and Appealing to Home Pride," by L. K. Starr, manager public relation department, Georgia Railway & Power Company, Atlanta, Ga.

"Safety and How to Make It Interesting to Mothers and Children," by W. Dwight Burroughs, publicity agent and librarian United Railways & Electric Company, Baltimore, Md.

"Best Methods for Holding Companies to Get Action Throughout Their Territories," by John S. Bleecker, Day & Zimmermann, Philadelphia, Pa.

"Public Utility Sections of the Associated Advertising Clubs of the World," by W. H. Hodge, Byllesby Engineering & Management Corporation, Chicago.

"State Public Service Information Committees," by J. S. S. Richardson, director Pennsylvania Public Service Information Committee.

"The Interurban," by J. P. Griffin, vice-president and general manager Texas Electric Railway, Dallas, Tex.

Committee Meetings at Atlantic City

A NUMBER of important committee meetings are scheduled in Atlantic City during convention week. All the executive committees will hold meetings at the Marlborough-Blenheim Hotel as follows: Sunday, Oct. 5, Claims Association, 11 a.m.; Engineering Association, 2 p.m.; Accountants' Association, 3 p.m. Monday, Oct. 6, American Association, 10 a.m.; Transportation & Traffic Association, 11 a.m.

Other committees of the American Association will meet as follows:

Entertainment — Marlborough-Blenheim Hotel, Sunday, Oct. 5, 5 p.m.

Exhibits — Convention Pier, office of director of exhibits, Sunday, Oct. 5, 2 p.m.

Education — Will meet with educational directors of member companies at a luncheon at the Marlborough-Blenheim Hotel, Tuesday, Oct. 6, 1:15 p.m.

Meetings of the newly elected executive committees of the American and affiliated associations will be held as decided upon by their presidents.

Entertainment Features for Atlantic City Convention

THE committee on entertainment of the American Association met at Association Headquarters, New York City, Sept. 5. Members in attendance were F. H. Gale, chairman; Harry L. Brown, J. F. Craig and A. A. Hale. Others present were E. P. Waller, M. B. Lambert, E. C. Faber, C. S. Hawley, L. W. Shugg, N. A. Garland, C. R. Ellicott, Mr. Smith, J. W. Welsh and G. C. Hecker.

The various entertainment features at the Atlantic City convention will be in charge of the following subcommittees: Golf, G. A. Barnes, chairman; opening reception, J. V. Sullivan, chairman; "Playtime on the Pier," A. A. Hale, chairman; grand ball, L. H. Palmer, chairman; music, S. J. Cotsworth, chairman; ladies' entertainment, J. A. Dewhurst, chairman.

The entertainment plans for the Atlantic City convention were reviewed and the following program was approved:

SUNDAY, OCT. 5

9 a.m. to 5 p.m.—Golf tournament.

9 p.m.—Sacred concert at the Marlborough-Blenheim Hotel.

MONDAY, OCT. 6

9 p.m.—Opening dance in honor of the president and officers of the association; Ballroom, Million Dollar Pier.

TUESDAY, OCT. 7

3:30 to 5:30 p.m. — Ladies' card party, Rose Room, Traymore Hotel, bridge and five hundred.

9 p.m.—Ballroom, Million Dollar Pier. This is the general evening session, at which there will be two prominent speakers.

The entertainment features consist of selections by Josephine Lucchese, coloratura soprano, and accompanying artists. Following the regular program there will be informal dancing on the Pier.

WEDNESDAY, OCT. 8

3:30 to 5:30 p.m.—Ladies' entertainment; concert by Mme. Josephine Lucchese and accompanying artists, Blenheim Ballroom, Marlborough-Blenheim Hotel.

9 p.m.—Playtime on the Pier. The biggest and best show on earth will be staged in the Ballroom. Fun for every one. Informal Dancing.

THURSDAY, OCT. 9

9 a.m.—Grand ball. Ballroom, Million Dollar Pier.

Special Trains to Atlantic City

THIS year a special train will be run from New York direct to Atlantic City for the accommodation of delegates to the convention. It will leave the Pennsylvania Station Sunday, Oct. 5, at 1:40 p.m. and is due to arrive in Atlantic City at 4:45 p.m. This train will have the finest special equipment, and an entertainment committee is providing surprises and fun for those taking it.

Pullman reservations for the New York Special can be obtained only from the following members of the committee:

New England—J. W. Belling, General Electric Company, 84 State Street, Boston, Mass.

New York State—W. F. Stanton, New York State Railways, 267 State Street, Rochester.

New York City—C. H. Beck, Westinghouse Traction Brake Company, 150 Broadway, New York City.

A special train composed of the most modern all-steel Pullman equipment (club-car, open section, comparment and drawing-room sleeping cars and observation car, with dining car service) will be operated from Chicago for those desiring to attend the Atlantic City convention. This train will be an exact counterpart of the world-famous Broadway Limited, and the Pennsylvania Railroad officials give assurance that everything possible will be done to make the trip pleasant and comfortable.

The train will leave Chicago at 1 p.m. Central Standard time, Saturday, Oct. 4; Fort Wayne 4:03 p.m.; Lima 5:12 p.m.; Crestline 7:43 p.m. Eastern Time; Mansfield 8 p.m.; Alliance 10:08 p.m.; Pittsburgh 12:09 a.m. Sunday, Oct. 5. It will arrive at Atlantic City at 10 a.m. on Sunday.

Delegates from Toledo, Detroit and vicinity can use the regular train service of the Pennsylvania Railroad and connect at Mansfield or Pittsburgh with the Chicago Special. Delegates from Cleveland can use the regular service of the Pennsylvania and connect at Alliance. Delegates from Akron and Youngstown can use the regular service of the Pennsylvania and connect at Pittsburgh.

Attention is again called to the fact that to secure the reduction of one-half fare from the return trip, identification certificates which can be secured from association headquarters must be used, and tickets must be purchased from the railroad company's ticket agents. Diagrams for the Pullman cars on the Chicago Special will be kept at the office of H. J. Kenfield, vice-chairman transportation committee, care of *Electric Traction,* 431 South Dearborn Street, Chicago.

Plans are under way to run a through train direct from St. Louis via Pittsburgh. Those interested should communicate with B. W. Frauenthal, general traffic agent United Railroads of St. Louis.

Arrangements are being made to run a special car on the Pacific Limited leaving Oakland, Cal., at 4 p.m. Wednesday, Oct. 1. This is due to arrive at Chicago 1:55 p.m. Saturday and at Atlantic City about 7 p.m. Sunday, Oct. 5. Arrangements for this car are in charge of W. V. Hill, California Electric Railway Association, 58 Sutter Street, San Francisco.

Annual Convention
and Exhibits

A. E. R. A., Atlantic City

October 6, 7, 8, 9, 10

Standards Committee

A MEETING of the standards committee of the Engineering Association was held at association headquarters, New York City, Sept. 10. Members of the committee in attendance were: C. R. Harte, chairman; H. L. Andrews; C. C. Beck; J. A. Brooks; C. H. Clark; C. G. Keen; John Lindall; H. H. Norris; N. B. Trist and W. W. Brown represented W. G. Gove.

Representatives of the various standing committees present included F. M. Van Deventer, power generation and conversion; J. P. Dick, purchase and stores; G. C. Hecker, buildings and structures; C. W. Squier, equipment; H. H. George, way matters; and A. P. Way, wood preservation.

Recommendations of the various standing committees for standards and for miscellaneous methods and practices were given careful consideration and recommended actions were decided upon.

There was also a discussion as to how the engineering standards could be made more effective and the relation of the American Engineering Standards Committee to the work of standardization being carried on by the Engineering Association.

Engineering Subjects

THIS year the committee on subjects of the Engineering Association has been appointed in time that its work could be done, prior to the annual convention of the association at Atlantic City. The personnel consists of R. C. Cram, engineer surface roadway Brooklyn-Manhattan Transit Corporation, chairman; Morris Buck, R. H. Dalgleish, Daniel Durie and C. R. Harte.

A meeting of the committee was held at association headquarters, New York City, on Sept. 10. It was attended by Messrs. Cram, Buck, Dalgleish and Harte. Reports were received from the chairmen of this year's committees outlining the work that they have accomplished and making suggestions for next year's subjects. A program of subjects for next year's committees has been made up and adopted by the subjects committee. The report will be printed for advance circulation among the membership preparatory to discussion on the floor of the convention.

More "Traction Tom" Talks

A SPECIAL Traction Tom series of 10 advertisements designed to help break up the "Gimme-a-Ride" practice has been prepared by Labert St. Clair, advertising director, American Electric Railway Association.

These ads are so written that they can be used either in single or double column with the standard Traction Tom cut.

The following is typical of the series:

Mr. Motor Car Owner,
All along the line,
Pleasantville, N. Y.

MY DEAR FRIEND: You wouldn't intentionally do anything which would hurt our business.

Yet several times, lately, in an entirely thoughtless manner, no doubt, you have dropped into the habit of doing something that is hurting us greatly.

It is the habit of picking up our possible customers along our lines and delivering them to or near their destinations, without charge, just as a friendly act.

The spirit in which you do it is fine. Friendly acts, when they injure no one, keep the world happy. But the friendly act which hurts other folks and don't help you particularly are of a different type.

Whenever our automobile-owning friends pick up one of our customers it makes it just a little more difficult for us to provide service regularly for everybody.

I thank you,
TRACTION TOM.

Other Association News

S. A. E. to Discuss Public Service Vehicles

THE Society of Automotive Engineers will hold a two-day meeting on Sept. 18 and 19, concluding with a joint meeting with the New York Railroad Club on Friday evening. The program should be of unusual interest in many ways to electric railway men. There will be valuable papers on motor bus and motor truck design, operation and maintenance. Friday morning will be devoted to inspection of various motor haulage developments in New York City. The program for Thursday, Sept. 18, which is the motor bus session, follows:

10 a. m. to 1 p. m. and 2:30 to 5:30 p. m., at Hotel Pennsylvania.

Engineering problems of bus design and operation, by F. D. Howell, Motor Transit Company of Los Angeles, Cal.

Motor bus body design and construction, by Hugh Bersie.

Maintenance methods, by R. E. Fielder, chief engineer Fifth Avenue Coach Company, New York.

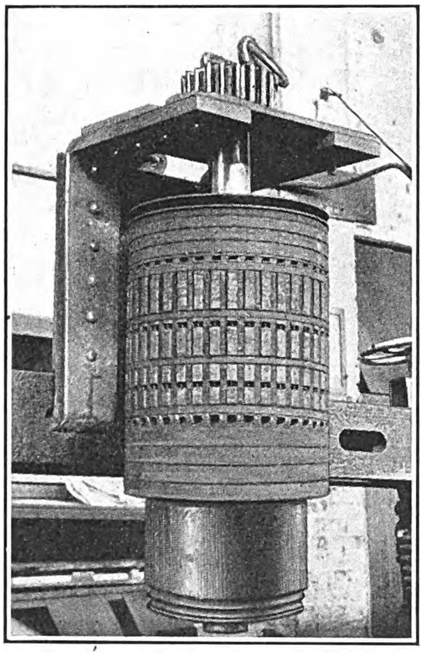
Operating experience of two public utility organizations that have found it profitable to install motor bus service, by V. E. Keenan, superintendent bus division, United Electric Railway, Providence, R. I., and J. B. Stewart, Jr., general superintendent Youngstown Municipal Railway, Youngstown, Ohio.

Views on motor bus design and operation, by W. F. Evans, president Detroit Motor Bus Company.

Maintenance of Equipment

Handy Support for Armatures

OFTEN it becomes necessary to press out an armature shaft because it has been bent or broken. The armature itself being in good condition, it is uneconomical to tear down the commutator end to remove the nut which holds the spider to the shaft. It is the practice in the Wheaton shops of the Chicago, Aurora & Elgin Railroad to split the retaining nut by drilling a number of small holes across its face. If such a procedure is performed with the armature in a horizontal position the borings may become lodged between the segments of the commutator or between the armature leads. This is likely to cause short circuits after the armature has been replaced in service. To eliminate the likelihood of these chips clinging to the commutator or armature, drilling of the nut at the commutator end of the laminations is done with an air drill from underneath, while the armature is suspended vertically in a bracket which engages the pinion.

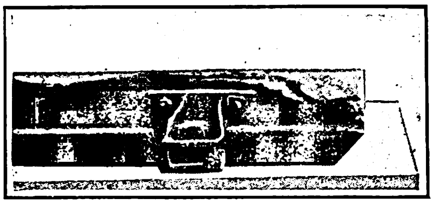

Armature Suspended so that the Spider Nut May Be Drilled Out Without Borings Becoming Lodged in the Commutator or Windings

Suspending an armature weighing 1,750 lb. in such a position without tying up one of the cranes or hoists is accomplished by means of a portable bracket attached to the top tension member of a wheel press. The bracket has two main supports of 5-in. x 1-in. steel, reinforced with ¼-in. steel gussets. The supports are so spaced that the vertical legs fit into two openings in the wheel-press tension member. The other ends of the supports are bent at right angles to the gusseted portion, but in the opposite direction to that of the legs. Two pieces of ¼-in. sheet steel are fastened to these legs. Both pieces are cut away at their facing edges to receive the armature shaft. One of these plates is fastened permanently to the legs, while the other may be swung out, allowing the armature shaft to be inserted. With the shaft in position a pin holds it in the closed position.

This device holds the armature so that the commutator end is approximately 4 ft. above the floor. It does not interfere with the use of the wheel press and it insures a clean commutator after the nut has been drilled.

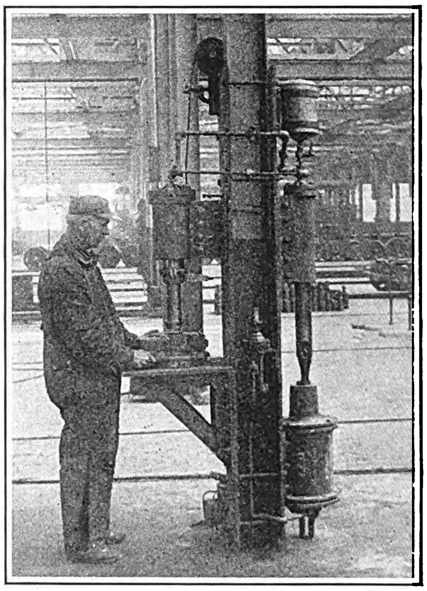
Welded Piece Restores Worn Switch Tongue

EXPERIMENTS have been made by E. W. Jennison, engineer maintenance of way Bangor Railway & Electric Company, Bangor, Me., to restore a worn switch tongue by welding in a piece of the web of an old rail. The shape of the piece used is arranged according to the amount of original metal worn away. After welding, the tongue is carefully ground down to proper size and shape. An example of a repair job of this sort is shown in an accompanying illustration. Switch tongues restored in this way are considered suitable for use anywhere except on main-line tracks. Their use in storage yards and similar places has effected important savings.


Switch Tongue Repaired by Welding in a Piece of the Web of an Old Rail

Pneumatic-Hydraulic Bearing Press

A NOVEL combination of pneumatic and hydraulic pressure is used in a bearing press installed in the new Hillcrest shop of the Toronto Transportation Commission, Toronto, Canada. The press, which has an arbor for pressing bearings into or out of the housings, is actuated by a hydraulic cylinder at the left of the column. This cylinder in turn is supplied with water by the operation of the cylinder at the right.


Bearing Press in the Hillcrest Shop of the Toronto Transportation Commission

Air pressure supplied from the shop air system is applied on the plunger of an air-brake cylinder beneath and so furnishes the power to operate the plunger of the hydraulic cylinder. The admission of air to the brake cylinder is governed by the motorman's valve directly in front of the column. The small tank above the hydraulic pressure cylinder contains a supply of make-up water, which can be added to the system as needed by opening a valve beneath.

Proper Brush Holder Spacing Essential

MAINTENANCE work on motors is reduced by keeping the brush holders in a good state of repair and properly aligned. Not only will this lengthen the life of the brush holders and carbons but, by improving the commutation and reducing flashing, the armature and field windings will give less trouble.

Many of the troubles in connection with railway motors may be traced directly to improper location of the brush holders in the motor frame. In almost all railway motors the brush holders should line up with the centers of the poles, and in all cases the distance from the center line of one brush holder to the center line of the other brush holder should be exactly equal to one-quarter of the distance around the face of the commutator. In addition to the necessity for correct spacing of the brush holders the sides of the brush holder box should be lined up parallel with the commutator bars. If they are skewed, the carbons will cover a greater number of commutator bars and thus short circuit too many armature coils.

Another point to watch in setting brush holders is to maintain the correct distance between the brush holder and the commutator surface. The under side of the carbon box should be from ⅛ to 3/16 in. from the face of the commutator. This reduces chattering and also the tendency of carbons to break.

While brush holder location may appear quite insignificant in itself, it is surprising to note the improvement in motor operation when misplacements are corrected. Particular attention should be given to the mechanical action of brush holder parts and to keeping spring pressures properly adjusted. In general, a spring pressure of about 5 lb. per square inch of contact area is considered good practice. This will give a range of pressure on the carbons of from 5 to 7 lb., depending on their size. If operating conditions are such that the brushes spark badly and there is a tendency for the motors to flash at high speed, the spring tension should be raised to from 7 to 9 lb.

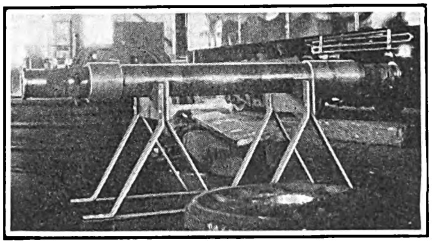
When carbon dust and dirt get into the working parts of the brush holders they are liable to work stiffly. The parts should be kept clean and lubricated occasionally. If neglected they will become tight and will not provide the necessary pressure. Excessive wear which throws the parts out of alignment is another result of neglect. The braided shunts should be kept in proper repair, in order to prevent the current from going through the spring mechanism and the sides of the carbon box.

Recent types of motors are provided with porcelain bushings for insulating the brush holders from the frame. It is important to keep these clean and free from dust and dirt, otherwise the necessary creepage distance to ground is reduced and short circuits will result.

When brush holders are mounted on the motor frame the pads or seats should be carefully cleaned and all burrs should be removed, in order to insure proper spacing and alignment. In making the connections from the wiring around the motor frame to the brush holders cables should be supplied with a sleeve or a terminal, depending upon the design of the brush holder. These connections should be kept tight, in order to secure a good electrical as well as mechanical contact. Set screws with lock washers and jam nuts should be used.

Convenient Stands for Supporting Axles

WHERE axles are rolled on the floor there is danger of injuring the bearing surfaces, and it is the practice in the shops of the New York, Westchester & Boston Railway never to allow the axles on the floor.



Axles Supported on Stands in the Shops of the New York, Westchester & Boston Railway

Stands for supporting the axles have been provided, as shown in the accompanying illustration. These consist of a top supporting plate, ⅜ in. x 8 in. x 2 ft. long. The center has a semi-circular recess to receive the axle. The supporting legs are made of steel straps ½ in. x 2 in. wide, and these are supported at the bottom by floor supports made of ½-in. x 2½-in. steel. All connections are riveted. By using these stands, axles are conveniently picked up by cranes and any inspection work is more readily taken care of than where axles are placed on the floor.

Increasing Trolley Wheel Mileage in Detroit

By A. C. Colby
Superintendent of Equipment
Department of Street Railways,
Detroit, Mich.

WHEN the Department of Street Railways took over the street car lines in the city of Detroit in June, 1922, an average of 2,352 miles was being obtained from trolley wheels, and the average for the first six months of the year 1922 was 4,450 miles. This mileage was considered low, and an investigation was started to determine the reasons. The principal troubles found were that the wheel hubs wore out rapidly and that flat spots developed in the contact grooves. The wheels which were being used at that time had a diameter of 5½ in. with a ⅞-in. grease chamber axle. The ends of the hubs were rather large, having a 3-in. diameter contact washer surface.

In an attempt to remedy the trouble the wheel was redesigned so as to cut down the frictional area at the hub of the contact washer to a 2-in. diameter area. A graphite bushing was also used instead of the grease lubrication, and manufacturers were checked carefully in order to eliminate eccentricity and unevenness in the metal mixture so as to obtain uniform hardness. The ⅞-in. axle was retained, but this was case-hardened and polished.

Trials were made of many type of wheels and harps, and it appeared that the most simple designs were the best and cheapest to operate. The graphite bushing gave the best means for lubrication, provided it was given a fair start by having the axle hard and smooth and by keeping all grease or oil away from the bushing. A drop or so of oil on the contact washer is desirable, but oil or grease on the bushing tends to soften the graphite mixture and spoils it.

Experience in Detroit with trolley wheels and axles which require refilling with grease at certain periods showed that they are sure to be neglected, and considering that the men doing this class of work must climb upon the roofs of cars in dark yards and on stormy nights, it is not surprising that many are missed;

MILES OPERATED AND AVERAGE TROLLEY WHEEL MILEAGE

Month	1922 Car-Miles Run	1922 Average Miles per Trolley Wheel	1923 Car-Miles Run	1923 Average Miles per Trolley Wheel	1924 Car-Miles Run	1924 Average Miles per Trolley Wheel
January	....	......	4,292,631.95	10,269	4,259,976	11,833
February	....	......	3,953,873.11	11,265	4,092,346	13,201
March	....	......	4,437,917.67	10,132	4,374,305	21,338
April	....	......	4,271,450.05	11,965	4,259,981	17,824
May	....	......	4,504,219.27	15,234	4,224,285	15,140
June	58,477.58	2,019	4,371,504.87	9,957	3,873,578	16,413
July	39,831.16	3,481	4,327,150.00	9,834	3,828,996	13,068
August	40,956.25	3,590	4,346,976.00	10,399	....	......
September	38,017.58	5,476	4,157,839.00	12,832	....	......
October	3,890,516.87	4,975	4,302,638.00	19,208	....	......
November	3,799,880.02	5,956	4,077,195.00	17,574	....	......
December	4,014,648.21	8,901	4,189,926.00	21,597	....	......

the results in Detroit also show that a large axle is desirable. Instead of using axles from ½ to ⅝ in. diameter, sizes of from ¾ to ⅞ in. give better results, providing a more generous wearing surface without producing excessive friction.

The accompanying table gives the total car mileage and the average mileage obtained per trolley wheel from June, 1922, up to and including July, 1924. While some months have shown a trolley wheel mileage of over 21,000, the average for the first seven months of 1924 is 15,545, which is a big improvement from the mileage originally obtained and is considered very encouraging.

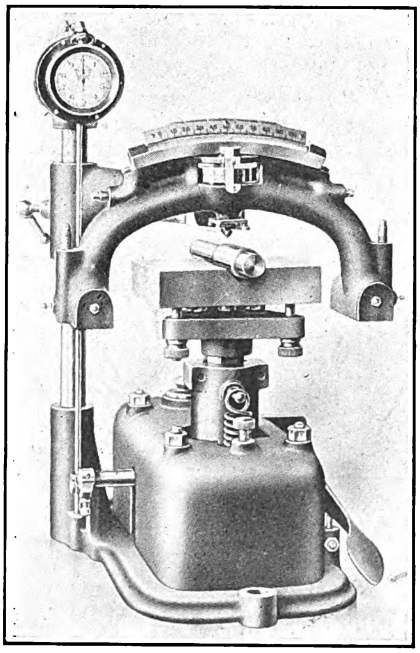
New Equipment Available

Improvements in Pendulum Hardness Tester

A PENDULUM hardness tester marketed by Edward G. Herbert, Ltd., Manchester, England, was described in the May 26, 1923, issue of the ELECTRIC RAILWAY JOURNAL. Since then, the manufacturer has made some improvements in this equipment, and also has developed a 24-kg. tester.

Improvements in the pendulum operating stand include provision so that the arm supporting the pendulum can be raised to admit specimens up to 6 in. deep. The table can also be replaced by special fixtures for testing irregularly shaped work. The standard pendulum can be used to make time tests on the stand and also to make scale, work-hardening and temperature tests by hand operation. Slight movements of one handle serve to release the table and allow it to rise until the pendulum swings gently on the work, also to operate the stop watch and to lower the table on to its three-point support.

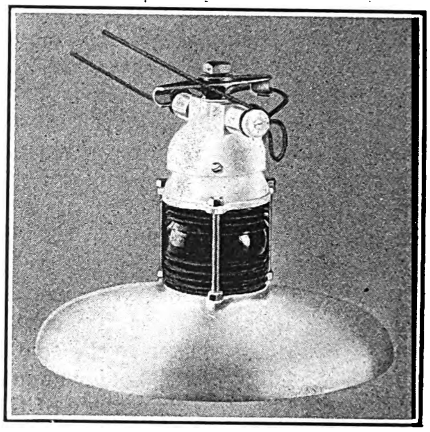
The 24-kg. pendulum hardness tester is a new development. It is identical in principle with the standard 4-kg. pendulum type but is adapted for testing much larger work. With it, hardness tests can be made on shafts or rolls up to a diameter of 30 in. and at any point on plates or other flat surfaces 30 in. wide. The pendulum weighs 24 kg. and is pivoted on a steel ball 3 mm. in diameter. Adjustable weights are provided whereby the center of gravity of the pendulum can be brought to the center of the ball, and a central weight mounted on a micrometer screw provides for adjusting the length of the pendulum. The 24-kg. equipment is adapted for making the same class of tests as the standard 4-kg. pendulum, and in addition tests may be made inside holes such as the bore of motors or bearings to determine their working hardness.



Improved Pendulum Hardness Tester

Double Duty Signal Lantern

A LIGHT-WEIGHT lantern arranged for the double duty of a warning signal and ground illumination is being marketed by the Nichols-Lintern Company, Cleveland, Ohio. The 4¾-in. Corning Fresnel lens provides for long-distance work and is furnished in either ruby, green, yellow or clear. A highly polished aluminum reflector of 16 in. diameter takes care of ground illumination, and one bulb furnishes the light for both jobs.



Light-Weight Signal Lantern

The lantern is furnished with mogul base receptacle and Edison base adapter. It is suitable for 100, 200, 300 or 500-watt lamps. Cast aluminum construction is used throughout, making the lantern light and eliminating rust or acid corrosion. The lanterns can be furnished with either span wire hanger or for ¾-in. pipe supension.

Corrugated Culverts Dipped After Forming

A NEW process of manufacture for culverts has been announced by the Wheeling Corrugating Company, Wheeling, W. Va. It consists of coating the finished culvert, after it is completely formed, with a protective surface of zinc. This method provides perfect coating unmarred by handling or forming, and the edges of the sheet are coated as well as the surfaces. The coating is applied by hand dipping, which the manufacturers claim gives a heavier and denser galvanizing than where other methods are employed, and therefore greatly increases the protection of the base metal. The method also makes it practicable to furnish extra heavy coatings.

The News of the Industry

Boston Arbitration Ended

General Manager Dana and Counsel Barnum Conclude Case for Railway—Award Awaited

Final arguments in the Boston Elevated Railway wage arbitration proceedings were completed on Sept. 3. The decision now lies with the special board of arbiters, including Judge John D. McLaughlin of the Superior Court, chairman; Charles W. Mulcahy, who represents the company, and James H. Vahey, who represents the Amalgamated Association. The hearings were begun on Aug. 13.

H. Ware Barnum, counsel for the Elevated, said the question is between two laboring classes—the railway employees on one side and the great laboring public, which pays the fares on the other. It is essential, he said, to determine what is a fair division of burdens among the laboring classes of the state. Mr. Barnum agreed that the financial condition of the company ought to be laid aside in considering wages up to the point of a living wage. He contended, however, that the present wages are far above the minimum standard. Mr. Barnum said:

> We believe that with an increase of 60 per cent in the cost of living, 100 per cent in carfares and more than 100 per cent in the wages of those men, it is too much that these men should ask their fellow men to pay more carfare in order to increase their wages.
>
> The question is what is a fair wage for these men compared with the condition of the people who ride in the cars. The present fare is all the public should be asked to pay to maintain the system in proper condition and to render reasonable service to the public. The company is demanding only a fare which will enable it to render reasonable service. The public, he said, is entitled to reasonable service, and that service must be met by the fares the public pays.

In speaking for the men, Mr. Vahey, one of the arbitrators and counsel for the men, said the employees were in a peculiar situation in that, by the agreement they have with the company, they cannot strike, regardless of the outcome of the arbitration proceedings. In view of this situation, Mr. Vahey argued, it would be unfair for the company to offer as an argument against any wage increase the law of supply and demand for labor or the financial condition of the company.

The public control act, said Mr. Vahey, has protected the stockholders by guaranteeing them interest on their investment at an approximate rate of 6 per cent, whereas no monetary protection is provided for the employees. When the public control act was devised, said Mr. Vahey, it was for the purpose of saving the railway from bankruptcy and of providing revenue sufficient to enable the company to operate at the cost of service. Mr. Vahey said:

> Included in the cost of service, necessarily is the cost of the labor of the men who run the cars and make money for the company. The Legislature never intended that the men should be discriminated against, since the cost of everything else was to be paid for even if an assessment were necessary.
>
> There was, in fact, one assessment, of something less than $4,000,000, and there is no doubt at all that the representatives of the cities and towns in the system stood ready to pay an assessment that would provide a living wage for the employes.

At a previous session of the arbitrators General Manager Dana of the Elevated testified that the estimated deficit of the company for August is $436,240, and that in July there was a deficit of $353,245. He declared that unless there is a decrease in the carmen's wages, with the road operating as it is now, with the same kind of service, the deficit at the close of the present fiscal year, on June 30 next, would be $732,000. Mr. Dana explained that the office employees enjoyed a two weeks' vacation by doubling up on their work, without extra cost to the company, but said that it would mean an additional annual expenditure of $650,000 if all the company's employees were granted vacations with pay.

Bus Made an Ally in Decatur

Fifteen New Buses in Use by Railway Operating in Illinois City of 45,000—Bus Routes Cover 11.9 Miles and Railway Routes 17.7 Miles—Results Very Encouraging

Despite the fact that the city of Decatur, Ill., and the Illinois Power & Light Corporation are in the midst of a discussion of a new franchise the company has invested $125,000 in buses and erected a $60,000 fireproof garage for the handling of the new equipment for the combined bus and trolley system, to which brief reference was made in the ELECTRIC RAILWAY JOURNAL of Aug. 23, page 294.

The story of how this company has turned the bus from a competitor to an ally is one of compelling interest. First of all, it should be explained that Decatur is a city of about 45,000. It is just the type of community that affords the best kind of picking for the jitney. And in this respect Decatur was no exception. There is no need, however, to go into the history of the jitney there. The development of that vehicle as an instrument of transport in Decatur differed in degree but not in kind, as the saying goes, from that witnessed in other cities. To make a long story short, the railway, after an adequate traffic survey, jumped in and bought competing bus lines, junked the ancient and decrepit equipment and started in on an entirely new basis on Aug. 1 with bus and railway co-ordinated.

The installation at Decatur is the most complete car-bus system that the company has yet established in any of the cities in which it operates. In addition to the regular street cars, the augmented equipment consists of fifteen bright, new, latest type Mack and Yellow Coach Company 25 and 29-passenger buses. On routes which had been agreed upon, and which supplemented the street car routes, the service was started with the full approval and active co-operation of the city officials. Through the establishment of the new service parts of the city which had not been served at all, or very inadequately served, now have service with free transfers to other bus lines and to the car lines.

The street car lines have a mileage of 17.7 miles in Decatur and the service is handled by twenty-five street cars with extras put into service at rush hours and for special occasions. The bus routes which were added to the street car routes to give the city complete service cover 11.9 miles. Ten buses are used with five more frequently put into service to care for the rush business. All buses run to the business center of the city at Lincoln Square and not any are used simply as feeders. All street cars in the city also run to Lincoln Square so that the exercise of the transfer privilege is made easy and very convenient.

CONGESTION IS KEPT LOW

By a plan of carefully systematizing the leading places on and about the square and by keeping the buses on the move, congestion, even in heavy traffic hours, is held to a surprisingly low point. A marked increase in the sale of tickets has also been noticed since the new system has been established. As the totals show, the addition of the buses has brought about an increase in the city's transportation business of more than 35 per cent. This is regarded as all the more remarkable as this is probably the busiest part of the motor car season.

C. A. Wait, writing in *Current Topics*, published in the interest of the employees of the Illinois Power & Light Corporation, says:

> Whether or not the bus service is making a profit remains to be figured out, but it has increased the patronage on the street cars and produced its own direct revenue. That much is certain. To the citizens of Decatur, the addition of the buses with transfer privileges to the street cars seems to be the solution of the transportation problem in the small city.
>
> Parts of this city are now being adequately served which had never had railway service or which had had an exceedingly poor service by two bus companies scantily equipped with buses that were cheaply built. Active co-operation of the city officials in seeing that parking places for the buses are reserved in the

business district and a genuine willingness to help have been of materal assistance in making the service particularly effective.

The cash fare in Decatur is 6 cents, including transfer. Tickets good on either bus or trolley car are sold nine for 50 cents.

Ten Cents in Toledo

Toledo, Ohio, will go on a 10-cent cash and three-for-a-quarter ticket rate on Sept. 14, according to an announcement to patrons of the Community Traction Company. This has been the fourth raise in fare in the last few months in an effort to boost the revenue of the company to a point where operating costs will be met and a surplus provided for the fare stabilizing fund. At present the fund is in "red." Revenue has been increasing slowly and the advent of colder weather and schooldays is counted on to increase riding.

The straight silver basis for fares will do away with about $700 a month cost in the handling of pennies.

Alabama Company Changes Mind —Not Tracks

The Alabama Traction Company did not suspend railway service in Decatur and Albany, Ala., on Sept. 1, as was expected. At a meeting of the Alabama Public Service Commission a few weeks ago the company was granted the right to suspend service on Sept. 1 on the ground that the cars were losing money. Many citizens protested against the abandonment and the company reconsidered the matter and complied with their wishes.

The company announces that it will continue with some slight changes in the loop line. Moreover, the $1 pass will be tried in an effort to increase revenue.

Under the agreement between the Alabama Traction Company and the Alabama Public Service Commission service may be suspended in the future at any time on thirty days' notice of such intended action.

Bus Service by Chicago & West Towns Railway

Following a successful court battle with independent bus companies, the Chicago & West Towns Railway has started bus service on many of the routes formerly traversed by independent operators. The present equipment consists of six Mack buses with 25 passenger street-car type bodies and one Reo 6-cylinder bus chassis with a 21-passenger body. These buses operate an average of approximately 160 miles a day over four routes and act as feeders to the company's car lines.

It is planned to establish a garage in a portion of the present carhouse and to maintain the vehicles on a basis separate and distinct from that of the company's trolley cars. The buses are painted the standard yellow of the company and are striped in black with the name of the company lettered just below the windows.

P. R. T. Gets Increase

Commission Permits Company to Advance Fares to Eight Cents—City to Study Evidence

Following a week of hearings before the Public Service Commission, the Philadelphia Rapid Transit Company, Philadelphia, Pa., was granted permission to increase its fare from 7 cents to 8 cents cash with a ticket rate of two tickets for 15 cents. The company filed the new tariff in Harrisburg on Sept. 9 and also posted the rates locally. This means that on Sunday, Sept. 13, the higher fares will become effective. The present four-for-a-quarter strip tickets outstanding will not be honored after that date, but may be redeemed at the offices of the P. R. T. The new metal tokens are already on sale. The company will put into effect the zoning system on its suburban lines, which will mean a saving for some riders.

The new rates will prevail only during the time the city is preparing to present its case and during the time further testimony is being taken. The order stated that they could not be collected until at least five days after the company filed a schedule of the new rates.

The commission's order sets forth that an immediate increase in fares makes it possible for facts to be obtained concerning decrease in number of riders which will result from higher rates. Thus, the commission believes, the matter of shrinkage in fares collected because of greater cost will be removed from the field of mere estimates.

MONTHLY STATEMENTS MUST BE FILED

The commission ordered the company to file monthly a detailed statement of gross operating revenue and gross operating expenses.

In part the statement of the commission follows:

> It is claimed on the part of the company that the new rate schedule, so offered for commission approval, will produce a revenue in excess of what it is now receiving under the present tariff of about $3,769,000 and that this amount is necessary in order that the company may properly perform its corporation obligations to the public.
>
> At the hearings in Philadelphia it was announced by the commission that the burden of proof would rest upon the company, and the company accepted that burden and presented testimony in support of its demand for increased revenue.
>
> The city of Philadelphia, through the City Solicitor's office, examined the company witnesses at considerable length. Many data were requested to be supplied by the company and brought before us on the record.
>
> After all the testimony was introduced the City Solicitor requested that an opportunity be afforded the city to check up these supporting data and present such testimony as would seem to be relevant.
>
> The commission is quite in sympathy with the request presented by the City Solicitor. If an investigation is to be made at all, it should be made with extreme thoroughness, and we are assured on his part that such is the plan of the city authorities.
>
> We will not fix a date for the reason that a period of time not less than three or four months may be required to complete the examination which the city proposes.
>
> It was stressed on the part of the applicant that the financial exigencies were such that delay would seriously imperil the company's ability to function properly, and that any delay in reaching a conclusion would have the effect of cumulating the deficit of the lapsed time, with a consequent situation that the revenues now asked for would not be sufficient. Immediate relief was therefore important. The commission has taken this matter into its serious consideration.
>
> When the valuation case was before us, we found "an assumed rate base as low as $200,000,000 with 7 per cent as the fair rate return" results in the amount of $14,000,000 available as the fair return. This plus the allowed operating expenses, as appears in respondent's budget of $30,868,000, and taxes of $2,818,000, gives an allowable annual gross revenue requirement of $47,686,000. The operating revenue for the year 1922 being in actuality $42,530,000, and the unimpeached estimate of operating revenues for the year 1923 being only $44,736,000. It would therefore appear that the company was not earning within approximately $3,000,000 under the then rate of fare as much as it was entitled to receive under the commission's findings, and the amount asked for under the proposed tariff would produce a gross revenue on these estimated figures of only $97,000 more than the amount we allowed them in 1923.
>
> The actual revenue for the full year of 1923 was $45,246,723, the operating expenses were $34,071,661, leaving for net return $11,175,062, as against an allowable net return of $14,000,000. The applicant submitted that in 1924, with six months actual and six months still to go, the revenue which the company would receive under the old rate of fare is estimated to be $44,633,000, the operating expenses $33,218,000, leaving available $11,415,000, the fair return which is likewise less than the amount which the commission's report and order of June 21, 1923, authorized.
>
> This 1924 estimate does not take into consideration certain increases in wages which the company maintains should be paid to its employees and which it has obligated itself to pay, and the deferred part of which is claimed, to be $1,516,000. It was claimed on the part of the company that under that agreement entered between the representatives of the city and the company, there was a loss growing out of the operation of the Frankford "L" of $860,814, exclusive of diversion losses and that the increasing rental in the future would increase that amount.

The important feature of the city's cross-examining the Philadelphia Rapid Transit's officials on Sept. 4 was the effort to prove that the company's income at present rates was more adequate to provide a margin for betterments than the company's method of presenting statements and estimates would seem for the city officials to indicate. Testimony was elicited from W. K. Meyers, to the effect that during 1923 the company retired 357 cars and for these cars charged the renewal and depreciation reserve with $1,981,435 less $162,585 salvage.

Robert F. Irwin, assistant city solicitor, in addressing the commission stated that as he had obtained from the witnesses the amount of revenue in Philadelphia County he was anxious to get the same data concerning the other counties served by the company. C. C. Schaeffer, a traffic engineer for the company, went exhaustively into the number and classes of passengers carried by the Philadelphia Rapid Transit in Philadelphia and nearby counties and agreed to supply additional information about practices used in figuring passenger revenue from outside counties.

At the second day of the hearing, Chairman Ainey remarked that the primary question at issue was whether the company should be permitted to charge a higher fare and not the question of general valuation, the commission already having fixed the value at $200,000,000 and 7 per cent having been declared a fair return.

The argument on the application of the company for permission to increase its fare was started before the Public Service Commission on Sept. 2. At the opening of the proceedings, Chairman Ainey of the commission ruled that the burden of proving the necessity for the fare increase was on the Philadelphia Rapid Transit. It was then that W. K. Meyers, vice-president of the company in charge of finance and accounting, gave figures to show that the company was confronted by a $2,000,000 increase in operating expenses due to contractual wage obligation and to the need for 200 new cars, 150 buses, building extensions and increased taxes. He told about the employees twice sacrificing wage increases and referred to the condition of decreased riding. He said further that there would be an increase in taxes in 1925 of approximately $130,000. Coleman J. Joyce, general counsel, presented a review of the commission's decision which established the present rate of fare.

Day & Zimmermann, a Philadelphia engineering firm, has been retained by the city as expert consultant.

Electric Railway Courses in Pennsylvania Universities

The University of Pennsylvania and Temple University, Philadelphia, will establish courses in the operation, economics and regulation of public utilities in October. These courses will be under the auspices of the Pennsylvania Public Service Information Committee and will cover the technical phases of the central station electric, electric railway and telephone utilities, and a comprehensive course dealing with the general business and economics common to all utilities. The courses are to be given by lecture by competent operators and executives.

The course on the electric railway industry will be introduced by W. C. Dunbar. It will include discussion of the importance and size of the industry and the development and complexity of organization and functions. The organization and executive departments of electric railways will be discussed by Mr. Dunbar. The subject of traffic and transportation will be handled by W. J. Bendle; electrical engineering, by H. G. Werner; mechanical engineering, by G. H. Stier, civil engineering, by J. H. M. Andrews, materials, by B. J. Yungbluth; financial functions and corporate records, by W. K. Myers; legal aspects, by T. D. Nesbit; claims, by J. J. K. Caskie; welfare, by Dr. A. A. Mitten; the motor bus as an adjunct to the railway, by J. A. Queeney. There will be a general résumé of the entire field by W. C. Dunbar.

Higher Wages Promised P. R. T. Employees

At the conclusion of the sixth annual picnic of the employees of the Philadelphia Rapid Transit Company, Philadelphia, Pa., Thomas E. Mitten said that the aims of the company were good wages and 100 per cent service, with every man measuring up to the highest standard in a constant effort to do his work best to serve the public. About 20,000 employees enjoyed the second day of the outing. Mr. Mitten said that wages next year would warrant that worn uniforms be discarded and that not less than three new uniforms every two years be required. He said further that the management must do its part in securing the desired improvements before the higher wage rate becomes effective. At the conclusion of the first day, Mr. Mitten promised the men a wage of 77 cents next year.

Work by City May Delay Chicago Suburban Electrification

George Donohue of the South Park Board of Commissioners, Chicago, has announced that it is unlikely electrification of the Illinois Central suburban lines out of that city will be actually accomplished before 1926. Six or eight more weeks will be required to complete the tunnel under Michigan Avenue at Van Buren Street. The concrete work has been completed on the west side of the tunnel, and only a few more days will be required to restore the street so that traffic can be resumed without interruption there. The contractors have begun excavation east of the sidewalk on the other side, and the work will proceed from there. The contract for the viaduct across 23rd Street, to connect with the proposed outer drive, has been let to Avery Brundage, and the work has started.

Agreement Reached on Railway Line for York, Ont.

An agreement was recently entered into between the York township and the Toronto Transportation Commission whereby York, Ont., is to finance the construction of railway lines in districts adjacent to Toronto and the Toronto Transportation Commission is to equip and operate them at a fare which will cover all costs. Three township railways are covered by the present agreement.

Of these three, one is the existing line to Lambton. The township is purchasing it from the Nationals for approximately $20,000. It will be regaged to conform to the city standard, and the Guelph cars will cease to use it, making Lambton their terminus until the new suburban entrance is completed. The Lambton line will be equipped with Toronto Transportation Commission one-man cars and operated at a 3-cent fare. This will give Lambton residents a 9-cent fare to any point within Toronto. The new service will be in operation this year.

The other two lines will be new and of standard city construction. Only one of them is likely to be completed in 1924. It will run from St. Clair and Oakwood Avenues to a point near the Newmarket line of the Canadian Nationals. The other line will follow the same route up Oakwood Avenue and branch off westward and will then run via Hillary Avenue and Weston Road to the Canadian Pacific Railway tracks. This route may be completed as far west as Dufferin Street this year. The fare on both the Oakwood systems will be 5 cents, making a total of 11 cents to any point in the city.

Many York ratepayers are protesting against the scheme. Injunction proceedings to prevent going ahead with the construction were heralded recently in the Attorney-General's office.

Rights Sought to Carry Out $5,000,000 Chicago Program

Officials of the Chicago Rapid Transit Company, operating the elevated lines in that city, announced on Sept. 5 their readiness to establish almost at once, service improvements which contemplate the expenditure of more than $5,000,000. In fact, application for approval of changes which "will increase the capacity of the elevated lines at least 30 per cent," was filed with Commissioner of Public Works A. A. Sprague. Only a few minutes before, banker representatives of the surface lines' owners notified Corporation Counsel Francis X. Busch that the administration's proposals to purchase the local railway properties had been rejected.

Enlargement of station platforms of all branches and in the loop division to permit the operation of eight-car trains and the construction of a third main or express track on the Lake Street division are among the improvements contemplated by the elevated lines. Bids have been asked for 100 new steel cars similar to those recently placed in service.

B. J. Fallon, vice-president and general manager of the company, is quoted as follows:

> The company is now operating six-car trains in and out of the loop during the morning and evening rush hours. The operation of eight-car trains will provide for more rapid transportation through the loop and upon other lines of the company, and will furnish better, quicker and more comfortable service to the public during the rush hours than is now possible with six-car trains.
>
> Approximately 25,000 more people can be carried into the loop in the morning rush period and out of the loop during the evening rush period with full eight-car operation. The company desires to put eight-car train operation into effect as soon as it can obtain the needed equipment and can complete the construction of the necessary extensions of platforms.
>
> Traffic through the loop on the elevated lines is delayed by two things—interruptions at junctions and delays in loading and unloading of passengers. The average rush hour train is one of five or six cars under existing conditions. If we are permitted to extend our platforms it will be possible to eliminate the "stacking up" of trains at the loop junctions. Eight cars can be loaded and unloaded as fast as five cars.

It is expected that the improvements with the 100 new cars can be in operation before Aug. 1 next if no delay in the plans is occasioned by hesitancy by the city in granting permits. The new cars will cost approximately $2,225,000, changes in old equipment another $1,100,000, enlargement of platforms $1,500,000, and $800,000 on the third track on the Lake Street division.

Right of Ohio Cities Over Buses Defined

Ohio cities have no right to enforce traffic regulations interfering with routes established for jitneys by the State Public Utilities Commission. The Court of Appeals of Ohio so ruled on Sept. 9 in the case in which Youngstown has fought to exclude the jitneys from the downtown section.

The court holds that routes established in the licenses granted to jitneys by the commission have the force of a state law under the Freeman-Collister act, and therefore cannot be nullified by a city ordinance.

Subway Readjustment Suggested

Brooklyn Company Would Revise Contract Under Which Lines Are Now Run—Ready to Finance

G. M. Dahl, chairman of the executive committee of the Brooklyn-Manhattan Transit Corporation, has offered to confer with city officials of New York on "readjusting" the existing subway contracts with the city. He made public the terms of his proposal on Sept. 11. Mr. Dahl said:

> We do not like the contracts any more than you do, but, notwithstanding that fact, we have faithfully carried out all the provisions of the contract on our part. However, when two parties to a contract are dissatisfied with it the sensible and businesslike thing to do is to get together in an effort to readjust the contract. This we are perfectly willing to do. We believe it to be in the interest of the people of this community.

Mr. Dahl, after pointing out the city's difficulties in financing new subway construction, offers to meet the Mayor and the Board of Estimate in an effort to work out a contract, fair and in the interests of the public, under which the company itself will be able to provide funds not only for the equipment but also for the construction of subways which are so urgently needed. The position of the officers of the company is that it is entirely possible to work out a plan whereby it will be necessary for the City of New York to finance future subway construction. In speaking for the company Mr. Dahl said it was in a position to make a firm commitment as to a substsantial sum of money.

Following a three-hour conference on Sept. 8 between members of the Board of Transportation and representatives of the Brooklyn-Manhattan Transit Corporation on the subject of bus operation with free transfer privileges to and from existing transit lines, the following questions were propounded by the board to the railway:

> 1. Will the B.-M. T. Company grant transfers from the bus lines which it proposes to establish to the rapid transit lines now under its control and from those lines to the proposed bus lines for a single 5-cent fare, the fares received by the bus lines for which transfers are given and used to be accounted for by the B.-M. T. as revenue or earnings received by it under Contract No. 4?
> 2. Will the B.-M. T. Company grant transfers from the bus lines which it proposes to establish to the trolley lines operated by it, and from those lines to the proposed bus lines without extra charge for such transfer?

The questions were presented in conformity with Mayor Hylan's letter to the Board of Transportation, in which the Mayor directed the board to "look into the possibility of an extension of bus service which will entail no expense in addition to that already borne by the traveling public . . . and whether the companies are willing to provide additional service without additional charge."

The meeting was the result of Chairman Delaney's letter to representatives of the Interborough Rapid Transit Company, the B.-M. T. and the Third Avenue Railway for conferences.

The discussion was limited to the recent proposal of the B.-M. T. for a franchise to operate three bus lines as feeders to rapid transit lines.

No date was fixed for the next conference with the B.-M. T. representatives.

During a hearing on Sept. 2, A. T. Davison, of counsel for the Third Avenue Railroad, announced the incorporation of the Surface Transportation Corporation, a subsidiary of the Third Avenue Railroad, and said that it would apply to the Board of Estimate for franchises to operate 19 bus routes for a total of about 50 miles in upper Manhattan and the Bronx. Mr. Davison added that if the city would grant franchises to the new company it proposed to establish bus lines throughout the Bronx to connect with the surface railroad system in that borough, which is entirely controlled by the Third Avenue Railway. It is proposed to charge a 10-cent fare on a large part of the system and give free transfers between the bus lines and the surface lines. Passengers also may transfer from trolleys to bus and from bus to trolleys. The company's plans provide also for several bus lines in upper Manhattan, including one to the Dyckman Street ferry. One of the chief bus routes would be established on the Grand Concourse, Mr. Davison said. The new company was incorporated in Albany on Aug. 27. The proposed bus routes were outlined in the application filed by the company with the Board of Estimate on Sept. 8.

Extension of Bus Service in Milwaukee Unnecessary

Further extension of bus service by the Milwaukee Electric Railway & Light Company in the upper east side district of Milwaukee is characterized as unnecessary by the Railroad Commission of Wisconsin in a report to the utilities committee of the Common Council on the bus situation in Milwaukee. The commission says that any further extension of bus service in that section of the city would tend to increase the cost of railway service, with the result that railway fares would have to be increased or the present standard of service reduced. The upper east side district is now served by two car lines, six or eight blocks apart.

The commission believes that many railway patrons would gain nothing from the bus service, but that they would suffer should the railway service be curtailed or the fares increased. A bus service between the two railway lines would be particularly unfair to the patrons of the railway lines which the buses would parallel.

The commission pointed out that the demand for bus service came largely from normal school teachers and pupils who would have to walk just as far to the buses as to the street cars. The state body emphasized the fact that at least twenty other sections of the city are entitled to bus service if the lines in question are to be extended. It advised that in the event any bus franchises were granted they could go to the railway. In the event the Council decides to disregard the bus report of the commission and rules that buses should be extended on the east side route, the commission suggests acceptance of the route laid down by the company in its bus appeal.

Pay-as-You-Please Bus Restrained

Judge Frederick C. Valentine of the Los Angeles Superior Court issued an injunction on Aug. 25, restraining the Independent Bus Company from operating on a "pay-as-you-please basis" from Los Angeles to Culver City and Venice. The injunction was secured at the instance of the Pacific Electric Railway. It holds good until the Railroad Commission acts on the application made by the community bus lines for an operating permit. At the same time the railway has applied for rights, for a bus line over a similar route as previously operated by the free bus system. The court's injunction required the railway to deposit a bond of $7,500.

The buses will continue to operate, however, under a Culver City franchise which allows them to charge 10 cents for trips within the city's corporate limits. This franchise was granted by the city trustees of Culver City to the free community bus line—to operate buses for a period of ten years on Washington Boulevard within the corporate limits. The project and subsequent struggle between the bus' line and the railway company have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

The court's temporary decision enjoins the "free" buses from operating for a profit and prohibits them from having a receptacle for the collection of a fare. It was decided that the buses were operating under a technicality and must be rated as common carriers by the California State Railroad Commission before the courts will lift the injunction.

The railway contended that the defendants were soliciting fares from passengers on the buses by placing fare boxes in conspicuous locations on the vehicles; also, they further alleged the bus lines were operating without a permit or franchise from the State Railroad Commission, and offered several affidavits to the effect that the bus lines had solicited passengers through the use of posters and "spielers."

The bus line set up a defense that while it received contributions from passengers it did not solicit them.

The case against the bus line is regarded as a test of the legality of any community bus to operate in the State of California. Should the decision go against the respondent, it will eliminate other community bus lines that are operating in southern California.

The community bus line has its headquarters in Culver City, a point midway between Los Angeles and Venice, the beach city terminus of the bus line.

Franchise Matter Contended in Omaha.—City Commissioner Koutsky of Omaha, Neb., says he will ask the next session of the State Legislature for a law to permit the city of Omaha to vote a new franchise for the Omaha & Council Bluffs Street Railway. The company claims a perpetual franchise on Omaha's streets, whereas the city claims the present franchise expires in 1928.

Millions Transported in Railway Aerial Stunt

Broadcasting to increase traffic on its lines is not the motive of the Third Avenue Railway, New York, N. Y., in entering the radio field. A utility which operates 350 miles of track and carries more than 1,000,000 passengers a day would hardly need such advertisement. In this vein did S. W. Huff, president of the company, open Station WEBJ on Sept. 9. Rather did he stress efficiency and safety of transportation as the reason for the company's own staff erecting on the roof of its shop at 130th Street and Third Avenue a broadcasting station from which educational talks along transportation lines will be sent over the air to instruct the people of this great city on traffic problems and allied subjects. In addition he said that WEBJ would function like a company house organ and seek to foster better relations between the management and its 4,000 employees, practically all of whom have their own receiving sets.

The company's preliminary announcement that popular programs would be broadcasted every Tuesday and Friday nights was fulfilled on Sept. 9, when the radio audience had two hours' entertainment starting with Richard R. Blythe and ending with some splendid musical numbers by the Rivoli Ensemble. It was Mr. Blythe who, as captain of the aviation squadron, went out to escort the pioneer round-the-world fliers over New York. He related this experience. Some jazz thrills were furnished by Henriette Turner, the Ukelele Girl, and by Breen's Syncopators, with the saxophone, piano, banjo and violin, all wailing at once "I Can't Get the One I Want." Before the syncopators were let loose, Barron G. Collier, second police deputy commissioner, gave an instructive talk on prevention of street accidents where automobiles and electric cars are involved. He referred to his intention of giving a prize next June to the school with the best safety record and to his plan to start a safety drive within a few weeks, exacting a pledge from all automobile drivers to observe traffic laws and regulations.

Bus Operation by Railway Is Planned in Columbus, Ga.

R. M. Harding, manager of the Columbus Electric & Power Company, Columbus, Ga.; F. U. Garrard and A. S. Bradley recently filed a petition in the Superior Court for a charter for the Columbus Transportation Company to operate buses for passenger transportation in the city of Columbus and immediate neighborhood. The recent State Legislature passed an enabling act whereby street railway companies can own and operate buses directly or indirectly by owning stock in bus transportation companies. The plan calls for the purchase of three buses of the latest type to operate two routes in the business section and in certain residential districts. If the two proposed routes prove successful it is said buses will likely be introduced in other sections of the town. It is intended to charge the same fare on the buses as is being charged on the railway cars and arrangements will be made between the bus company and the railway so that transfers can be used. It is hoped to put the buses in operation before the end of the present year.

Appeal of Ottawa Company Upheld

By a vote of five to three, the Town Council of Eastview, Ont., has decided to renew negotiations with the Ottawa Electric Railway for the operation of railway service in Eastview on a straight 5-cent fare basis, with a special ticket rate. Recently, Judge Wright upheld the appeal of the Ottawa Electric Railway against the Eastview by-law, under which the railway was fined for operating buses through Eastview without a license. The court ruled that the municipality had exceeded its powers in passing the by-law, though the Legislature appears to have recognized the right, the court said, of a municipality to license the vehicular traffic carried on entirely within its limits, but asserted the right of the province to license intercity traffic. The company has withdrawn its buses temporarily. Following the court action the Eastview Town Council decided to negotiate for railway service.

Temporary Bus Permits Have No Attraction at Buffalo

Although Mayor Frank X. Schwab of Buffalo has declared a transportation emergency exists in Buffalo and has offered to grant permission to any individual or company to operate buses on Delaware and Delevan Avenues, neither the International Railway nor the VanDyke Motor Bus Corporation will avail itself of the opportunity presented by the Mayor.

Both companies have been seeking bus rights, but they have informed the municipal authorities they will not make the investment in double-deck buses needed to operate on the two streets unless a franchise is secured from the city. They say the courts already have ruled that the Mayor is without authority to declare a transportation emergency exists and grant temporary permits for buses while street cars are being operated on schedule over regular routes.

The proclamation of Mayor Schwab says in part:

> In view of undisputed evidence that buses are needed on Delaware Avenue and Delevan Avenue, I hereby declare an emergency exists which must be met immediately, and which can be met only by affording opportunity for the operation of bus lines on these streets.
>
> As Mayor of the city of Buffalo, I invite all persons or corporations desiring to furnish bus service on these streets to apply to me at once for permission to operate on these streets so that I can forward such applications to the Council at its next meeting and ask for prompt and favorable action on just and reasonable terms.

Even so-called jitney operators who provided bus service in Buffalo during the strike of the employees of the International Railway two years ago have failed to avail themselves of the opportunity to engage in the transportation of passengers. At the time of the strike the courts ruled against the municipal authorities in declaring a transportation emergency and hundreds of bus operators were arrested and fined on charges of contempt of court. Only a short time ago, when a similar proclamation was made by Mayor Schwab, the VanDyke company started buses in Bailey Avenue, but these were promptly stopped by the court when complaint was made by the International Railway.

Bus Rights Sought by East St. Louis Railway

The East St. Louis Railway has notified the City Council of East St. Louis, Ill., that it has applied to the Illinois Commerce Commission for a certificate to operate buses on Tenth Street between Piggott Avenue and Missouri Avenue, in East St. Louis. At present there are no street car tracks on that section of Tenth Street.

The new bus line will furnish a connection with the St. Louis Municipal Bridge, which touches East St. Louis at Tenth Street. At present street car patrons can get to the Municipal Bridge via the Main Street car line, but that route is indirect and necessitates many blocks of extra riding.

The Community Motorbus Company, Belleville, has applied to the Illinois Commerce Commission for permission to operate buses through East St. Louis from Belleville to the St. Louis Municipal Bridge. This company has also applied to the Board of Public Service, St. Louis, to cross the Municipal Bridge and loop through the St. Louis business district via Seventh Street and Washington Avenue. A public hearing was held on the latter application on Aug. 26, but no one appeared to speak for or against the permit.

Two Fare Petitions in Niagara Falls

Two petitions are being circulated, one favoring suspension of the 5-cent fare clause in the franchise of the International Railway in Niagara Falls and one opposing such action on the part of the municipal authorities. The petition favoring suspension of the 5-cent fare clause is being circulated by large industrial plants and merchants of the city who say that if it is true the company cannot make operating expenses on the local lines, there is danger that the Public Service Commission will allow the company to abandon other lines in the city. The company already has abandoned one local line with the consent of the Public Service Commission.

No action will be taken by the City Council of Niagara Falls on the application of the company to have the 5-cent fare clause in the franchise vacated so as to enable the company to appeal to the Public Service Commission for a higher rate of fare in the city of Niagara Falls. The company proposes a fare similar to that in Buffalo where a 7-cent cash rate is in effect with four tokens for 25 cents and free transfers.

News Notes

Services Honored.—Employees of the Monongahela-West Penn Public Service Company, Clarksburg, W. Va., their families and friends recently gathered at the annual outing and paid respects to a score of men who had been in the service of the company for 20 years or more. One of the features of the program was the presentation of veterans' badges to those who had rounded out their 20 years of service during the past year. Among the honored ones was George M. Alexander, president of the company.

Bus Starts on Regular Route.—The Beaver Valley Traction Company, New Brighton, Pa., put into service on Aug. 24 a bus to run over a regular route from Sewickley to Beaver, making stops at Leetsdale, Ambridge, Monaca, Colona, Rochester, New Brighton, Beaver Falls and Beaver. The project was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 17. The bus, one of three to be constructed by the E. J. Thompson Company, is equipped to carry 25 passengers. The body is mounted on a Pierce-Arrow special chassis and costs approximately $9,000 complete.

Closer Co-operation Sought. — Employees on the Holland and Kalamazoo divisions of the Michigan Railroad have organized to develop a closer co-operation between the company and the men. The Holland organization, the older of the two, was organized about three months ago and now includes about 80 per cent of the employees. Clubrooms have been provided at Holland and this winter a variety of social functions is planned. The Kalamazoo organization is a bit younger, but has as charter members about 60 per cent of the men in the division and others are fast signing up. This organization has decided to go into the mutual benefit idea for sick or disabled workers.

Time Extended for Substituting Buses.—An extension of time has been granted to the Union Traction Company of Santa Cruz, Cal., until Dec. 31, 1924, in which to accept a certificate for the operation of buses as a substitute for the abandonment of railroad service.

Bus Permit Denied—Railway Service Adequate. — The Corporation Commission of Oklahoma has denied the application of F. H. Hood, operating the Lincoln Park stage line, for a certificate of convenience and necessity to carry passengers between Oklahoma City and Lincoln Park. The reasons assigned by the commission are that the Oklahoma Railway operates half-hour service from Oklahoma City to the park and that public necessity does not demand nor public convenience justify the granting of a certificate.

Wants to Run Fifteen One-Man Cars.—The Macon Railway & Light Company, Macon, Ga., recently petitioned the City Council to permit the operation of fifteen one-man cars, as an economical measure. The petition said that the increased use of automobiles in the city was making heavy inroads on the company's revenue. During July, 1920, approximately 772,000 passengers rode street cars, according to the petition, but since that time the increased use of automobiles had brought about a gradual decrease and that during July of this year the number of passenger totaled only 510,000

One-Man Type in Operation.—The last remaining city line of the Worcester Consolidated Street Railway, Worcester, Mass., on which cars with two men have been run went over to the one-man type of car on Sept. 7. On the main line two-men cars are being operated from 11 a.m. to 8 p.m. week days. One-man cars are used the remainder of the time.

Danbury Electrification Formally Announced.—The New York, New Haven & Hartford Railroad will immediately complete the electrification of its New York Division by the extension of the present electrification from Norwalk to Danbury, Conn., a distance of 23 miles. Engineering work necessary in advance of actual construction is now progressing. Operation of this branch electrically will avoid necessity of change of engines at South Norwalk and will afford patrons in this section of Connecticut service similar to that being given on the other electrified lines. Official announcement to this effect was made on Sept. 8, but the fact that the new work was about to be carried out has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Wages Increased.—Trainmen in the employ of the Public Service Corporation of San Antonio, Tex., will accept the company's offer of wage increases of 3 cents and 8 cents an hour for operators of two and one-man cars, respectively. Working conditions, against which the employees had also complained, will remain unchanged. Under the agreement putting into effect the wage increase each trainman will receive one blue serge uniform a year. An adjustment on seniority rights is also made. Bus drivers and repairmen will participate in the wage increase. The wage increase becomes effective immediately.

Files Fare Protest.—The Mayor and City Council of Johnstown, Pa., filed on Sept. 2 with the Public Service Commission a complaint against the Johnstown Traction Company alleging the increase in fares was unjust. The new rates were effective Sept. 5. The tariff provides for an increase to 10 cents or four tickets for 30 cents. The old rate was 7 cents with four tickets for 28 cents. Special tickets to school children remain at 5 cents. The petition of the company and the explanation by Manager Shannon for the increase in rates were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 16.

Seeks Permission for Bus as Feeder.—The Binghamton Railway Bus Lines, Inc., made application on Sept. 9 to the Public Service Commission for permission to operate a bus line in the village of Johnson City, Broome County. It is proposed to operate the line in coordination with the Binghamton Railway's present electric railway system, the bus line acting as a feeder. Two buses will be operated and a 6-cent fare will be charged, with free transfers to and from the present Binghamton railway lines.

Orange-Colored Cars for Boston.—The Boston Elevated Railway announced on Sept. 5 that hereafter it would paint the cars of its surface lines orange instead of green. General Manager Edward Dana said the change in color was to increase visibility and thus prevent accidents. He also believed orange would be more attractive.

Parades Prohibited on Downtown Streets.—Parades in the downtown district of Los Angeles were banned by action of the City Council on Sept. 2, when an ordinance was adopted declaring the territory bounded by Sunset Boulevard, San Pedro Street, Pico and Figueroa Streets to be kept free from parades. The ordinance provides, however, that on occasions of exceptional national interest a special permit can be given by the City Council for the use of the downtown streets. Hereafter South Figueroa Street and the Coliseum will be used chiefly for parades. This will eliminate interference with downtown business and transportation. Adoption of the ordinance was urged by police and fire department officials and downtown business houses.

Franchise Granted.—The Texas Interurban Company, which is electrifying the Dallas-Denton branch of the Missouri, Kansas & Texas Railway, has asked the city of Denton for a franchise, which has been approved. Announcement is made that the route of the interurban line in the city limits of Denton after it leaves the tracks of the steam railway will be changed from East Oak Street to McKinney Street. The interurban company has purchased a site on Ash Street, immediately north of the Federal Building, for a modern brick passenger and baggage station. Work of electrifying the line is going forward rapidly, according to Richard Meriwether, vice-president and general manager of the Dallas Railway. It is expected that cars will be put in operation early in October.

Bus Permits Denied.—The Corporation Commission has again refused to cripple existing transportation lines by authorizing unnecessary motor competition. Messrs. Harrell and Giles were refused permission to operate between Oklahoma City and Norman because the present electric and steam service was held adequate.

Safety Plans Approved.—Samuel Riddle has announced that electric railways and other public utilities have approved the plans adopted and will cooperate to insure the success of the program, which will start Sept. 28 and end Oct. 4. He said the plans include posting safety signs on the front of all cars and messages to the public on the inside of the cars. In addition safety buttons, banners and parades will feature the celebration. Mr. Riddle is vice-president of the Louisville Railway and chairman of the committee representing the public utilities of Louisville on the general arrangements committee for the safety education week demonstration and the National Safety Council.

Railway Opposes Bus Proposal.—Application has been made to the Lockport City Council and to the Public Service Commission by the Iroquois Indian Trails Motor Coach Company, Inc., Buffalo, for permission to operate de luxe buses between Buffalo and Olcott Beach via Lockport, a distance of about 40 miles. The International Railway, Buffalo, objects to the granting of the proposed franchise on the ground that the buses would compete with cars of the Buffalo-Lockport and Lockport-Olcott interurban divisions of the company.

Ordinance Can't Be Put on Regular Ballot.—The City Council of Tacoma, Wash., has been advised by James W. Selden, prosecuting attorney and legal adviser of the Pierce County election board, that the car ordinance which the Tacoma Railway & Power Company desired to get before the voters on Sept. 9 cannot be placed on the regular election ballot and neither can it be handled in any official way by the board without endangering the regular election to the point of invalidation. He advised that if the company wants to put up its own ballot boxes 50 ft. away from the election polls, have its representative there and its own officials to check up the results of the vote, the matter could be handled in an unofficial way. The ordinance which the company is endeavoring to have adopted would change its franchise obligations to the extent of relieving the company of certain taxes, of some paving obligations and of carrying city employees on its lines free of charge.

Will Use Buses.—The Olean, Bradford & Salamanca Railway, Olean, N. Y., which recently petitioned the Public Service Commission for permission to abandon its line between Salamanca and Little Valley, N. Y., now plans to replace the trolley service with buses.

Jitney Licenses to Run Five Years.—Under an amendment to the "for hire" vehicle ordinance passed recently by the Tacoma City Council, jitneys can be licensed for periods of five years hereafter instead of only one year. Mayor A. V. Fawcett was sponsor for the new provision, asserting that bus owners were unwilling to make the investment necessary for high-class buses with licenses running only one year and that he "needed more leverage to make the Tacoma Railway & Power Company do the right thing by Tacoma." The amendment also carried a provision requiring the consent of the Council to the transfers of licenses. Operation of competitive jitneys is one of the things which the Tacoma Railway & Power Company desires eliminated through a new franchise ordinance.

Plan for Express Service Opposed.—In a letter to the secretary of the Maryland Public Service Commission, L. H. Palmer, vice-president and general manager of the United Railways & Electric Company, Baltimore, has rejected a plan recently advanced by some patrons of the Emory Grove line to establish express service in the city zone by side tracking local cars to let the express car pass. He pointed out that if the present service were made "two fares as you enter" on outbound cars in the evening and "no stops to receive passengers" in the city fare zone in the morning, the cars would be operated, on the average, with less than seated loads in the city zones during the rush hours. This would result in discrimination against local riders.

Want Railway, Not Bus Line.—Residents in the North Salem District of Oregon have announced their strong opposition to the application of the Southern Pacific Company for permission to abandon its trolley service on Seventeenth Street. Petitions signed by more than 500 persons opposing the move have been prepared. In lieu of its present street car service, the company has agreed to establish bus service, but this mode of transportation is not satisfactory to the patrons of the line.

No Ruinous Competition to Be Allowed. — The City Commissioners of Oklahoma City, Okla., have under consideration a proposed ordinance to govern the operation of buses within the city. The measure as originally introduced provided for $50,000 bond to indemnify passengers and the citizens against injury and damage, and an occupation tax of $30 per year for each seat provided in the vehicle. It is understood that both figures have been substantially modified but final figures have not been agreed upon. Members of the commission are said to favor giving the buses a fair trial, but desire to avoid crippling the electric railway system. It is understood that as a protection to the electric railway company buses will be permitted to operate only on streets where it is considered that they could operate without creating competition ruinous for the electric railway company.

Public Utility Course in Evanston.—The Northwestern University, Evanston, Ill., will establish a collegiate curriculum in public utilities and utilities management in its school of commerce. The principal studies to be undertaken in this new field will be the economics of public utilities, public relations of public utilities, public utility accounting, public utility finance, public utility law and public utility operation and management. These subjects will be taught by men who are prominent in the utility field and by nationally known educators. Dean Heilman of the university says that a strong feature of the new department at Northwestern will be "original investigation, scientific research and impartial inquiry into those problems of utilities' operation, management and public relations which are of vital public importance."

Rewarded for Safety Efforts.—Operating its cars in Milwaukee, Wis., for sixty days over nearly 20,000 miles without a single accident, members of team "A" and "B" of the Chicago, North Shore & Milwaukee Railroad were rewarded with a banquet for their accident prevention efforts during a contest which was in force during that time. Four teams were in this safety contest, which was limited to men operating the company's one-man city cars in Milwaukee.

Foreign News

London Railway Opens New Extension

The extension of the London Electric Railway from Hendon to Edgware was opened for traffic early in August. This completes the northern extension of the Charing Cross & Hampstead Railway and opens three new stations. The Edgware extension has taken 22 months to construct and with the exception of a tunnel 0.62 mile long is entirely above ground. The line is altogether 3.05 miles long and has cost well over £600,000 to build and equip.

An interesting feature of the new railway is that the electrical energy will be obtained from the Burnt Oak substation, which has been equipped with 1,200-kw. rotary converters with supervisory control from Golder's Green, nearly 4 miles away.

Considerable development of the new areas served is expected to follow this latest underground venture. Town-planning schemes have been framed and houses and shops are springing up.

Traffic Conditions in Paris to Be Improved

Several improvements for the relief of street and underground traffic conditions in Paris are being considered. It is probable that many lines of street cars penetrating the crowded center of the city will be eliminated and the service taken care of by additional motor buses. A beginning has been made on the Rue Reaumur and the Rue Quatre Septembre line from the Place de la République to the Opéra, buses having been substituted for the street cars.

The Council of the Department of the Seine has decided to abolish all steam railway grade crossings within the department as a measure of safety and to speed up traffic.

The extension of the Metropolitan Underground, Line No. 1, eastward from Vincennes to the Marne, some 8 miles beyond the gates of the city, will be the first of the real improvements linking the outer suburbs with the center.

Weekly Pass in Doncaster, England.—After being in operation for a year on the Doncaster tramways the weekly pass is reported to be satisfactory. About 1,126 passes are now being sold weekly as against 522 in August, 1923.

Paris Fare Increases Reduce First-Class Passengers.—A diminished number of first-class passengers of the Paris Metropolitan Subway has resulted from the increase in fares last spring. Trains now have four second-class cars and one first-class car. Statistics for the month of June, following the rise in fares, show an increase of second-class tickets sold of 1,177,461 more than in June, 1923; while 586,498 fewer first-class tickets were sold.

Financial and Corporate

Bondholders Buy Erie Road

Foreclosure of Properties Will Be Followed by Separation of the Interurban and the City Lines

John McNaughton of the Equitable Trust Company of New York, acting for J. R. McDonald, president of the First National Bank of Erie, Pa., on Sept. 5 purchased all of the assets of the Buffalo & Lake Erie Traction Company, Buffalo, at public auction under an order of foreclosure. The order of sale was signed by George D. Crofts as referee. The plaintiff in the foreclosure action was the New York Trust Company, represented by DeForest Brothers, New York; Morgan, Lewis & Bockius, Philadelphia, and Gunnison, Fish, Gifford & Chapin, Erie, Pa.

The property sold includes all the franchises, right-of-way, equipment, lands and buildings on the line between Buffalo, N. Y., and Erie, Pa., together with these securities: 1,500 shares of common stock and 100 shares of preferred stock of the Erie & Suburban Railway; 12,500 shares, being all the capital stock of the Erie Electric Motor Company; $58,000 of first mortgage bonds of the Hamburg Railway; $10,000 first mortgage bonds of the Buffalo & Lackawanna Traction Company; 3,459 shares of common stock of the Buffalo & Lake Erie Traction Company; 4,041 shares of stock of the Jamestown, Chautauqua & Lake Erie Railroad and 550 shares of the Buffalo & Lackawanna Traction Company.

The property was sold subject to certain receivers' certificates of the Buffalo & Lake Erie Traction Company in the amount of $310,000 which matured on Aug. 1, 1924, and subject to $150,000 of receivers' certificates which are a lien on the property known as the interurban system which also matured on Aug. 1, 1924. The sale was made subject to the lien of certain taxes and other assessments levied against the system.

The terms of the sale specified that no bids would be accepted unless the bidder deposited $100,000 as evidence of good faith or $750,000 par value of the first and refunding mortgage 5 per cent thirty-year gold bonds of the Buffalo & Lake Erie Traction Company.

On the day of the sale the Public Service Commission issued an order approving the plan of the reorganization committee of the Buffalo & Lake Erie Traction Company whereby a new company, the Buffalo & Erie Railway, will acquire and operate that part of the street surface railroad of the Buffalo & Lake Erie Traction Company extending from the southerly line of Buffalo to the west bank of Six Mile Creek in Harbor Creek Township, Erie County, Pa. The line is about 81 miles long.

The Buffalo & Erie Railway is authorized to deliver to the Metropolitan Trust Company, New York City, an indenture to secure an issue of first mortgage thirty-year sinking fund gold bonds to the value of $1,500,000 and is also authorized to issue securities to carry through the transaction.

This approval provides for carrying out only part of the plan. The full plan contemplates the organization of two new companies, designated in the plan as the Erie Company and the Interurban Company. The Erie Company will acquire the lines in the city of Erie and the Interurban Company will acquire the purely interurban line.

The Erie company will have a capitalization of $5,000,000 of 6 per cent first and refunding mortgage sinking fund thirty-year gold bonds, of which $1,000,000 are "presently issued"; $1,500,000 of 7 per cent cumulative preferred stock, of which $1,050,750 will be the initial issue, and $60,000 no par value shares of common stock. From the proceeds of $1,000,000 of the sinking fund gold bonds, and other moneys, the syndicate proposes to retire the receiver's certificates now a lien on the property of the Erie Company and to make available the $700,500 cash to be received by the committee. The property will be subject to mortgages and other secured debt.

The Interurban Company's capitalization is to consist of $1,500,000 of first and refunding mortgage 6½ per cent thirty-year sinking fund bonds, $800,000 of which comprise the initial issue; $1,500,000 of 5 per cent noncumulative preferred stock, of which $700,500 will be "presently issued," and 30,000 shares of no par value common stock.

On the basis that all bondholders assent to the plan each holder of a $1,000 bond of the Buffalo & Lake Erie will receive $150 par value of 7 per cent cumulative preferred stock of the Erie Company, amounting to 15 per cent of his holdings; 10 per cent in 5 per cent non-cumulative preferred of the Interurban Company, or a par value of $100; three shares of common stock of the Erie Company, no par value, having an estimated book value of $16.47 a share and aggregating $49.41, and $30 cash on the basis of an estimated available balance for this purpose of $218,900. In other words, each holder of a $1,000 bond will receive new stock of a par value of $299.41 and cash of approximately $30.

The company has been in the hands of a receiver since 1915.

Special Master's Findings Questioned

Exceptions Taken by Both City and Railway in Denver Case—Comments by Special Master of Much Interest—Case Under Way Seven Months—6,400 Pages of Testimony

NEITHER the officials of the city of Denver nor the officers of the Denver Tramway are pleased with the recent findings of Special Master in Chancery Henry A. Dubbs in the valuation case. The major objection on both sides is to the valuation fixed. The company insists that the value should be $31,104,667. The city says that it is about $12,000,000. Judge Dubbs fixed the value at $20,105,707.

The Tramway Company has filed exceptions in the United States District Court. Receiver Ernest Stenger for the tramway also takes exceptions to the rate of earnings fixed by Judge Dubbs. The Judge said the return should be 7½ per cent on the valuation. Mr. Stenger says that it must be 8 per cent on the valuation he cites. The company insists that it has a perpetual franchise, while the city says that the franchise is good only for the 20-year period, 1906 to 1926. The city now says that there was never any need to throw the railway into the hands of a receiver and that there was no justification for the appointment of the special master. The court still has the master's report under advisement.

Valuation the Important Question

The decision by the special master was referred to briefly in the ELECTRIC RAILWAY JOURNAL for July 5, page 31. At that time a condensed tabulation was presented of the principal items entering into the valuation of $20,105,707 found by the special master. The hearings extended through a period of seven months. Forty-five witnesses appeared and their transcribed testimony covered more than 6,400 pages. The exhibits numbered more than 300. The case is looked upon as being of great general interest. The fundamental question in the case was whether the ordinance rates resulted in such a low net revenue to the company as to cause an unjust return upon the fair value of the property used and useful in the public service. In other words, did the rates effect a confiscation of the use of that property? The underlying inquiry, therefore, was as to the value of the property, inventoried and valued as of the date fixed for the proceeding. In his review of the case the special master said that the presumption was that rates fixed by the city were fair and not confiscatory, and the burden was on the company to show the contrary.

For the purpose of this review there appears to be no reason for going into the underlying history of the company, but the need does appear to exist for reciting some of the more recent moves in the history of the company. Shortly after Mr. Stenger was appointed receiver of the company on Dec. 24, 1920, he presented a petition to the District Court of the United States for the District of Colorado for instructions, and, in substance, for injunctive relief against the ordinances of the city of Denver which purported to limit the fares to be charged by the tramway to a maximum of 6 cents for adults, and 3 cents for children. Mr. Stenger alleged that the fair value of the property of the city lines of the company was in excess of $30,000,000 placed upon it as of Jan. 1, 1918, by engineers employed by the company in 1917. He asserted that the enforcement of the ordinance rates had left the company without money or means of credit to meet its financial obligations. He also alleged that the net income of the company, as depleted by that enforcement, was so small it really resulted in confiscation. In addition to other relief, he asked the aid of the court in carrying out what he alleged to be his proper and necessary plan of charging fares of 10 cents for adults and 5 cents for children.

The city and county of Denver intervened. It asserted that the ordinances in question were binding contracts, and that, therefore, the enforcement of their terms relative to fares violated no constitutional provisions, regardless of what rate of return the fares might produce upon the value of the company's property. It also took the position that the fair value of the city lines of the company was less than $12,000,000 and that the rates in force produced a sufficient return upon the fair value.

Court Ordered Eight-Cent Fare

Upon a preliminary hearing, the court granted a temporary injunction. It adjudged that, until further order, the city authorities be enjoined from enforcing the ordinance rates; and it permitted the receiver to establish rates of 8 cents for adults and 4 cents for children, with free passage to children under six years, and with free transfers, and with an additional limitation making the rates 7½ and 3¾ cents, respectively, in case of the purchase of tickets or tokens. The court directed that the order should in no manner restrict the future exercise of the power of the city to regulate rates. It proceeded upon the basis of the confiscatory character of the rates then in force. It left open the right of the city to act within constitutional limits, and it also left open the right of the receiver to question the legality of the result of any subsequent exercise of the city's power. Since then, the city has not attempted to establish new rates.

The order of the court was affirmed by the Circuit Court of Appeals. That court held that the ordinances assailed were not contracts binding the parties as to the fares to be charged, and that the company could not be held by them to rates which were confiscatory. Upon making a subsequent order relative to final hearing, the trial court directed that the company's property should be inventoried and valued as of Dec. 31, 1922. The cause was thereafter referred upon the receiver's petition and the city's answer, and Mr. Dubbs was appointed special master to take and report the evidence, with findings of fact and such conclusions of law as might be deemed essential to the proper advisement of the court.

The record disclosed controversy on almost every matter of valuation presented, from that of the methods of valuation to be adopted, and the correct unit prices to be used, to that of the questions whether working capital, financing costs, going values, and other intangibles should be given weight. Mr. Dubbs said that no witness testified to the present value of the property except as predicated upon some practically exclusive method of valuation. Each of them arrived at his conclusions from his assumed premise. Mr. Dubbs explained that consistent with their contentions that their chosen methods were exclusive, each litigant objected to the admission of evidence in line with the consideration of any factors but its own. The special master overruled both of them. He said:

> The wide breach between the parties requires a consideration of what constitutes value in cases of this character, and of how that value should be determined. Generally speaking, the value of a thing is its worth; but the word carries no exact definition. Unlike articles bought and sold in the open market, the valuation of the entire system of a public utility involves additional considerations. There are many cases in which, as here, the worth cannot be determined in dollars and cents "as a mere matter of formulas, but there must be a reasonable judgment having its basis in a consideration of all relevant facts." The valuation proceeds upon the "fair value of the property" in public service. Minnesota Rate Cases (Simpson vs. Shepard), 230 U. S. 352, 434.

To the special master the substance of the matter seemed to be that the law was as originally stated in Smyth vs. Ames and that, whatever the line of approach, the special evidence introduced on any one method or theory was, after all, mere evidence to be considered, in sound judgment, in reaching the ultimate result of present value. In this connection the special master said:

> Neither that special evidence, nor the method of theory under which it is presented, excludes the consideration of other proper evidence, or constitutes an exclusive measure. It is conceivable that there might be cases of unusual stability of conditions where, after giving full weight to all the evidence, it would appear that either original cost or present reproduction cost represented present value; but this case is not one of them.

The city opposed any allowance for working capital and general stores. It contended that a street railway differed from certain other utilities in that, generally speaking, it receives its revenues either in advance of or at the time the service was performed, and that its own expenditures were usually delayed, and that it thus accumulated a fund to take the place of these allowances. The special master said that he saw no reason for refusing a fair allowance here and that to do so would impede the efficiency which the public has a right to expect. The stores on hand, however, appeared to him to be in excess of what should normally be expected, and to include items not properly and currently to be carried in such an account. For these two accounts he allowed $425,000 for general stores and $200,000 for working capital.

Allowance for Franchise Cost Reduced

The company figured franchise cost at $284,100. Mr. Dubbs found that the company was entitled to some allowance for the fair and necessary cost of securing franchises for its operations, as distinguished from an allowance for the value of the franchises themselves, but the "speculative and vague estimates on which the large figures presented by the company are in part based" did not appeal to him. He excluded expenditures for the acquisition of franchises now expired, and treated the matter as governed by the fair and necessary cost of obtaining franchise rights for the present operations. In this respect he agreed with the city's counsel that it was improper to predicate value on the expenses of voluntary advertising, public speakers, and like matters, connected with campaigns to induce public approval of a proposed franchise. He said that the allowance should be limited to the fair cost of the matter as an ordinary business transaction. In his judgment the evidence warranted an allowance of value at $100,000, and no more.

Claim for Cost of Financing Disallowed

From the claim for engineering and superintendence, the special master excluded certain classes of property for the reason that they were either in the nature of cash allowances, or under the evidence did not require the application of this overhead charge. He regarded 5 per cent as the proper allowance and applying this item to the accounts against which it might properly be set found for the company in the sum of $776,228. For administration, organization and legal expenses he allowed $500,000 and for taxes during construction he allowed $275,000. This sum he fixed on the basis of an average of years.

Under the evidence, it was the judgment of the special master that three years was a reasonable construction period in the present case, and that the interest should be computed for half of that time. He found 6½ per cent per annum to be reasonable as the rate to be allowed. For interest during construction he allowed $1,664,889.

The special master disallowed entirely the claim of $2,000,000 for cost of financing. In this connection Mr. Dubbs said:

> The company asks credit in its general values for what it terms financing costs, which it fixes as high as $2,000,000. The figures are, in large measure, hypothetical estimates. Whether or not they include technical discounts, the figures represent cash paid to bankers and underwriters for services and expenses in securing required funds. The testimony also discloses that they include a consideration of the cost of finding markets for securities, inviting the public to invest, and matters of that nature. I have already made a valuation for administration, organization and legal expenses.
>
> The present claim is, in substance, one for the cost of obtaining money for the construction of the plant. If the original cost of the property were the sole test of value, the question might be different; but here we are concerned with the present value of the property. This remains the same whether the promoters had the cash to build, or whether, for lack of cash, they had to submit to expenses or exactions in procuring it. Such matters may be important between the promoters and the underwriters, but they are not material here. We are attempting to find present value, and must assume a construction by persons financially able to construct. Otherwise, the more impecunious the organizers, and the more subject to excessive costs of procuring money, the greater would be the present value of the property. I disallow the claim, in its entirety. Galveston Elec. Co. vs. Galveston, 258 U. S. 388, 397; City of Minneapolis vs. Rand, 285 Fed. 818, 820.

All claims made for the value of the franchise were disallowed. In this connection Mr. Dubbs cited both the Galveston Electric and the Georgia

Railway & Power Company cases. For going value the sum of $1,500,000 was allowed. The company contended for a sum between $3,000,000 and $4,500,000 for this item. The city contested against any allowance on this account. In his consideration of the matter of going value Mr. Dubbs excluded all consideration of past losses, and, in the present connection, the cost of erecting the physical system as a mere physically assembled concern; and also all items which have been otherwise valued. He also excluded any allowance for so-called "good will."

With respect to the outstanding capitalization Mr. Dubbs said:

> Little weight has been given to the matter of the stock and bonds of the company. The capitalization, as represented by the bonds and stocks upon which the company is obligated, is largely in excess of the value of the property as I find it, and it rests upon important assets in addition to those valued in this proceeding. In the present case, a consideration of this matter is therefore of no real aid in determining the value of the city lines property. The present market value of stocks and bonds is also dependent on many considerations other than the actual value of a property. In large measure it may be controlled by the fact that a property is, or is not, being deprived of a just return.

From the evidence, Mr. Dubbs found that the depreciable property, taken as a whole, was in 85 per cent of condition new and should be charged with depreciation of 15 per cent. He found that the accrued depreciation amounted to $2,832,840.

Mr. Dubbs said that it was apparent that with the allowance for annual reserve for depreciation, the returns for 1918, 1919 and 1920 ranged from a figure of less than 5 per cent on the values as he found them to a figure of approximately one-half of 1 per cent. Even if all allowance for going value were excluded, the returns during the above years of 5 and 6-cent fares were less than 4½ per cent in 1918, less than 5 per cent in 1919 and less than 1 per cent in 1920.

In fixing the rate of return at 7½ per cent the special master said:

> While a utility company may not insist that past losses be made up by present or future rates, that very fact tends to weaken credit, just as the fact that the utility may not be compelled to serve for confiscatory rates tends to support it. Investors take these things into consideration in determining whether they will invest in such an undertaking, but they cannot expect high or speculative dividends, or more than fair and reasonable profit from a property devoted to public use.

In conclusion Mr. Dubbs said:

> In his petition, the receiver asked protection in increasing fares, and the court, in its preliminary order, permitted the rates as they now stand. I do not understand that it is for me to pass upon the question as to what rate should be authorized during the receivership. That matter seems to me to be one for the court's general direction of the receivership, having in mind not only the value of the property, but the general administration of the trust, the conditions and demands of operation, and the probabilities of revenue. The record before me was made up largely upon the question whether the ordinance rates are confiscatory, and, consequently, it sheds little light on what could be expected in operating results from rates other than those fixed by ordinance or now in force. It seems apparent, however, on the values as I find them that the present rates have not resulted in a return at which the public can justly complain.

Since 1915 the company has paid no dividends on its capital stock. Its requirements for interest on indebtedness exceed $900,000 per annum, and much of the indebtedness has gone to default.

Maumee Valley Seeks Abandonment—Will Run Buses

The Maumee Valley Railway, operating a belt line from Toledo, Maumee and Perrysburg on both sides of the Maumee River, in Ohio, has applied to the Public Utilities Commission for permission to abandon its lines, sell and dismantle the property. Hearing will probably be held on the petition about Sept. 30 and officials of the road say service will be abandoned immediately if the petition is granted.

The State Highway Department has changed the grade on intercounty highway No. 51, which parallels the interurban railroad and the railway has been ordered to reduce its grade to conform to the new grade of the highway, according to the petition. The company fears that if it does not do the work the county may change the tracks and charge the expense to the interurban line. The company is already working under financial difficulties and new changes would be too expensive.

For several weeks the company has been forced to operate between Toledo and Maumee over the tracks of the Toledo, Bowling Green & Southern Railroad. This route eliminates much of the regular suburban business of the Maumee Valley line.

The Maumee Valley line was purchased by bondholders in December, 1920, after operation for several years by the Henry L. Doherty & Company interests at Toledo. There are $345,000 of first mortgage bonds outstanding against the property. New cars were put in service more than a year ago and they are subject to equipment trust liens. The same interests now operating the Maumee Valley lines have formed the Lake Shore Power Company here and have purchased the Toledo & Indiana Railroad.

Those interested in the traction line have applied for permission to operate buses over the route now used by the cars. The bus company is the Maumee Valley Transportation Company. Hearing on the bus application was scheduled for Sept. 11.

Increase in Passengers Carried on Seventeen Ohio Roads

Annual reports of the seventeen city railways in Ohio filed with the Public Utilities Commission show that 27,413,264 more passengers were carried in 1923 than the year before. The total of passengers carried last year was 762,551.464.

The city railways paid out a total of $3,325,354 in taxes, an increase of $17,375.74, although they operated 46 fewer miles of track than the year previous. The total distance mileage operated was 630.

It required an investment of $120,001,598 to operate the railways, additional capital to the amount of $6,212,535 being needed during the year.

Operating expenses were shown to have increased during the year by $3,449,097, made up largely of increased wages paid car crews. The total operating expenses amounted to $31,069,866, and the total revenue was $38,988,611, an increase of $622,028.47.

Nine of the seventeen companies paid dividend returns on their invested capital, the reports showed.

Net Operating Revenue of California Railways, $15,528,376

Public utilities operating in California showed a substantial gain in gross and net operating revenues during the calendar year of 1923, according to their annual reports recently compiled by the financial division of the Railroad Commission. The total revenues of the combined utilities was $890,351,741 in 1923 and $818,244,533 in 1922. The operating expenses increased from $602,976,460 in 1922 to $638,448,890 in 1923. The total net operating revenue for last year was $251,902,850, against $215,268,093 for the previous year.

The operating revenues of the electric railways in 1923 were $60,676,463, against $55,238,183 in 1922. The operating expenses increased from $41,037,553 for the calendar year 1922 to $45,148,088 during 1923. The net operating revenue in 1923 was $15,528,376 and $14,200,629 in 1922.

Key System Transit Employees Buy Stock

Most of the 2,500 employees of the Key System Transit Company, Oakland, Cal., are now stockholders of the organization. A large block of prior preferred stock offered the employees on an installment plan of payment was oversubscribed in fifteen days of a 60-day campaign. The stock that was offered to the employees was purchased by the trustees in the open market at $79.53 a share and was sold to the employees at $70 a share. Up to Sept. 11 a total of 1,901 shares, representing at par value $190,100, had been subscribed. At that time the plan was to continue to take subscriptions up to Sept. 30.

C. O. G. Miller, president, acted as chairman of the board of trustees in charge of a voluntary committee of 100, comprising for the most part the rank and file of the company. This committee issued a bulletin in which it answered questions asked about the stock and the company's financial standing. It was also made plain that the company would not, in its relation with the employees, discriminate between stockholders and non-stockholders.

Mr. Miller said that the trustees decided to announce the successful conclusion of the stock sales campaign in some detail because they felt that the public was greatly interested "in the family affairs of this most human of all public utilities." He said:

> The trustees, directors and other officials of the company are pleased but equally sobered by the overwhelming success of the sale. We realize that we have assumed a sacred trust which imposes upon us the necessity of making this big urban and interurban transportation system a success.
>
> But the interest of our own people in the company will make this task easier of accomplishment. It is a splendid indication that the transportation departments show the larger number of stockholders. We are selling service to the public, and the employees who operate our street cars, trains and boats form the most important contacts with our patrons. They have already established friendly relations with the public, but we feel that their increased

interest in the company through their partnership with it will stimulate their desire to make this the best transportation system in America.

For many years I have been connected with various public utility corporations, but in all that time I have never before witnessed an expression of confidence so spontaneous as that shown in this rapid sale of stock.

Instead of the usual high pressure sales method, the committee of 100 adopted a policy which could only be defined as negative. An editorial in an issue of an informal bulletin published by the committee bluntly advised prospective buyers not to invest unless they were absolutely certain of being able to afford the necessary reduction from their pay checks. That was the introduction of the sales talk. Mr. Miller ventured to assert that the conduct of the campaign by his company constitutes a unique contribution to sales practices.

Interborough Did Better in July

Earnings of the Interborough Rapid Transit Company, New York, July, 1924, show a deficit of $316,724 after operating expenses (including all expenditures for actual maintenance), taxes, rentals, fixed charges and the accrual of the dividend rental on Manhattan Railway stock at the 5 per cent annual rate provided under the plan of readjustment.

This deficit is $444,012, less than the similar deficit for July, 1923.

The betterment is ascribed in part to an increase in the operating revenues, in part to decreased cost of operation, the result of cheaper coal and operating economies, and in part to the fact that in July last year large maintenance expenditures had to be met for extraordinary repairs to turbines in the subway power house. There was no such unusual expenditure this year. Frank Hedley, president and general manager of the company, explains that it is unlikely this betterment of July, 1924, over July, 1923, will continue at the same rate throughout the current fiscal year.

Date for Suspension Postponed.—The State Utilities Commission of Ohio on Sept. 5 granted an extension of time for abandonment of operation by the Cleveland & Eastern Traction Company to Jan. 1, 1925, and the Cleveland & Chagrin Falls Railway to Oct. 1.

Hearing on Dividend Payment Set.—F. C. Chase, sitting as special master, will begin hearings Sept. 29 on the bill of L. Sherman Adams against the trustees of the Eastern Massachusetts Street Railway, Boston, Mass., to compel them to pay a dividend of 2½ per cent on the adjustment stock, accruing in February, 1923, and a dividend of 6 per cent on the common shares.

Disagrees with Provisions for Taking Over Line.—The Attleboro, Mass., Council recently refused to accept the provisions for taking over the Norton, Taunton & Attleboro Street Railway by the Eastern Massachusetts Street Railway. The Norton, Taunton & Attleboro Street Railway is owned by these three communities and Mansfield. The Council objected to a resolution instructing the Mayor to confer with the chairman of the boards of selectmen of Norton and Mansfield, with the object of junking the road. The Eastern Massachusetts had offered to take over operation of the road if it was given a mortgage on the land and buildings of the carhouse and power house to defray expenses of repairing the roadbed. Norton, Taunton and Mansfield voted to accept the offer. The towns had considered the question of junking the road prior to the offer. Under municipal ownership the railway was not a success.

Seeks Discontinuance. — The Visalia Electric Railroad has applied to the California Railroad Commission for authority to discontinue passenger service between Visalia and Exeter, Tulare County. The applicant sets forth that it has had an operating loss in excess of $50,000 per annum for the last two years.

$90,000 Issue Approved.—Authority for the Winona Interurban Railway, Warsaw, Ind., to issue and sell $90,000 of 7 per cent gold notes to raise money to pay expenses incident to work to be carried out on its power distribution system has been granted by the Indiana Public Service Commission. The notes are to be secured by $170,000 of its first mortgage 6 per cent bonds and are to be sold so as to yield $85,000. The company operates a traction line between Peru and Goshen.

Company at Mansfield Plans to Expand.—The Ohio Public Service Company, Mansfield, Ohio, has asked the Public Utilities Commission for authority to purchase electric and gas properties in the vicinity of Sandusky and of the Central Ohio Gas Company, with headquarters in Wooster. The companies involved in the proposed deal include the Sandusky Gas & Electric Company, Port Clinton Electric Light & Power Company and the North Ohio Railway & Power Company. To finance the merger the Ohio Public Service Company has asked authority to issue $4,177,500 of common stock, $4,000,000 of 7 per cent preferred and $8,000,000 of first mortgage and refunding 5 per cent bonds.

Definite Announcement of St. Louis Terms Expected Soon.—A meeting of the reorganization committee of the United Railways, St. Louis, was held in New York on Sept. 5. It was said after the meeting that while the plan would probably be announced soon several matters still remained to be cleared up before it could be submitted.

Adjustment Stock Dividend Declared.—The trustees of the Eastern Massachusetts Street Railway, Boston, Mass., have declared a dividend of 2½ per cent on the adjustment stock, payable on Oct. 1 to holders of record of Sept. 15. This is the first dividend of the kind since April, when the trustees ordered the payment of 83⅓ cents for the two months, February and March. This was at the rate of 5 per cent a year, or the full rate to which the stock is entitled. Under the readjustment plan of the company, which was declared effective as of Jan. 4, 1922, the adjustment stock remained non-cumulative until Feb. 1, 1924, and all accumulated dividends thereon to Feb. 1, 1922, were canceled. An initial dividend of 2½ per cent was paid on May 15, 1923; Dec. 1, 1923, 2½ per cent; May 15, 1924, ⅝ of 1 per cent, covering the two months period from Feb. 1 to April 1, 1924. No dividends were paid on the common to April 1, 1924.

Surplus Earnings Increase.—For the twelve months ended July 31, 1924, the United Light & Power Company and subsidiary companies, Grand Rapids, Mich., realized gross earnings from all sources of $12,549,648, against $12,434,572 in 1923. The operating expenses, including maintenance, general and income taxes, decreased $264,920. The surplus earnings available for depreciation, amortization and common stock dividends advanced from $1,244,120 for the twelve-month period ended July 31, 1923, to $1,309,696 for a similar period ended July 31 of the current year.

Road in Mississippi Planning to Resume.—J. T. Dalier, manager of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., has announced the resumption of traffic between Gulfport and Long Beach over the local company's line. Cars will be operated over the back route instead of the front beach, as was the case previous to a recent storm, which washed away the roadbed. Mr. Dalier has also stated that within 60 days he expected to resume traffic between Pass Christian and other Mississippi coast points over the electric railway.

Passenger Traffic Lower in July.—The Des Moines City Railway, Des Moines, Iowa, reports for July a falling off of 69,000 passengers as compared with June and an additional deficit to the stabilizing fund of $25,025. This leaves only $8,500 in the stabilizing fund, which officials admit will probably be entirely wiped out by results in August. The $25,025 deficit for July occurred in the face of an increase in passenger revenue of approximately $15,000 over June. In June the deficit was $41,693.

Referee's Report Filed in Chicago Elevated Case.—A report has been filed in the Supreme Court at New York by Charles L. Hoffman, appointed referee in an accounting ordered by the court in the suit filed several months ago by Charles E. Mitchell, George M. Reynolds, John H. Mason and R. Floyd Clinch, a committee for the reorganization of the Chicago Elevated Railways, against the United States Mortgage & Trust Company. The suit was brought to determine the amount of assets held by the trust company as successor trustee under a deed of trust made in 1911, and for a ruling as to the amount of property now distributable to the owners of stocks and bonds of the Chicago Elevated Railways. The referee recommends that the court direct the sale of all the properties and a ratable distribution of the proceeds, with the cash remaining in the hands of the present trustees, among the holders of the notes and debentures after the payment of the cost and allowances in the proceeding. This is merely another technical step in a plan which has carried the company to successful reorganization as the Chicago Rapid Transit Company.

Book Reviews

Study of Natural Resources—Pennsylvania's Resources

Published by Smithsonian Institution. Part III, Transportation. 32 pp., illustrated.

This is a part of a publication compiled to make more accessible to the public, particularly in Pennsylvania, the teachings of the collections of the Smithsonian Institution. Part III, just issued, relates to transportation, and six pages are given to electric street railways and three pages to bus transportation. The evolution of the street car is depicted from the early omnibuses through to the latest cars, and statistics are given as to the growth of the industry, the distribution of the dollar of investment and the dollar of income, with something about peak load characteristics, etc. A map of the electric railway lines in Pennsylvania is included. The bus portion gives some particulars of the development and present status of the bus and a map of the bus lines in Pennsylvania. The cost of compilation of the book is being defrayed by persons interested in education in Pennsylvania, and copies are to be supplied to the Pennsylvania schools.

The Choice of Switchgear for Main and Substations

By W. A. Coates. 292 pages, illustrated. D. Van Nostrand Company, New York.

The usual systems of connections, reactances, oil breakers, arresters, voltage regulators, switchboards and high and low voltage switching equipment are well treated in this book. A brief treatment of automatic stations, general schemes of protection, excitation systems and auxiliary supply systems complete the work. The book is clearly written and contains sufficient examples, data, curves and theoretical information to give engineers a very thorough grounding in the subjects considered. Both foreign and American equipment and practices are considered and typical installations for large and small stations are included. An appendix by T. W. Ross treats admirably of automatic converter stations for railway applications, etc., and in addition the latest developments in automatic hydro-electric stations are considered.

The book is by far the best in its field and properly belongs in the library of all colleges and central station engineers. It fills a need that has been felt and is a valuable addition to technical literature.

Engineering in American Industry

The development of industry in these United States during 120 years. By Conrad Newton Lauer, general manager Day & Zimmermann, Inc., Engineers, Philadelphia. 96 pages, 9 x 12, illustrated. Published by McGraw-Hill Book Company, Inc., New York. $2.50.

This book consists of a lecture delivered before Princeton University under the Cyrus Fogg Brackett lectureship in applied engineering technology. Mr. Lauer reviews the growth and development of manufacturers in the United States and the contributions which engineering has made. By means of many diagrams and charts the author shows the tremendous growth of the United States and its industries on the formation of the American government to the present time. Progress and methods are also shown by means of numerous photographs and line drawings. Considerable space is devoted to the development of transportation, including street railways. This book will form a valuable addition to the library of those interested in the history of our industries.

Crain's Market Data Book

Crain's Market Data Book and Directory of Class, Trade and Technical Publications. Fourth Edition, 1924. 505 pages. Published by G. D. Crain, Jr., Chicago. $5.

This book, in addition to listing practically all American and foreign industrial publications, gives a brief résumé of the extent of each industry, including the electric railway. The book has its principal value to advertisers in locating a market.

Personal Items

I. T. S. Operating and Traffic Departments Merged

A consolidation of operating and traffic departments of the Illinois Traction System is being completed which will make Springfield, Ill., the center of activities of this large electric railway system. As a first step in carrying out this plan the headquarters of the traffic department of the system will be moved from Chicago to Springfield. This will include the offices of W. H. Wylie, traffic manager, and the tariff department; also the office of E. E. Kester, assistant traffic manager, which will be moved from Peoria to Springfield. The traffic department office of the railway has been located in Chicago for more than a year.

In connection with removal of the traffic department to Springfield, W. H. Wylie, traffic manager, announced changes as follows:

P. M. Saylor is appointed general agent at Peoria, Ill., in charge of all freight and passenger matters; P. A. Beaghan, soliciting freight agent; R. V. Sharp, local freight agent, and E. F. Tower, city passenger agent, all at Peoria.

E. R. Rauch is appointed general traveling passenger agent and E. A. Cordell, general traveling freight agent, both with headquarters at Springfield, Ill.

J. S. Wellman is appointed district passenger agent, with headquarters at St. Louis; George L. Rush, chief clerk in the general traffic department at Springfield, and Walter P. Brown, chief clerk in the general traffic office at Chicago, Ill.

A branch office of the general traffic department will be maintained in Chicago and the office of D. R. Peck, general agent, will also be continued in Chicago.

The Illinois Traction System has a through freight and passenger service serving Peoria, Springfield, Danville, Bloomington, Decatur, Champaign, Ill., and St. Louis, Mo.

The headquarters of J. M. Bosenbury, superintendent of motive power equipment, is transferred from Chicago to Springfield and a number of adjustments in several departments will be made accordingly. No changes are made in the personnel of the present general operating offices at Springfield. C. F. Handshy remains as general manager of the main division with headquarters at that point.

T. D. Kiniry Will Return to Philadelphia

Thomas D. Kiniry, general superintendent of transportation of the local and interurban lines of the International Railway, Buffalo, N. Y., since early in 1923, will return to Philadelphia as an aid to Superintendent Good in putting into effect desired improvements before the higher wage rate for employees goes into effect. This statement was made by Thomas E. Mitten in addressing "Men and Management" at the recent outing in Willow Grove. Mr. Kiniry first joined the Philadelphia Rapid Transit Company in May, 1900, as a motorman and four years later became supervisor. Early in December, 1922, he was detailed to Buffalo by Mitten Management, Inc., in the capacity of supervisor to the instruction force, and with the resignation of Mr. Casey he was made general superintendent of transportation. A brief history of Mr. Kiniry's activities in the railway field was reviewed in the ELECTRIC RAILWAY JOURNAL, issue of April 7, 1923.

George H. McFee, general superintendent of the Boston & Worcester Street Railway, Framingham, Mass., since 1920, has resigned, effective Sept. 15, to reenter the employ of the United Fruit Company in Central America. F. C. Lewis, general freight and passenger agent, has been appointed to succeed him.

George C. Mathews, in charge of the statistical division of the Wisconsin Railroad Commission at Madison, has accepted appointment as professor of public utilities at Northwestern University. Mr. Mathews, however, will remain with the commission, devoting one day a week to classes in the problems of operation and management of public utilities different in type.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

League of Nations Functioning Effectually on Economic Side

Many Popular Presentations of Work of New International Body Touch Only Lightly on Economic Work of Interest to Business Men—McGraw-Hill Man Recently Returned from a Study of League Workings at Geneva Summarizes Nature of Extra-Political Activities

BY E. J. MEHREN
Vice-President McGraw-Hill Company, Inc.

THE world today is a collection of producing units bound together by an elaborate network of commercial ties. Back and forth over the borders go the goods of one country in exchange for those of another, creating an economic dependence that, when disturbed, upsets the whole social organism. After the disruption, statesmen can throw down new boundaries almost at will, but the results will be chaotic until the experts in finance, communication and transportation readjust the services and mechanism cut asunder by the new lines.

Strange as it may at first seem to many, here it is that the League of Nations may be brought to intervene. This, of course, is not the place to speak of the political mission of the league; there are other publications that adequately deal with this element of its work. But there are economic and educational functions regarding which the engineer, the industrial leader, the man who wants to know what the world is doing, should be informed.

The economic and technical functions of the league are administered chiefly by the following sections:

1. Financial and Economic.
2. Transit.
3. Health.
4. Intellectual Co-operation.

In the dramatic character of accomplishment the work of the Financial and Economic Section easily occupies first place. Austria came to the league a bankrupt and was put on its feet. Hungary is working under a somewhat similar rehabilitation plan. A half million Greek refugees from Turkey are being settled on land under a plan, involving a large and difficult financing feature, worked out by this section. Danzig has been given a new currency, settling an almost impossible problem for this "free city," surrounded by Polish territory.

These are outstanding accomplishments, and many admirable articles about them have been published in American general magazines. However, there is much additional work under way—on the equitable treatment of commerce passing between nations, on suppression of unfair competition, on fair treatment of nationals of one country established commercially in another, on simplification of customs and other formalities affecting commerce, on arbitration of international commercial disputes, on unification of laws relating to bills of exchange, on uniform methods of presenting statistics and index figures, and on similar international economic and commercial problems.

As for the Transit Section, there is a long list of subjects before it involving day to day operation of means of communication on which the committee is working, all looking to the facilitation of transit between states. Much, of course, had been done in this direction by international conference and agreement before the war, such agreements as the Stresa convention on technical uniformity (standardization of gages, clearances, equipment, etc.) and the Berne convention covering international bills of lading. The section begins its work where such conventions leave off. The extension, for example, of the use of a through bill of lading and of standard contract provisions in the bill to shipments originating in, destined for, or passing through all continents as well as Europe, is being sought by the league. Of course, in Russia and the United States the league has no government support—a bar to the world-wide extension of any uniform practice that may be adopted.

In the two general conferences held under the auspices of the section since its formation steps have been taken in the formulation of recommendations and conventions (proposed international agreements) covering, among other things, the following matters:

1. Removal of obstacles to the free passage of goods in transit through a country, involving the granting of complete equality in shipment between foreign and domestic goods. (This is a subject of very special concern to landlocked nations, such as Austria, Hungary, Switzerland and Czechoslovakia.)
2. Principles regarding transportation and rights of use on "waterways of international concern"; that is, waterways which provide access to the sea for more than one nation.
3. A standard statute of port regulations
4. Uniformity of tonnage measurement in maritime navigation.
5. A long series of problems involved in rail communication between countries, covering such points as
   - (a) Agreements on through service.
   - (b) Unification of frontier stations.
   - (c) Mutual use of rolling stock.
   - (d) Regulations regarding tariffs that will facilitate international traffic.
   - (e) Financial arrangements between railway administrations.

Conventions have also been drawn up on the transmission from country to country of electric power and for agreements between nations for the development of hydraulic power.

The Health Section has, among other things, attacked the whole problem of public health administration and epidemic control in a very broad way.

The final extra-political phase of the league's work that has general interest is less tangible than those already described. It deals with "intellectual co-operation" and has as its purpose the development of contacts between thinkers and writers of all countries to the end that while "avoiding interference with the way each country expresses its own national genius" this will make it easier to draw upon the "common fund of knowledge, methods and discoveries."

INTERNATIONAL LABOR OFFICE

One other agency needs mention to complete the picture of the international economic and technical organizations centering at Geneva, namely, the International Labor Office. Its function is to gather information regarding labor conditions and, in conference, to develop out of this information recommendations and proposed laws. In the six conferences already held a variety of recommendations and measures have been adopted relating to such matters as hours of employment, night work by women, employment of minors, protection of workers in hazardous employment, employment at sea, use of white lead paint and collection of statistics regarding unemployment, emigration and immigration.

Whatever may be the strength of the League of Nations as a political agency, it is a boon to the whole world, and to Europe in particular, for the extra-political work it is carrying on. It reminds one of the centralizing agency that is constituted by every national government carrying on for the good of every section of its territory activities that necessarily transcend district borders. Moreover, these extra-political activities of the league are much more effective than would be international co-operation by economists, technicians and educators without official standing. There was a great deal of such unofficial co-operation before the war, but much of it was inffective. The league's work all has official backing and its effectiveness is correspondingly great. This has been shown by the results of the non-political work.

We, of the United States, of course, have no official connections with the league's work, but the extent to which Americans as individuals have participated is astonishing. Americans are represented in nearly every important extra-political activity of the league and in many of the political ones. In all, 115 Americans have served on committees, have been present as "official observers" at conferences or have worked in the headquarters office at Geneva. As Dr. Manley D. Hudson of Harvard has said, "The United States is not in the league, but it is necessarily of it. The government has not become a member, but scores of Americans have joined."

On the Pier or Off the Lot

The American Electric Railway Association is reiterating the decision of its exhibit committee to the effect that it looks with disfavor upon demonstrations of buses outside the Pier during the coming convention at Atlantic City. All exhibits are to be on the Pier itself except a few railway cars, which will be placed on the track directly across the Boardwalk. Notice to this effect has been sent to the various exhibitors, and it is hoped by the committee that all will observe both the spirit and the letter of this ruling.

White Company Has Large Orders from Railways

The White Company reports that 63 electric railways are operating 667 White buses in fleets ranging from two or three buses to 80. In addition the company now has orders from electric railways for 68 buses for early delivery.

Metal, Coal and Material Prices

Metals—New York	Sept. 9, 1924
Copper, electrolytic, cents per lb.	13.313
Copper wire base, cents per lb.	15.875
Lead, cents per lb.	8.00
Zinc, cents per lb.	6.525
Tin, Straits, cents per lb.	51.00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.125
Somerset mine run, Boston, net tons	2.075
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.55
Kansas screenings, Kansas City, net tons.	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.55
Weatherproof wire base, N. Y., cents per lb.	18.50
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.04
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.12
Turpentine (bbl. lots), N. Y., per gal.	0.89

Rolling Stock

Marshall Traction Company, Marshall, Tex., has purchased a 22-passenger bus.

Columbus Electric & Power Company, Columbus, Ga., plans to purchase three buses with a seating capacity of 28 persons each for operation by the Columbus Transportation Company.

Staten Island Rapid Transit Company, Staten Island, N. Y., recently placed an order with the Standard Steel Car Company for 80 cars of the multiple-unit type, similar to those now operating in the subways of the Brooklyn-Manhattan Transit Corporation. Before going into operation the completed cars will be tested on the test tracks of the General Electric Company at its Erie Works in Pennsylvania. Electrification of approximately 17 miles of double-track passenger line of the Staten Island Rapid Transit Company and the Staten Island Railway is now under way, an order having recently been placed with the General Electric for 80 two-motor equipments.

Miami Beach Electric Company, Miami Beach, Fla., recently placed an order with J. G. Brill Company for six new cars at a cost of $7,024 each. Delivery is promised at the beginning of the winter season.

Track and Line

Seattle, Wash.—The City Council has passed an ordinance appropriating $76,000 for railway track reconstruction and double-tracking on the Fauntleroy line in West Seattle.

South Jacksonville Municipal Railway, South Jacksonville, Fla., has started the Fletcher Park extension which will be rushed to completion.

Birmingham Electric Company, Birmingham, Ala., has made changes in the Tidewater line, eliminating approximately 100 grade crossings over steam railroads. Five track connections with a like number of changes in trolley wires have been made. Approximately five blocks of new double-track line were laid to effect the changes in track arrangement. A total trackage of the equivalent of 8.7 miles of single-track line was abandoned when the changes were made. The majority of this trackage was doubled track line. Work of taking up the old rails will be started in a few days. The old track is largely 70-lb. rail. The new standard rail is 101 lb. Such of the old material as can be used will be salvaged, it is stated. Three new lines were created out of portions of the old Tidewater line. The eastern end of the line was retained, but a connection with the East Lake line on First Avenue was constructed on Sixty-eighth Street, and the new South East Lake Line was created. This line and the East Lake line have an interlocking schedule with a three-minute headway at the peak hours. A section of the old Tidewater line was connected up to the Avondale line, making the new Avondale-Woodlawn line. The western end of the Tidewater line was not changed except that it makes a loop through the business section of the city. This was named the Ensley line.

Philadelphia, Pa.—An ordinance has been introduced in the City Council permitting the Continental Passenger Railway or its lessee, the Philadelphia Rapid Transit Company, to construct a connecting curve and turnout at Fifteenth and Filbert Streets.

Trade Notes

Horne Electric & Manufacturing Company, Jersey City, N. J., manufacturer of hand brakes, trolley bases and other railway specialties, has combined with the Russell & Stoll Company of 17 Vandewater Street, New York City. Under the new arrangements the company will have still larger manufacturing facilities. L. W. Horne, who has been well known in railway circles for many years, becomes the manager of the railway department of the Russell & Stoll Company.

A. J. Stott is now affiliated with the Glidden Company of Cleveland, handling the Glidden line of varnishes, enamels, paints and thinning oils.

A. C. Irwin, for a number of years a member of the engineering staff of the Chicago, Milwaukee & St. Paul Railway and prominently identified with the activities of various railway engineering organizations, has been appointed manager of the railways bureau of the Portland Cement Association, succeeding D. A. Tomlinson, recently deceased. For many years Mr. Irwin has been engineer of the Portland Cement Association in the structural bureau, with general headquarters at 111 West Washington Street, Chicago. For the past two years he has been devoting much of his time to the problems concerning the development of joint committee specifications and similar special work.

New Advertising Literature

Electric Machinery Manufacturing Company, Minneapolis, Minn., has issued Bulletin No. 840, on vertical alternators. A chart is inclosed showing various possible applications of E-M synchcronous motors, with Bulletin No. 785 of May, 1924, listing some of the users of E-M synchronous motors and vertical alternators.

Buffalo Forge Company, Buffalo, N. Y., has issued in a 16-page booklet a comprehensive review of the use of electric fans for blowing, exhausting, ventilating, cooling and drying. The subject matter is confined solely to direct-connected units, including descriptions of small disk or propeller fans, multi-blade type fans used for heating and ventilating, stoker units, pressure blowers, mill exhausters and electric forge blowers. The booklet is amply illustrated with views of installations in various types of industrial plants.

Carrick Engineering Company, Chicago, Ill., has issued catalog 99, entitled "The Automatic Control of Combustion." This publication is a thorough discussion of automatic control methods and systems. It brings out the limitations of the various systems and why they fail. Copies of this 32-page treatise may be obtained from the company. Another booklet recently issued is Bulletin M, called "Systems for the Automatic Control of Combustion." In this 16-page bulletin the complete specifications, together with diagrams and list of equipment required for 33 distinct methods of automatically controlling boiler room equipment, are given. This bulletin will be sent to interested parties free of cost.

Irvington Varnish & Insulator Company, Irvington, N. J., has issued Catalog 101, a 60-page illustrated booklet entitled "Irvington Insulation." The booklet contains a complete and interesting presentation of the long list of Irvington insulating material, including cambrics, tapes and "Irvington" baking varnishes. Commercial and technical data on all "Irvington" products are included.

Hubbard & Company, Pittsburgh, Pa., have issued catalog No. 24, a 200-page booklet which gives a complete list of Hubbard pole line hardware and Peirce construction specialties. It is divided into sixteen sections and contains a stock number index, a section index and a material index and is replete with diagrams and illustrations.

New York, Saturday, September 20, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 12

FOREIGN REPORT NUMBER

Committee on Foreign Operation Given This Issue

THIS issue of ELECTRIC RAILWAY JOURNAL is given over entirely, except for a condensed news section, to the advance publication of the report of the American Electric Railway Association committee on foreign operation. This committee, composed of James W. Welsh, Harley A. Johnson and Harry L. Brown, was sent abroad at the suggestion of President Britton I. Budd to study transportation facilities there in the interest of furthering the modernization movement in the industry in this country. The JOURNAL is glad to turn over its pages this week and give this extra prominence to a report which represents such a large expenditure of effort and money. The observations of the committee were so extensive and embodied so many points of interest to American railway operators that it was also thought desirable to give the report the fullest circulation in advance of the convention. For obviously, only a brief summary of the findings and conclusions of the commmittee can be given within the time available in the convention proceedings.

Not all of the matter treated in the report is to be taken, it is understood, as having the indorsement of the committee as desirable or practicable for application here, or as a commendable practice abroad. The committee members thought it desirable, however, to include an account of some things as a record of the present state of the art in the European countries visited, even though they might not consider them better than, or perhaps as good as, the corresponding practices in this country. In other words, so much of interest was learned that it seemed desirable to pass on a good deal of the information to the field, rather than to confine the report strictly to those ideas and practices which the committee believed to be improvements over American methods. An interesting thing about the expressions of opinion in the committee's report is that they represent the joint observations and conclusions of three men selected as being well versed in American practices, in the light of which their comparisons are made.

Much of the information gathered is presented by means of illustrations. This, together with the fact that the JOURNAL has taken some liberties in breaking the text matter up by headings and subheadings, will, it is hoped, make the report more readable and easier for reference work than if presented in the usual manner.

What We Can Learn from European Railways

To the
AMERICAN ELECTRIC RAILWAY ASSOCIATION:

THE Committee on Foreign Operation, after its short search in Europe for better practices and new ideas that might be put into use here in America to further the general program of modernization in the electric railway industry, finds it necessary to report that our foreign contemporaries have not a great deal to show that suggests material improvement. Yet some of the English railway men who have looked into our railway practices have gone back to their own properties with about the same feeling. This perhaps reflects as clearly as anything how difficult it is to adapt the practices followed in one country to the very different conditions prevailing in another. There are, however, some transportation practices in Europe from which we may derive lessons—some for which we might profitably take a leaf out of the book of our foreign brothers, and others which serve better to help us know what to avoid in the future.

We find in Paris and in the British cities, except London, a confirmation of the best American thinking with respect to the relations of the motor bus to the existing rail systems. In all of these cities the bus is being taken up more and more as an auxiliary and feeder to the tramway system. Nowhere is there any feeling that the bus can do the work of the tramway, and everywhere the tramway is being extended and developed. The bus is simply being fitted into the general transportation scheme wherever it can be used economically, even to the extent of displacing some few non-paying tram lines, as occasion arises to renew the tracks.

London offers probably the most interesting study of all the cities visited. The situation there is the exception to all of the accepted principles of transportation. In this one city we shall apparently have an opportunity to see worked out whatever merit there may be in no monopoly, no regulation, little co-ordination, and plenty of competition. Private company buses are in competition with "pirate" buses, with private tramways and municipal tramways, and with the privately operated underground lines. All of these systems are giving more service than is needed or warranted at lower fares than they can afford, in the effort to hold traffic or take it away from the others. The result is that the tramways are losing traffic, the underground lines are barely holding their own, but the buses are building an enormous patronage. Even the last, however, is diluted by the operation of so many buses, again as a competitive measure, that it is doubtful whether the buses will continue to make money if they are doing so now. Temporarily, London people are enjoying an abundance of transportation service, but there must soon come a day of reckoning and some one will pay the bill. It will be the taxpayers for the municipal tramways and the stockholders for the private companies.

The main conclusion that may be drawn is this: The tramways are now handling some 1,000,000,000 passengers annually, and carrying nearly the whole of the extra surface traffic of the rush hours. The omnibuses are already carrying well over one billion passengers annually, but making no attempt to provide the extra peak-load service. Even on this basis, buses already virtually take up the entire capacity of the main arteries of travel. The most enthusiastic bus proponents in London said that buses *could* handle the entire surface transportation, including the billion passengers now handled by the tramways, only if an extensive street widening program were carried out. This was quickly admitted to be financially impossible. For the tram to be displaced would also mean a great expansion of the underground lines, and this was likewise said to be financially impossible. All of which is to say, then, that buses could not provide the entire surface transportation and that the tramways must remain. But if co-ordination is not soon brought about and the competition eliminated private enterprise will be forced out and the municipality will have to take up the burden and carry it on at the expense of the taxpayers. Recently a bill has passed Parliament which is a step in the direction of relief, as it gives the Ministry of Transport some authority in the bus service operated over the streets. But it is not yet in effect and it is somewhat doubtful just how helpful it will be.

Even under a proper system of co-ordination and regulation, the motor bus will have a very large place in London's transportation—a larger place than will probably ever exist in any American city. The reason is that the tramways are, and always have been, excluded from the central area comprising the principal business, theater and governmental activities. In fact, this is the reason that many Americans returning from London have the impression that "all" of London's surface traffic is handled by buses, as they have seen practically no tramcars.

Despite this great handicap, the tramways are serving an enormous patronage at a remarkably low fare, with a heavy excess of financial obligations to the city and government as compared to the bus, and doing it with losses surprisingly small. At the same time it should be said that the London General Omnibus Company has done a master job of supplying a service which the public wanted. Its original idea was to co-ordinate this service with that of its tram and underground lines, but the competition of independent bus owners has necessitated a wide expansion of the bus service into competitive territory as a measure of protection. This is now in varying degree jeopardizing all investment in rail service, and the future course of procedure and outcome are conjectural and not promising.

One point in which the tramways of England and Scotland clearly excel is the high standard of maintenance prevailing on the majority of properties. If one can overlook the fact that the tramcar there has undergone practically no development in the matter of design in the past twenty years or more, he cannot fail to admire the good mechanical condition and attractive appearance of the cars and the almost total absence of bad joints, noisy special trackwork and poor paving along the rails. The reason is that particular attention is paid to these features. It is almost the universal practice to wash every car in service every night, and to give each car at least a coat of varnish and such touching up of the paint as is needed once a year. Large plate-glass windows that are clean also enhance the appearance. A marring feature in London and some of the other British cities is the advertising carried on the outside of the cars. This is even worse on the London buses.

But while the exterior appearance and good mechanical condition reflect a real effort to attract the pedestrian to board the tramcars, little has been done to add to his comfort once he is aboard. Mostly longitudinal seats, and in any event, plain wood seats, continue to prevail. And only recently is any effort being made to speed up the service. This is being done in part by replacing the old-time motors with new ones on a few properties, though nowhere do they seem to be getting all there is in even the old motors in acceleration and running speeds. Another speeding-up measure noted is the beginning made in Edinburgh to arrange the cars so that both ends can be used for the movement of passengers, rather than to compel the entire ingress and egress to take place from both decks at the rear platform as is almost universally the case.

The single-truck car also seems still to satisfy most of the managements, and the "jazzing" (nosing) of these cars militates against any real speed of transit. The absence of air braking is notable, as is also the continued use of the electric track brake, despite the serious wear on the rail at stopping points. British tramcars are lighter per seat than ours, due mainly to the double-deck wood construction, use of single trucks largely, or in any event, the use of only two motors even on two-bogey cars. Generally speaking, British tramcars are better painted, cleaner, better maintained, lighter in weight and less noisy, but slower and less comfortable than our street cars in America.

The one important new idea with respect to car design comes from Paris, where 100 new cars have been placed in service which have the two motors mounted on the body, each driving one of the two axles by means of beveled gears. This design appears to offer an interesting means of reducing both the total and the unsprung weight, where it is possible to use a four-wheel car.

The most interesting thing about British track construction is that practically no cross ties are used. The rail is laid directly upon the concrete, with tie rods to hold the gage. Lighter cars, lower speeds and less severe temperature changes perhaps account for the success of this lighter track construction. The committee would hesitate to express an opinion that such construction would stand up under American conditions. But it may be worth while to raise the question and to show and describe the details of construction, as is done in another section of the report.

Another feature of British track construction that is worthy of note is the process by which thermit rail joints are made under pressure with apparently very beneficial results.

Besides corrugation of the rail, which British tramway men appear to be bothered about as much as we, they have another serious trouble which is in the nature of a coning wear of both wheel and rail head, slanting downward toward the gage line. This contrasts markedly with the tendency of the American wheel tread and rail head to wear flat. As the coning becomes worse, the tendency of the single-truck cars to "jazz" increases.

The *in situ* treatment of rails is still in the experimental stage in Europe, but the experience thus far seems to indicate that it is at least of value in eliminating corrugation.

With respect to motor buses, the newer designs abroad still remind one of the early designs in this country, wherein the vehicle was an adaptation of a truck chassis rather than one intended in its whole make-up for passenger carrying duties. But despite this fact, buses are being far more extensively used in London and Paris than in any of our American cities, and they have much to teach us on the use of buses and chars-à-bancs in special tour services.

Steam passenger buses in Great Britain, to which there have been many references in this country in the last two years, have all ceased operation, and as far as the committee could learn, there is no steam bus operation in England and Scotland at present. The gasoline-electric bus is being tried out on a rather extensive scale in London, and in a limited way elsewhere in England. Their advantage is still a matter of doubt.

The use of trackless trolleys and the design of the vehicle are both still very much in the experimental stage in Great Britain and France. The committee was able to find no substantial enthusiasm for this type of transportation as compared with the motor bus. There has been a tendency on the part of some tramway managers to favor the trackless trolley because, with its lower center of gravity, they felt safe in making it an inclosed-top double-deck vehicle. Double decks and British tramway men are inseparable. But just recently, some inclosed-top double-deck motor buses have been placed in trial service which give promise of meeting requirements equally well.

Both in London and in Paris, the underground service is made attractive by the attention given to the interior appearance of the cars and the absence of severe congestion, even in the rush hours. There are, of course, nothing like the peaks to be handled in either of these cities that we have in New York or Chicago, for example, and the development of these systems has not been hampered by political abuse. The later London underground cars are particularly notable for their comfortable velour upholstered seats. The Paris underground seats are attractive in appearance, but are rather uncomfortable. Both the London and Paris subway cars are less noisy than our New York cars, but the reason is primarily that the windows are kept closed and many of the cars are built of wood—a practice which would not be permitted in this country. The London management has also made a particular study of noise reduction on its new steel cars and has met with some success. This, and the new attractive cars, and the use of escalators have been important factors in holding patronage in the face of the heavy surface competition. The deep level of many of the London subways militates seriously against the building of traffic. Thus, it takes a rather long ride to make sufficient saving in time to induce a rider to make the long descent to the rapid transit system. For this reason the underground lines are now being extended into outlying territories, and of course the distance fare helps to make this feasible. Another factor which favors the surface systems is that the speed of the underground trains in both London and Paris is not as fast as that of our New York and Chicago rapid transit lines.

One factor which greatly favors the operation of buses in London and Paris, and which should not be overlooked, is that there is nothing like the street congestion there that we have in our large American cities. This is due to the very much smaller use of private automobiles and to the absence of high buildings with the attendant heavy concentration of business people in a limited area. Thus, in both London and Paris, whatever street congestion there is, and it is fairly bad at certain points, is caused almost entirely by motor buses and taxicabs.

The regulation of street traffic is notable. There is almost no evidence of any control, yet traffic jams and collisions between vehicles are exceedingly rare. No use is made of any mechanical means of signaling traffic, not even the simple semaphore. Traffic largely takes care of itself, and the pedestrian, above all other users of the streets, must look out for himself.

The zone fare system used everywhere abroad produces a remarkable amount of short-haul riding. This suggests the thought that with the introduction of bus service in co-ordination with street railway service in America, it might be possible to start the bus off on a zone fare system, and use the bus to develop and handle short rides.

The general courtesy of British tramway, railway and bus platform men and their apparent desire to be friendly in their attitude toward passengers was another outstanding impression.

A general characteristic of travel in British cities, over which an American marvels, is the universal practice of permitting passengers to jump on and off moving cars, buses, and even underground trains. English women have certainly mastered the "face forward" rule. Half the time tramways and buses seem hardly to stop at all, or at least the interchange of passengers is almost wholly made while the vehicle is in motion. London's tunnel trains come in and leave the stations with several of the doors open. Many passengers hop off before the train stops and some even rush out, open the doors and jump on after the train has started. One would think that the companies would spend half their revenue in accident claims, but actually such expenditures are quite low.

JAMES W. WELSH,
HARLEY A. JOHNSON,
HARRY L. BROWN.

Observations on Foreign Practice

Committee on Foreign Operation of American Electric Railway Association Presents Report as Result of Study in England, Scotland, France and Switzerland—The Policies Abroad with Respect to the Relations of Tramway and Bus Are Told and Analyzed, the Designs of Rolling Stock Are Treated and Numerous Aspects of Transportation Across the Water Are Discussed

BY

James W. Welsh
Executive Secretary
American Electric Railway
Association

Harley A. Johnson
Assistant to General Manager
Chicago Rapid Transit Company
President American Electric Railway
Engineering Association

Harry L. Brown
Editor
ELECTRIC RAILWAY
JOURNAL

To the AMERICAN ELECTRIC RAILWAY ASSOCIATION:

Pursuant to the instructions of President Britton I. Budd, American Electric Railway Association, the committee on foreign operation submits the following report:

At the meeting of the executive committee on June 20, President Budd said he believed it desirable, in furthering the general effort toward modernization of the industry, to send a committee of three abroad to study foreign tramway, bus and railway operation, and bring back to the electric railways in America any ideas, which in the light of the committee's knowledge of American practices, seemed to offer possibilities of improving the service rendered the public by our companies. He felt that the association could probably not afford to pay the expenses of the entire committee on so extensive a trip, but said that his companies would send one man, if ELECTRIC RAILWAY JOURNAL would send another and the association the third. The executive committee approved of this plan and James H. McGraw, president McGraw-Hill Company, Inc., readily agreed to the proposal when approached by Mr. Budd.

The itinerary of the committee followed out in its studies in Europe is shown in an adjacent column. In general, this covered two weeks in London, one week in northern England and Scotland, one week in Paris and one week on the electrified railroads in Switzerland and southern France. The committee spent its time on each property looking into those things which appeared to be of particular interest, though it attempted, so far as time permitted, to go over the construction and operating practices of the company in general.

In practically every instance discussions were had with the management as to the operating results and trend of business, and its policy with respect to bus and trackless trolley in relation to the tramway. Information was sought as to any new construction or operating methods which the management considered in the nature of improvements that would interest American railway companies. The committee rode the cars, buses and trackless trolleys of each system, observed traffic conditions, inspected shops and carhouses, new track construction, power facilities and overhead construction, and made inquiry with respect to the relations between city authorities and tramway and bus undertakings. In its travels on the steam railways, the committee made particular note of the type of rolling stock used, the condition of the roadbed and its type of construction, courtesy of employees, general attention given to passengers, dining car and sleeping car facilities, speeds of operation, and any features tending to attract traffic.

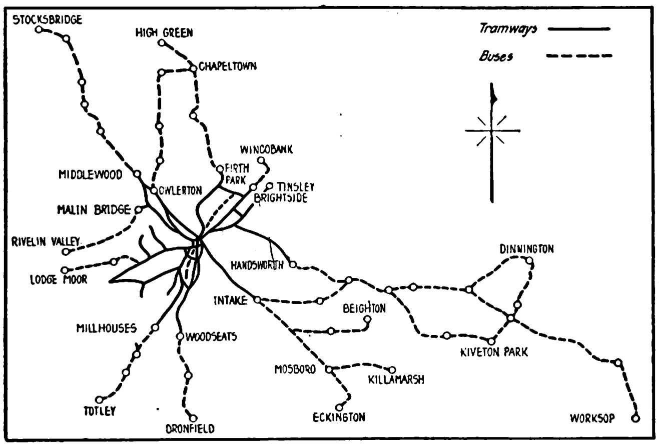
The committee naturally allotted a large share of its time to the transportation systems of Great Britain because of the greater similarity of the operation there with American conditions. The British electric railway men showed a splendid willingness and desire to give the committee all engineering and operating data requested and to assist it in seeing any part of the operation, not to mention the attentions which helped to make the visit pleasant. Not such a wealth of information was secured about the systems on the Continent, partly because of the handicap of the language and because many of the principal railway executives were unfortunately away on holiday.

The committee wishes to make acknowledgment of the great assistance afforded it through letters of introduction to European officials, which were supplied by a number of American railway executives and manufacturers. It wishes particularly to mention that Thomas W. Casey, vice-president National Pneumatic Company, placed his Paris Representative, Frank M. Delaney, at our entire disposal, and that he accompanied us on our calls upon railway people and acted as our interpreter and otherwise greatly facilitated our studies in France and Switzerland.

The Place of the Systems

THE question of whether the surface street railway is to be replaced with some other form of vehicle, and in general the place of tram, bus, trackless trolley and tube, are as live topics in Europe as they are in the United States. After looking into this phase of foreign practice particularly, the committee came away with the impression that the ideas about these questions are not quite as well crystallized abroad as they are here at home. Everywhere we went in Great Britain the tramway officials were more or less concerned about the bus and were studying its possibilities. A very few of them expressed themselves as feeling that the tramway would sooner or later be displaced by the road vehicle, but they were not able to give satisfactory answers in any case as to how the total traffic now being hauled by the tramways could be handled by buses. In no place is the bus handling the peak-load traffic, nor is any attempt being made to handle it with buses, not even in London where a total of 4,800 buses are in operation.

Some of the more progressive managers are bringing the bus into use in conjunction with the tramway, feeling that to have buses in operation is the best means of keeping control of the local situation and avoiding destructive competition. One might suppose that with municipal ownership, which exists in a majority of the cities in Great Britain, the local authorities would be able to prevent competition with

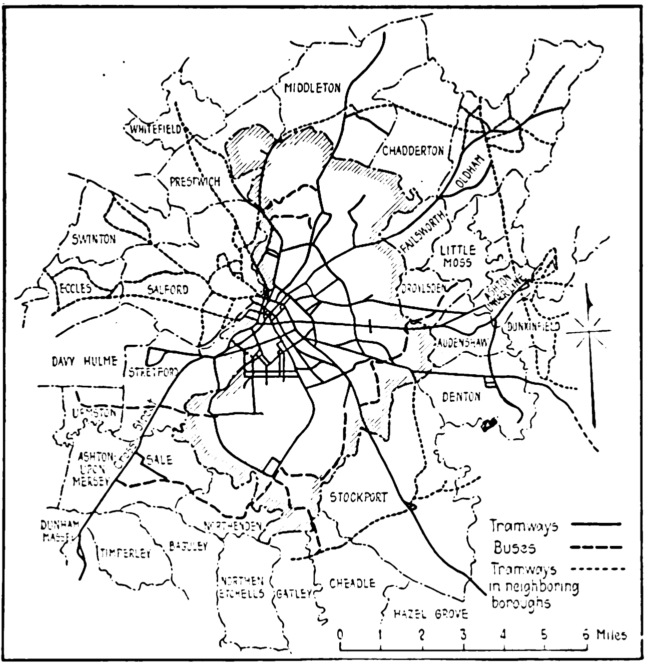

STOCKSBRIDGE
HIGH GREEN
CHAPELTOWN
Tramways
Buses
WINCOBANK
FIRTH PARK
TINSLEY
BRIGHTSIDE
MIDDLEWOOD
OWLERTON
MALIN BRIDGE
RIVELIN VALLEY
LODGE MOOR
DINNINGTON
HANDSWORTH
INTAKE
BEIGHTON
MILLHOUSES
WOODSEATS
KIVETON PARK
MOSBORO
KILLAMARSH
TOTLEY
DRONFIELD
ECKINGTON
WORKSOP

Buses extend many of the Sheffield Corporation Tramway lines to points outside the city, serving as feeders and keeping out competitive bus operators. They also make a good profit. No trackless trolleys here

their own systems. However, this is not the case. The authority to operate buses or any form of transportation over a given route is a parliamentary grant. While the local authorities are given an opportunity to try to show cause why competitive lines should not be established, the decision as to whether or not there should be additional transportation facilities rests with Parliament, and the local authorities not only can be overruled but have been. A local tramway concern cannot extend its own rail lines nor engage in bus operation without specific parliamentary authority for each undertaking.

In general, the tramway officials are installing buses as feeders to the tramway system or to replace a tramway line here and there when confronted with the necessity to rebuild the track and pavement on a route where the traffic is light. It is also usually in a case of the latter type that the trackless trolley has been installed, and this primarily because the overhead construction was already up.

Some British managers consider that the choice of


MIDDLETON
WHITEFIELD
CHADDERTON
PRESTWICH
OLDHAM
FAILSWORTH
SWINTON
LITTLE MOSS
ECCLES
SALFORD
DROYLSDEN
ASHTON UNDER LYNE
DUNKINFIELD
AUDENSHAW
DAVY HULME
STRETFORD
URMSTON
DENTON
CROSS STREET
ASHTON UPON MERSEY
SALE
STOCKPORT
DUNHAM MASSEY
NORTHENDEN
TIMPERLEY
BAGULEY
NORTHEN ETCHELLS
GATLEY
CHEADLE
HAZEL GROVE
Tramways
Buses
Tramways in neighboring boroughs
0
1
2
3
4
5
6 Miles

Tram and bus system of the Manchester Corporation Tramways and the neighboring connecting tram lines. No trackless trolleys here

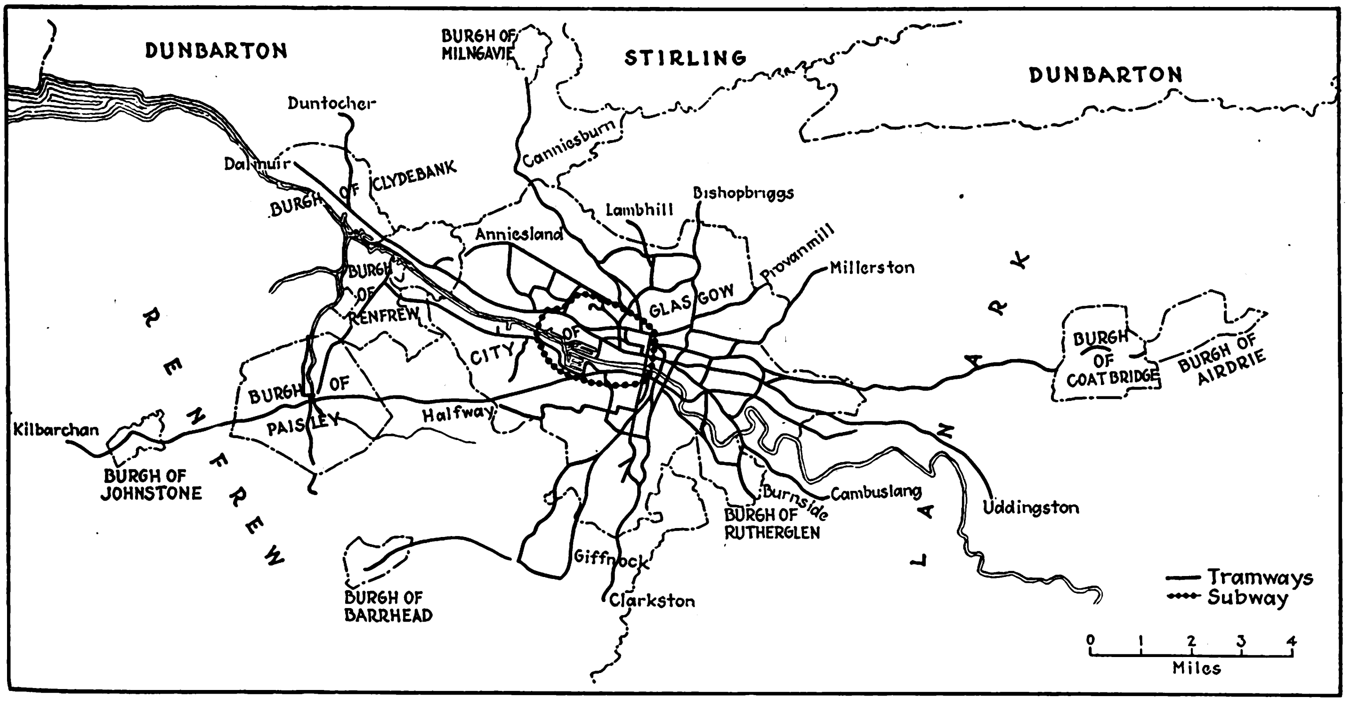
Itinerary of the Committee on Foreign Operation

Wednesday, July 9....	Sailed from New York.
Tuesday, July 15......	Arrived London.
Wednesday, July 16...	London Underground Railways.
Thursday, July 17.....	London General Omnibus Company, Chiswick Works.
Friday, July 18........	London Underground Railways.
Saturday, July 19.....	London Underground Railways.
Sunday, July 20......	Trip over London, Brighton & Southern Railroad; London to Brighton and return, and tour of Brighton tram system.
Monday, July 21......	Tramways of London Underground Group.
Tuesday, July 22......	London Underground Railways.
Wednesday, July 23...	London County Council Tramways.
Thursday, July 24.....	London County Council Tramways.
Friday, July 25........	Inspecting London traffic and organizing data collected.
Saturday, July 26.....	Same.
Sunday, July 27......	Sleeper London to Glasgow over London Midland & Scottish Railway.
Monday, July 28......	Glasgow Corporation Tramways.
Tuesday, July 29......	Edinburgh Corporation Tramways.
Wednesday, July 30...	Leeds Corporation Tramways and Bradford Corporation Tramways.
Thursday, July 31....	Sheffield Corporation Tramways & Motors.
Friday, Aug. 1........	Manchester Corporation Tramways.
Saturday, Aug. 2.....	Birmingham Corporation Tramways and Motors.
Sunday, Aug. 3........	London. Rode long country bus route of L. G. O.
Monday, Aug. 4......	British Empire Exhibition, Wembley.
Tuesday, Aug. 5......	British Empire Exhibition, Wembley.
Wednesday, Aug. 6....	London Underground, Acton Works.
Thursday, Aug. 7.....	Articulated train over Great Northern Railway, London to Doncaster and return.
Friday, Aug. 8........	Non-stop run, 207½ miles, over Great Western Railway, London to Plymouth and return.
Saturday, Aug. 9.....	London to Paris.
Sunday, Aug. 10......	Char-à-banc trip, Paris to Versailles and return.
Monday, Aug. 11.....	Conference with officials of Midi and Paris-Orleans railways.
Tuesday, Aug. 12.....	Metropolitan underground railway.
Wednesday, Aug. 13...	Paris to Berne, Switzerland, via Chemins de Fer de l'Est.
Thursday, Aug. 14....	Berne local tramway and Swiss Federal Railways.
Friday, Aug. 15......	Rode electric locomotive Berne to Thun; electric and electric-rack railways Interlaken to Jungfrau-yoch and return.
Saturday, Aug. 16....	Interlaken to Geneva; rode electric locomotives (three-phase and one-phase) Brigue to Lausanne.
Sunday, Aug. 17......	Geneva to Toulouse, France.
Monday, Aug. 18.....	Toulouse to Tarbes; rode electric locomotive Tarbes to Lourdes, where inspected mercury arc substation. Night trip to Paris.
Tuesday, Aug. 19.....	Arrived Paris 11 a.m.; inspected new multiple-unit equipment of French State Railway.
Wednesday, Aug. 20...	Paris tramways and buses.
Thursday, Aug. 21....	Metropolitan underground; shops and traffic study.
Friday, Aug. 22......	Called on Transport Commission.
Saturday, Aug. 23....	Paris to Cherbourg; sailed for U. S. A.
Friday, Aug. 29.......	Arrived New York.

system is a matter of growth of traffic; that the bus should be replaced by the trackless trolley after traffic has reached a certain density, and then that the ultimate system will be the tramway when the traffic becomes dense. While a number of the tramway officials explain the possible field of the three in this manner, no such actual transition has taken place, and the in-between field of the trackless trolley is so limited that others think its place could easily be dispensed with by operating the buses a little longer than they should be operated from an economic standpoint, and beginning the operation of tramways a little earlier than they should be.

How Various Tramways Are Treating the Bus

IN VIEW of the absence of definite opinion as to the place of the bus, it is perhaps as enlightening as anything to tell what has been done up to date in each of the provincial cities visited in England and Scotland. In Glasgow, which has long been a city of particular interest because of the high density of traffic and low rate of fare, the tramway has not placed any buses in operation as yet, but now has 14 on order. Furthermore, there is no bus competition there as yet. In view of the competition which has sprung up in various other cities, it may be interesting to point out certain reasons why there has been none in Glasgow.


DUNBARTON
BURGH OF MILNGAVIE
STIRLING
DUNBARTON
Duntocher
Dalmuir
BURGH OF CLYDEBANK
Canniesburn
Lambhill
Bishopbriggs
Anniesland
Provanmill
Millerston
BURGH OF RENFREW
CITY OF GLASGOW
L A N A R K
BURGH OF COATBRIDGE
BURGH OF AIRDRIE
R E N F R E W
BURGH OF PAISLEY
Halfway
Kilbarchan
BURGH OF JOHNSTONE
Burnside
Cambuslang
BURGH OF RUTHERGLEN
Uddingston
Giffnock
Clarkston
BURGH OF BARRHEAD
Tramways
Subway
0 1 2 3 4
Miles

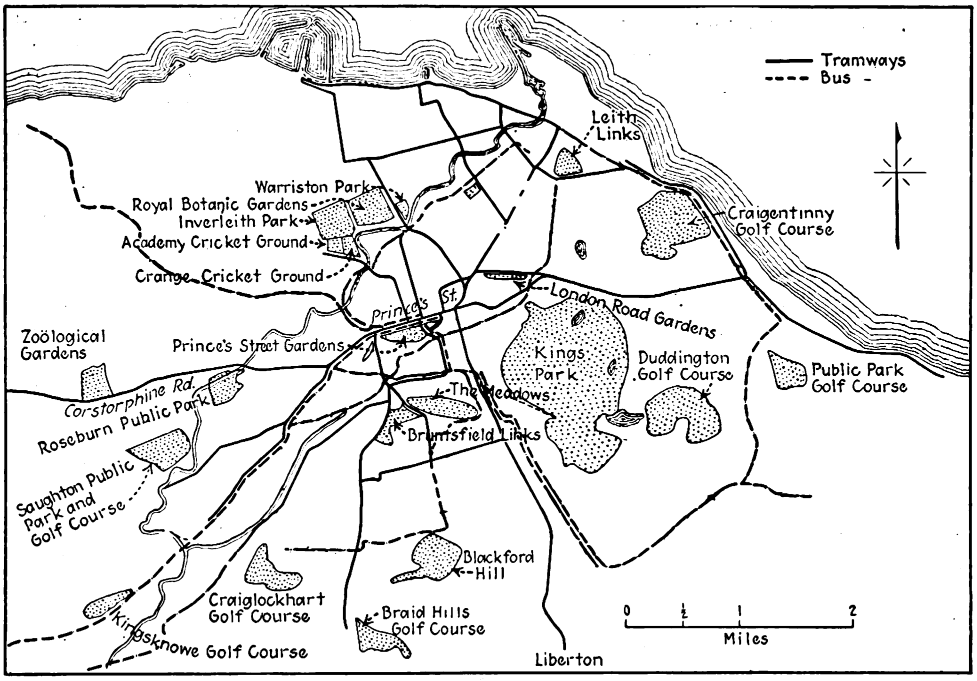
The lines of the Glasgow Corporation Tramways cover the city so thoroughly and provide so frequent and cheap a service that there has been no attempt at bus competition

In the first place, the rate of fare is extremely low and the frequency of service is very close and nearly all of the available streets are occupied with tram lines, so that the possibilities for profitable independent bus operation are obviously limited. James Dalrymple, general manager of the Glasgow Corporation Tramways, expressed the belief that the Ministry of Transport, which is a parliamentary body, would not grant operating rights to a competitive undertaking, if application were made, on account of the completeness of the service rendered by the tramway. He had not made definite plans at the time of our visit as to where his new buses would be operated, but he feels that he should operate some buses in order to determine their field if there is one in Glasgow. The Glasgow Corporation has built considerable extensions to the tramway system since the war, some of these lines extending out into undeveloped territory and to public parks. A good deal of this work has been done as a part of the general program prevalent in Great Britain of providing employment, and in connection with the widening of streets and the extensive housing developments.

EDINBURGH CITIZENS SHOWED THEIR DESIRE TO RETAIN TRAM

In Edinburgh, Scotland, the Edinburgh Corporation Tramways are now operating 86 buses of the single-deck, 32-seat, two-man type. The first operation of buses began three years ago when the rail lines were still being operated by cable. Several routes were operated entirely with buses and at first they made a strong appeal, but later the public reacted strongly against them. This was because of the vibration, noise and slow loading and unloading. Some of this operation was over roads paved with granite block, and as the buses were equipped with solid tires, the vibration was bad and the riding uncomfortable. The buses were also unpopular because their limited capacity made it necessary often to leave passengers at various corners, who then had to wait for the next bus or walk.

Some of the dissatisfaction was overcome by the use of pneumatic tires, which did away with the vibration and also saved in gasoline consumption and body maintenance, and the tires cost little more. But the most


Tramways
Bus
Leith Links
Warriston Park
Royal Botanic Gardens
Inverleith Park
Academy Cricket Ground
Grange Cricket Ground
Craigentinny Golf Course
Prince's St.
London Road Gardens
Zoölogical Gardens
Prince's Street Gardens
Kings Park
Duddington Golf Course
Public Park Golf Course
Corstorphine Rd.
Roseburn Public Park
The Meadows
Bruntsfield Links
Saughton Public Park and Golf Course
Blackford Hill
Craiglockhart Golf Course
Braid Hills Golf Course
Kingsknowe Golf Course
Liberton
0 ½ 1 2
Miles

Edinburgh Corporation Tramways system

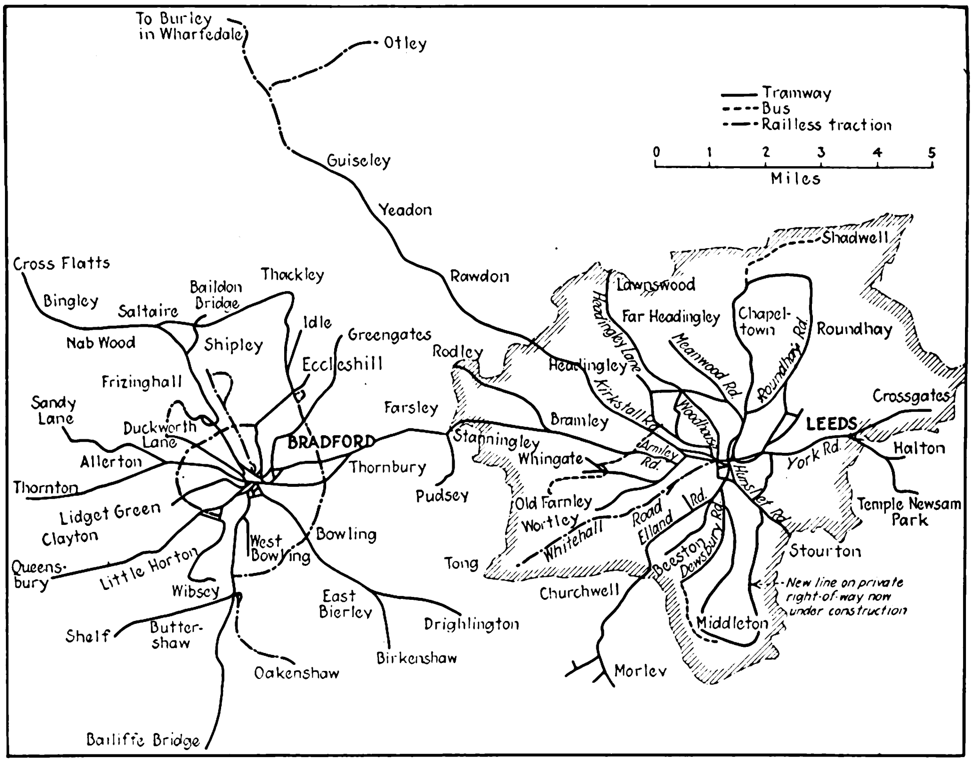
This shows the relation of tram and bus routes. Buses operate over Prince's Street in the rush hours, paralleling the tram line on the principal thoroughfare as a means of increasing the street capacity, and also on several routes into the outskirts of the city.

interesting part of the experiment was that the experience with these early type buses, which were not all that might be desired, led to a clamor for tramway lines rather than bus lines and probably was a factor in the decision to electrify all the cable lines. This has been done during the last two years. When some of these bus routes were replaced by the electric tram, the tramcars carried all of the passengers who offered themselves, even with a 1-minute longer headway, and the total revenue was substantially better, as there were fewer walkers.

The opinion of R. Stuart Pilcher, manager, is that there is a general field for buses everywhere, but he does not think that they will do away with the trams. The most serious disadvantage is that not enough buses can be operated to handle the rush-hour loads. The buses are being used in Edinburgh now not only as feeders to the tram lines, but to parallel the tramway on Prince's Street, which is the main thoroughfare, during the rush hour as a means of increasing the capacity of the rail line on that street. The company is also operating 15 pneumatic-tired chars-à-bancs in tours from 10 to 20 miles out of Edinburgh and charging a fare of 1s. to 2s. These chars-à-bancs are not run unless a three-quarter full load is available. Last year some 50,000 passengers were carried on char-à-banc trips at a profit of £4,000.

Leeds Operates Both Buses and Trackless Trolleys

The Leeds Corporation Tramways, Leeds, England, is operating 14 trackless trolley buses over 8 miles of route. The corporation is also operating eight motor buses on lines which serve as extensions of the tram lines to new housing developments. The principal trackless trolley installation in Leeds replaced a tramway line and was put in when the corporation was faced with the necessity to rebuild the track. This line was operated with a 5-minute headway of the tram, though not more than a 10 or 15-minute headway was needed to handle the traffic. Other trackless trolley lines were installed to provide crosstown service or extensions to the tram lines. The trackless trolleys that are used in Leeds seat 60 passengers, are of double-deck design and weigh 7 tons 12 cwt. (17,024 lb.). The tramcars seat 56 passengers on the two decks and weigh 11 tons 4 cwt. (25,088 lb.). The corresponding energy consumption is 1.6 kw.-hr. per car-mile for the trackless trolleys and 1.78 kw.-hr. per car-mile for the trams. An effort is made to carry only a


To Burley in Wharfedale
Otley
Tramway
Bus
Railless traction
0 1 2 3 4 5
Miles
Guiseley
Yeadon
Shadwell
Cross Flatts
Bingley
Saltaire
Baildon Bridge
Thackley
Rawdon
Lawnswood
Nab Wood
Shipley
Idle
Greengates
Far Headingley
Chapeltown
Roundhay
Frizinghall
Eccleshill
Rodley
Headingley
Headingley Lane
Kirkstall Rd.
Meanwood Rd.
Roundhay Rd.
Sandy Lane
Farsley
Bramley
Crossgates
Duckworth Lane
BRADFORD
Stanningley
Woodhouse
LEEDS
Halton
Allerton
Thornbury
Whingate
Armley Rd.
York Rd.
Thornton
Pudsey
Old Farnley
Wortley
Hunslet Rd.
Temple Newsam Park
Lidget Green
Clayton
West Bowling
Bowling
Whitehall Road
Elland Rd.
Beeston Rd.
Dewsbury Rd.
Queensbury
Little Horton
Tong
Stourton
Wibsey
East Bierley
Churchwell
New line on private right-of-way now under construction
Shelf
Buttershaw
Drighlington
Middleton
Birkenshaw
Oakenshaw
Morley
Bailiffe Bridge

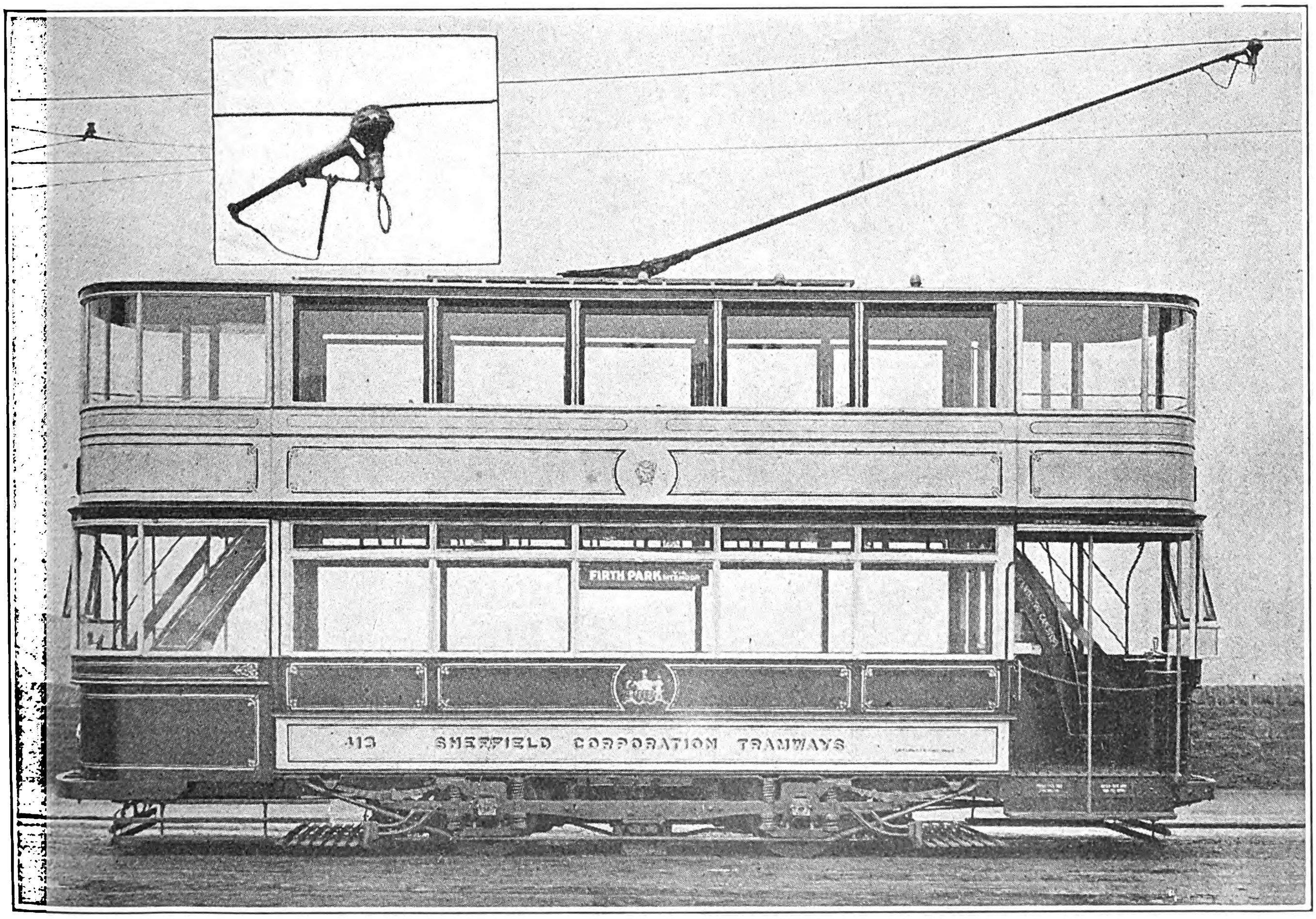
The neighboring tramway systems of Leeds and Bradford, showing trackless trolley routes in both cities and bus lines in Leeds seated load in the trackless trolley, while a standing load of 12 passengers is permitted on the trams. The maintenance cost of the trackless trolley has been found to be just about the same as that of the tram. No road maintenance tax is paid for the trackless trolley except the vehicle tax, which is based on the carrying capacity. The opinion of the Leeds management is that where the traffic on a given line required not closer than a 10-minute service, the trackless trolley is the best vehicle, while buses should be installed for headways of 25 or 30 minutes.

Another instance came to light in Leeds of the people preferring the tramway where the headway was long, because it had the capacity to carry all the passengers who offered themselves. This was on a route where three one-man, 20-seat, pneumatic-tired buses were providing the service. It was frequently necessary for the bus to leave some of the passengers because of the definite limitation of its capacity.

The corporation is now engaged in the building of a 3½-mile extension of the tram system to the village of Middleton, primarily to take care of the week-end and holiday riding to a park and also to serve a new housing development. The headway required normally will be very infrequent, but considerable capacity is needed on these heavy days. The fact that there is no direct road between Leeds and Middleton was given as the primary reason for building a tram line rather than to operate buses. This means that the tram line is being built on private right-of-way with open-type track construction. An interesting sidelight in Leeds is that J. B. Hamilton, manager of the corporation tramways, is also in charge of the street improvements and street cleaning and is able to correlate the tram and road work.

TRACKLESS TROLLEYS BUT NO BUSES IN BRADFORD

R. H. Wilkinson, manager of the corporation tramways in Bradford, England, is a great believer in trackless trolleys and has 20 such vehicles of various designs in operation. He believes that trackless trolleys could be used practically anywhere. No motor buses are in use by this corporation. None of the trackless trolley routes is paying, however, and Mr. Wilkinson explained that the reason is that all of them are operating on routes where the traffic is so light that there is no possibility of their paying, but they provide a service demanded by the city. They are operated on crosstown lines and as extensions to tram lines. It costs about the same to operate a trackless trolley as a tramcar, exclusive of fixed charges. A road tax of £70 a year is required for each vehicle. Mr. Wilkinson believes that it will be possible to handle any traffic with the trackless trolley as well as with the tram, except where there are bad gradients. He says that the trackless trolleys are being kept in service absolutely on their merit, but comments also that the people of Bradford do not like them and that the tramway committee is not inclined to



Standard Type of Car Used on the Sheffield Corporation Tramways

This car, fitted with plate glass windows and curved plate glass vestibule windows, upper and lower deck, is one of the most attractive cars seen abroad by the committee. The absence of advertisements on the outside of these cars, and on the Edinburgh cars, which are present on the trams in many cities of Great Britain, greatly enhances the appearance. The Sheffield cars were particularly inviting in appearance when lighted at night, on account of the glistening of the curved vestibule windows, which appeared to be highly polished on every car. This Sheffield car seats 70; weighs 13 ton 7 cwt. (29,904 lb.), and is equipped with two 50-hp. motors. The inset shows the swivel harp used generally in England.

authorize any further extensions of them. Some light may be thrown on this by reference to the design of these vehicles, which is discussed elsewhere.

An effort has been made by the management to secure authority from Parliament to operate motor bus lines into outlying territories, but this has been opposed by the surrounding communities on the ground that they think that if the corporation tramway of Bradford were to supply them with transportation service, this would tend to bring about their absorption into the city. Nevertheless, they want bus service into Bradford and would welcome it if supplied by a private company. The committee thought this was a rather interesting sidelight on municipal ownership.

While there is no bus competition in Bradford at the present time, there are a large number of buses operating out into the country from the ends of the tram lines. The railway out to the city limits takes thousands of passengers who are picked up there by buses and delivered to their homes outside the city. If these buses should come into the city, even though they did not pick up any local city passengers, they would nevertheless take away from the tramway a very large patronage which it now has.

On this question of competition, the opinion was expressed here in Bradford that if application was made for operation of buses by a private enterprise within the city, which of course would be opposed by the tramway authorities, the Ministry of Transport would probably grant the right, because the government is now tending to favor private business. The comment was also made that municipal works in Great Britain have reached their zenith.

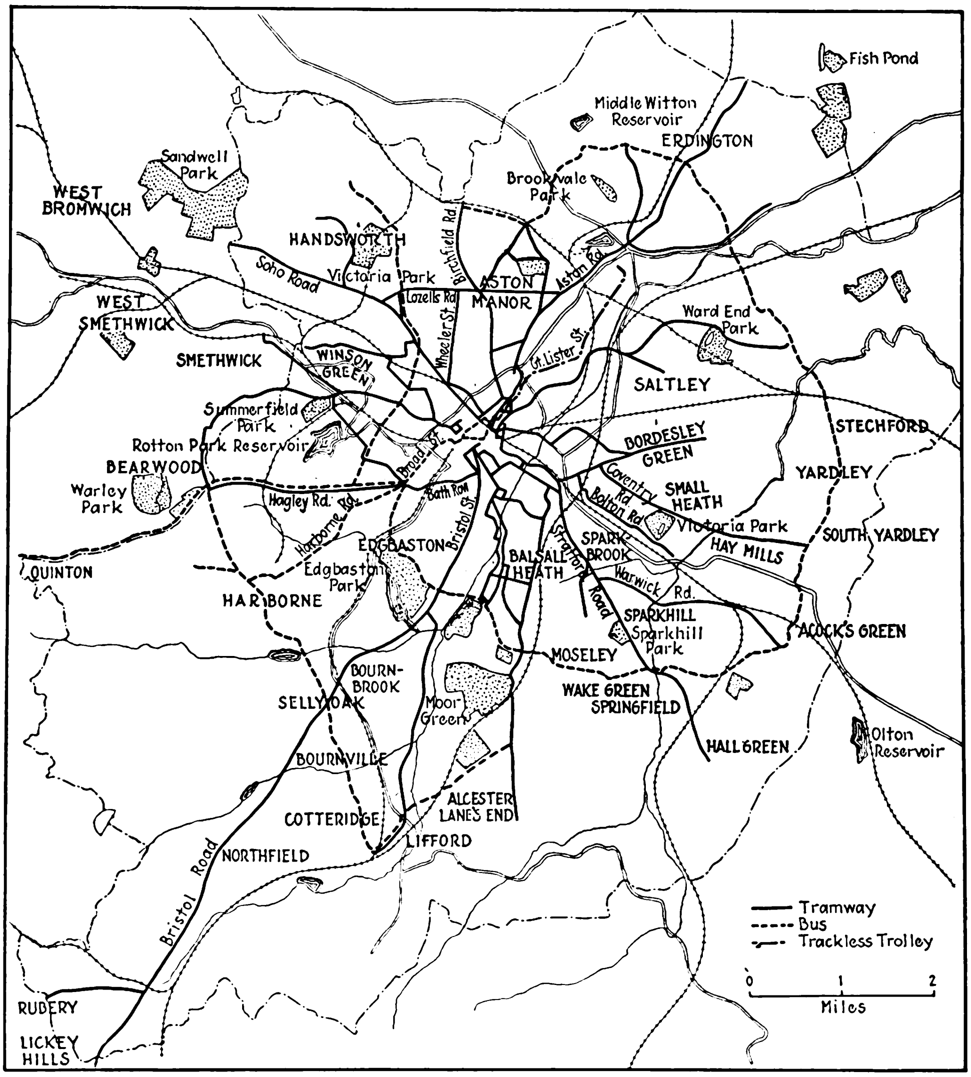
A Progressive Development of Both Tram and Bus in Sheffield

In Sheffield, the tramway-bus situation is particularly interesting. Under the direction of A. R. Fearnley, manager Sheffield Corporation Tramways and Motors, not only is the tramway being used to its best possibilities, but an extensive use of buses is being made in co-ordination with the rail lines. There are now 56 buses in use on services which are very largely extensions of the tram lines and which do not compete with the rail lines. These bus lines are not only serving as good feeders to the tramway system and keeping out competition, but they are also showing, as a whole, a substantial profit in themselves. Mr. Fearnley commented that the bus undertaking is financing itself out of revenue. Trackless trolley powers have been obtained from Parliament but have not been exercised, Mr. Fearnley feeling that economically there is no particular place for this type of vehicle.

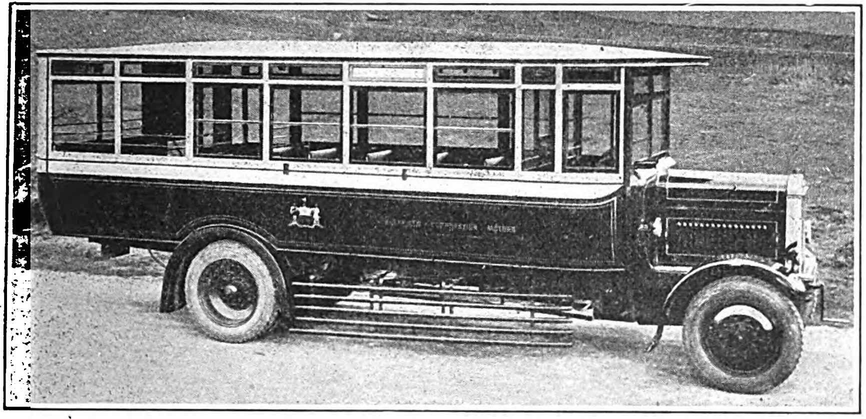
Mr. Fearnley is not at all of the opinion that the tramway is a back number, but considers that the bus business is very attractive and that the tramway people should get into it and prepare to dominate the local transportation field. If the motor bus is to be the vehicle of the future, the tramway people should be the ones to operate it.

As evidence of the faith in the tram, the Sheffield Corporation Tramways has renewed 50 per cent of the trackage in the last 5½ years. An extension 1¼ miles long is being made this year, and three lines were extended last year. The extension being made this year is in connection with a road-widening project and the tram line takes the place of a bus extension of a tram line, because the people did not like to have to transfer from tram to bus, and the management did not want to parallel its tram line for 2½ miles with buses.

Nevertheless, in every place where rebuilding of the tracks becomes necessary, the management is giving serious consideration to the advisability of installing buses rather than to put the new investment into track. In one case this decision has been made. The Petre Street tram line,


Fish Pond
Middle Witton Reservoir
ERDINGTON
Sandwell Park
WEST BROMWICH
Brookvale Park
HANDSWORTH
Birchfield Rd.
Soho Road
Victoria Park
ASTON MANOR
Aston Rd.
Lozells Rd.
WEST SMETHWICK
Ward End Park
SMETHWICK
WINSON GREEN
Wheeler St.
Gt. Lister St.
SALTLEY
Summerfield Park
Rotton Park Reservoir
Broad St.
STECHFORD
BORDESLEY GREEN
BEARWOOD
Warley Park
Hagley Rd.
Bath Row
Coventry Rd.
Bolton Rd.
SMALL HEATH
YARDLEY
Victoria Park
HAY MILLS
SOUTH YARDLEY
Harborne
Bristol St.
EDGBASTON
Edgbaston Park
BALSALL HEATH
Stratford Road
SPARKBROOK
Warwick Rd.
QUINTON
HARBORNE
SPARKHILL
Sparkhill Park
ACOCK'S GREEN
MOSELEY
BOURNBROOK
SELLY OAK
Moor Green
WAKE GREEN
SPRINGFIELD
HALL GREEN
Olton Reservoir
BOURNVILLE
ALCESTER LANES END
COTTERIDGE
LIFFORD
NORTHFIELD
Bristol Road
Tramway
Bus
Trackless Trolley
0 1 2
Miles
RUBERY
LICKEY HILLS

Birmingham Corporation Tramways system comprises tram, bus and trackless trolley. The bus lines are largely circumferential and all within city limits



Latest single-deck 32-seat bus of the Sheffield Corporation Tramways, which is typical of the newest designs of buses manufactured in England

although a good paying rail route, with a 10-minute and 6-minute headway, is to be replaced by a bus service with a 5-minute headway. Use will probably be made of a new type of double-deck bus seating 52 passengers and having the top inclosed, of which the company now has one trial bus, described elsewhere. The high cost of replacing the track was one factor in the decision to substitute buses, but another one was that the tram line was short and had a rather poor terminus, while the bus line, which will be substituted for it, will extend some distance farther out and reach a better terminus. The street over which this extension of route will be made was rather too narrow to permit of satisfactory rail operation.

Except for this new bus line which will shortly be installed on Petre Street and one other bus line inside the city, as shown on the accompanying map, all of the bus routes operated by the Sheffield Corporation Tramways extend outside of the city and are distinctly in the nature of extensions of and feeders to the tramway system. Mr. Fearnley considers that these outlying bus routes are a benefit to the tramway system and to the city, even if the operations have to be conducted at a loss. In fact, one poor tram line in Sheffield has been turned into a paying line as a result of business brought to it by the corporation's own buses and by competitive buses operating into the country.

The total revenue derived from bus operation for the year ended March 31, 1924, was £96,351. The operating expenses were £72,973, leaving a net balance of £23,378. The deductions for fixed charges, sinking funds, renewals, etc., and the net income were as follows:

Interest	£1,476
Sinking fund	6,188
Income tax	62
Renewals	6,188
Total deductions	£13,914
Net revenue	£23,378
Total deductions	13,914
Net income	£9,464

This net income was expended for new buses, garage facilities and other capital expenditures.

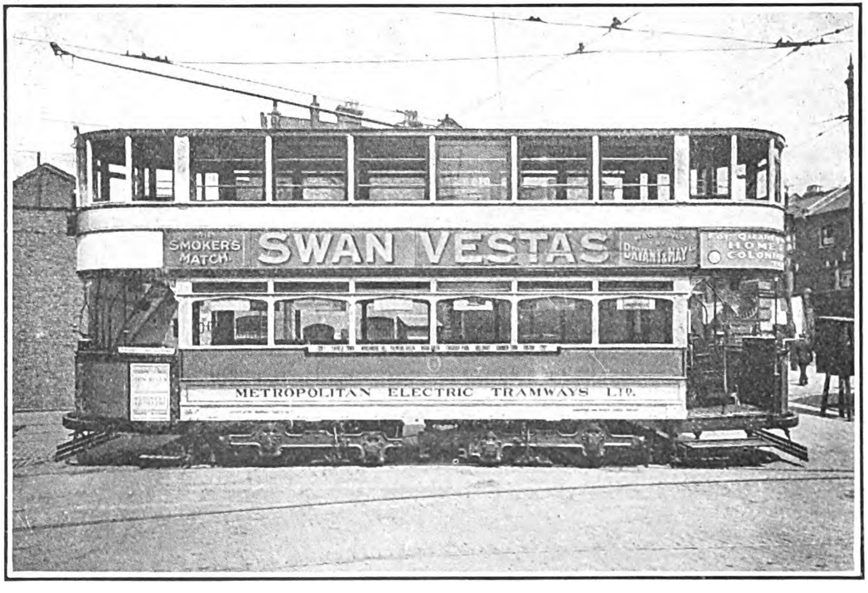
The figure for bus mileage operated during the year is confidential, but it may be said that the total expense, including operating expenses, interest, sinking fund,* renewals and all other charges, figured for both bus and tram, showed a total cost of 3d. per mile less for buses than for trams. This, however, is not on an equivalent seating capacity basis, and if this is taken into account, the cost per passenger would show up much more favorably for the tram.

In considering this matter of seating capacity, the newest type Sheffield cars seat 70, while the new inclosed-type double-deck bus seats 52, and it is expected that future double-deck buses will seat 60. The 52-seat bus must pay a license of £70 a year. The maximum speed of both tram and bus is about the same, but the buses make about 1 m.p.h. higher average schedule speed on account of operation on country roads.

THE TRAM IS THE THING IN MANCHESTER WITH LIMITED FIELD FOR THE BUS

The opportunity for operation of buses in co-ordination with the rail lines by the Manchester Corporation Tramways is rather more limited than that of most of the British tramway systems. On five-sixths of the circumference of the city the lines of the Manchester corporation connect with other tram lines, so the only place where buses can be operated without being in competition is in the south sector of the city. Here the corporation has 30 buses in service, including those few which are operated in crosstown service. As indicated, the lines in this south sector of the city are in the nature of extensions of the tramway system.

Henry Mattinson, general manager, expressed the opinion that buses may be used to advantage as feeders, but that he has not the slightest doubt that the tramway is the best means of handling the major transportation service. Buses cannot be operated successfully except at practically double the rate of fare on the tramways. Furthermore, nearly three buses would have to be



This is typical of the present day London tram car, which seats 78 passengers and is equipped with double maximum traction trucks and magnetic track brakes operated for one tram. He considers that independent buses cannot compete with the tramway systems at an equal rate of fare, and that bus lines will ultimately become tramway lines as the territory develops.

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*By parliamentary act, investment in buses by municipal systems must be amortized at the rate of one-eighth a year; tramways, one-twenty-fifth a year.

As to the field of the trackless trolley, none of which is in use in Manchester, Mr. Mattinson thinks that there may possibly be an economic field for it between bus and tram, but this field is so narrow as to be eliminated in many cases. He thought that the principal opportunity to use it would be where a tram line was to be replaced by some form of road vehicle, and here, with the overhead already up, it probably would be more economical to operate trolley buses than buses.

The soundness of the Manchester tramway position is reflected in the construction program which is being carried out. During the year ended March 31, 1924, the track mileage was increased by 8 miles, or nearly 4 per cent of the total mileage. A number of additional track extensions are now under construction, and petitions are before Parliament for authority to build others in connection with housing developments. The corporation is also rebuilding 30 of its single-truck cars a year into larger double-truck cars with a seating capacity of 82. On rebuilding, the cars are also equipped with new motors. These rebuilt cars weigh 14 tons and are legally permitted to carry 12 standees, but they easily carry 100 passengers.

BIRMINGHAM BUSES IN CROSSTOWN SERVICE; TRACKLESS TROLLEY REPLACES TRAM ON NARROW STREET

The Birmingham Corporation Tramways has 78 buses and 12 trackless trolleys in operation. The buses, except for one experimental inclosed-top double-deck type, are all of single-deck design, while the trackless trolleys are all of double-deck design. The latter seat 52 passengers, as does also the double-deck bus. The double-deck bus and the trackless trolley weigh just about the same.

The motor bus services of the tramway corporation are all within the city limits and are of a circumferential or crosstown nature, though some of the routes run into the center of the city. Outside of the city there is a very large bus undertaking by an independent private company, but there is no competition. The tramway has an agreement with the bus company whereby the corporation does not run buses outside of the city and the independent bus company does not pick up any city passengers, although it brings the suburban passengers into the center of the city. The independent company is big enough to prevent competition outside of the city, and the tramway service is so complete as to do the same thing within the city. If an independent bus picks up a strictly city passenger, it is required to charge him twice the tramway fare and turn over to the tramway the usual fare. These circumferential bus services of the tramway were reported to be paying, and it was said that the suburban traffic of the independent company was growing very rapidly.

In 1921 the corporation substituted trackless trolley operation for one of its tram lines, the occasion having arisen to rebuild the track. This tramway line was a single-track route with sidings, and the best that could be done was to provide a 5-minute headway. The street was not wide enough to put in double track, so the corporation decided to try out trackless trolleys, as these could be run at any headway and reconstruction of the track also avoided. This line extended through a thickly populated combined residential and business district of lower class and really needed better than a 5-minute headway of trams.

During the first year of operation of trackless trolleys, 46 per cent more mileage was operated, producing 27 per cent increase in gross receipts and 37 per cent increase in net revenue. The detailed comparison between the last 12 months of tram operation on this line and the first 12 months of trackless trolley operation follows:

	Car-Miles	Receipts	Gross Profits
Railless, 12 months ended March 31, 1924	339,396	$123,790.53	$40,114.19
Tramcars during previous 12 months......	232,165	97,672.72	29,302.79
Increase...........................	107,231	$26,117.81	$10,811.40
Percentage increase.....................	46.2	26.7	36.8

Alfred Baker, general manager, considers this the first instance where trackless trolleys have been installed where they really had a chance to make a showing. Both the management and the passengers are well satisfied with this trackless trolley service. The service is fairly fast, the vehicles give a sensation of more mobility than many of the trackless trolleys and they ride well.

Mr. Baker was very positive in his views on motor buses. He believes they are of great value as feeders and extensions out into districts not yet thickly populated. With traffic built up sufficiently, bus lines will later be replaced with tram lines. He had no idea that the motor bus will replace the tram for handling traffic in the built-up portions of cities. There are certain special cases where the trackless trolley may also work in. Buses require a higher fare, because while the operating expenses are about the same as for trams, the seating capacity per vehicle is smaller. The peak load in Birmingham would militate against any possibility of such substitution of buses. This is illustrated by the fact that during the non-rush hours two-thirds of the tramcars are in the carhouses from 10 a.m. to 5 p.m., and are all out during the two rush hours. Applications are now before Parliament for permission to build 6 miles of tram-line extensions. The company is also gradually replacing its 54-seat single-truck cars with 70-seat double-truck cars.

This sums up the conditions surrounding the use of the bus and trackless trolley in the cities outside London visited by the committee. These situations are more nearly comparable with those which prevail in most of our American cities than is that in London. The London situation is so very different, really unique, that the committee feels this must be discussed entirely by itself. In order to get a fair view of the problem, one must first have a general idea of the variety of facilities that are serving London and of the great extent and overlapping of the various systems and the many other complicating features.

Air washers and ozonizers used heretofore in ventilating the London Underground tubes are being done away with. There is so much iron rust and dust in the tubes themselves that it seems unnecessary to go to such great lengths to introduce absolutely pure air. The tubes are ventilated the year around except on a few very cold days. In summer the temperature in the tubes ranges from 70 to 77 deg. About half of the heat is dissipated by convection and conduction through the walls and the remainder is taken care of by the ventilation.

REID'S STOUT
THE BEST COMBINE
DAILY NEWS THE STAR
1,250,000 DAILY
UNDERGROU D
GENERAL

Omnibus terminal opposite Victoria railroad station, London, which is typical of numerous bus terminals at important loading points in various parts of the city

London's Complicated Transportation Situation

Buses, Trams and Underground All Bid for Patronage—Competition Keen Between the Systems Under Same Management, Between Municipal and Private Management and Between Bus Company and "Pirate" Buses—For the Moment Londoners Have an Abundance of Service of All Types

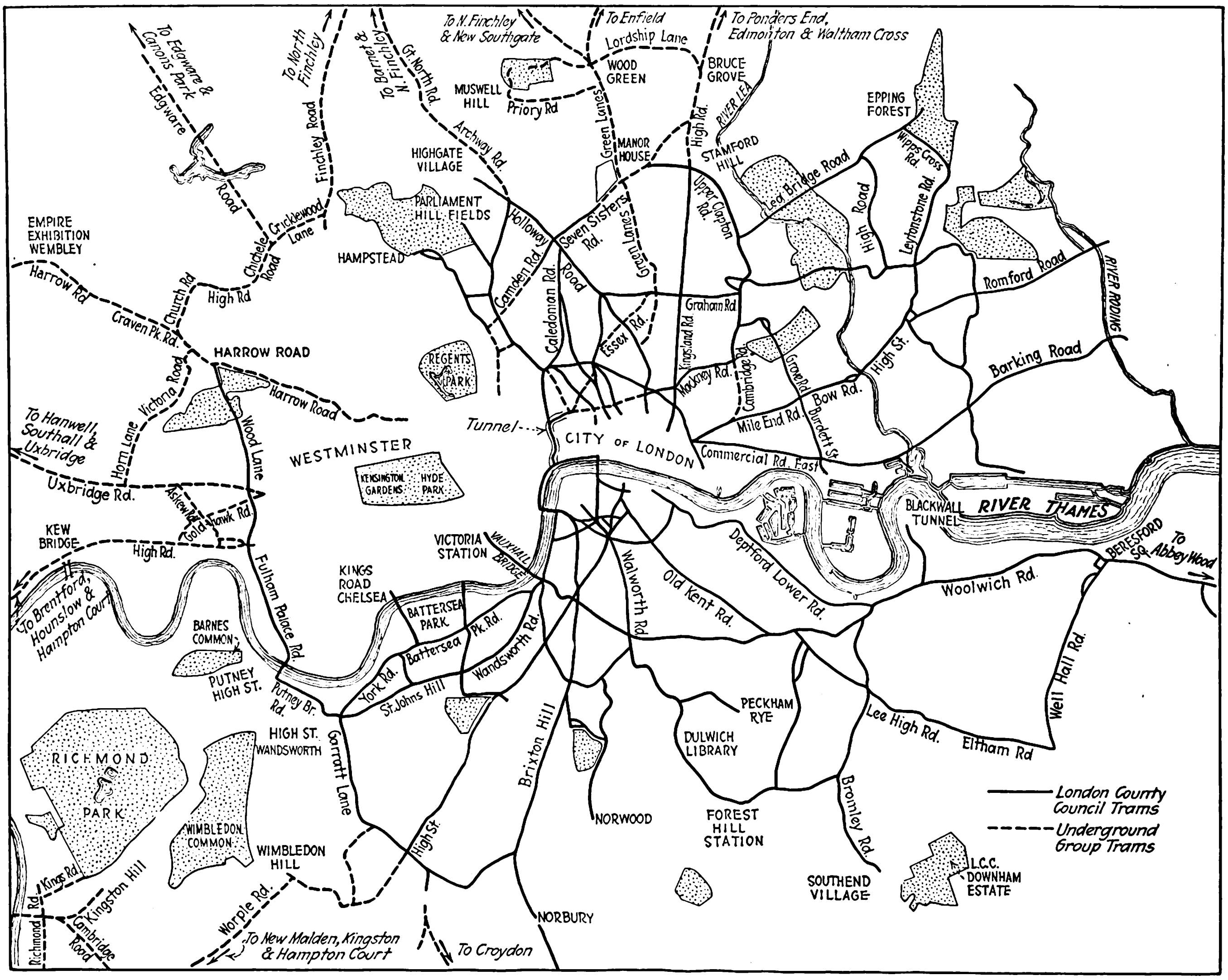
LONDON, with its extensive systems of tube and tunnel railways, trams and omnibuses and suburban steam lines, all working in a maze of competition, has a transportation situation for which there is probably no parallel in the United States. It is so complicated that no one seems to have a clear conception of the future course of development. But this much is evident: If there is any merit in competition, London is the place where we shall see the result worked out. Meantime, the people of London are getting the benefit (at least temporarily) of an enormous duplication and excess of service. The competitive aspect here, with bus, tram and tube often on the same street, is the more unusual because the competition is in part between systems under the same management, as well as between separate managements, and also between private and municipal enterprise, and between organized companies and irresponsible, individual bus operators.

First, there is the London Underground Group of transportation systems, under one management, which comprises most of the underground tube and tunnel railways; 114 route-miles, mostly double track, of tramway lines, and a system of buses having a network of 753 route-miles completely covering the city. Then there is the Metropolitan underground railway, a private company, and the London County Council Tramway System, a municipal undertaking. The latter is the major surface rail system and comprises 164 route-miles, practically all double track. The London County Council operates 2,032 cars, the Underground group tramways 553 tramcars—a total of 2,585 cars. There are also a number of minor municipal systems in outlying sections of the city. The London General Omnibus Company operates 4,500 buses, being a subsidiary of the Underground. Then there are some 300 individually owned buses, usually spoken of as the "private" buses. The steam road suburban traffic is also of considerable moment, as each railroad comes into its own station, these stations being rather widely separated and located in various parts of the city, and each having a suburban traffic. An estimate of the passenger traffic handled by each of these several systems, as furnished by Frank Pick, assistant managing director of the Underground Group, is given here:

DIVISION OF TRAFFIC AMONG VARIOUS SYSTEMS
LONDON AND SUBURBS

		Annual Passengers
London Underground Group	Tubes and tunnels (including Metropolitan Ry.)	568,000,000
	Tramways	190,000,000
	Motor buses	1,214,000,000
London County Council Tramways		719,000,000
Suburban tram systems		126,000,000
Suburban steam traffic		343,000,000
		3,160,000,000

Looking at the map of the London Underground, reproduced herewith, it is difficult to imagine what could have determined so intricate and haphazard a mesh of tube and tunnel railways. Obviously, there was no plan behind it. The lack of a plan is explained at once by the knowledge that the present underground system is the unification under one management, except for the Metropolitan Railway, of numerous independent undertakings, each built by its special promoters without any reference to the other railways, and only governed by what seemed to offer a profitable route. Some of the lines were built so that they competed with existing tube or tunnel railways, for in those days Parliament definitely encouraged competitive transportation. Similarly, each company had its own ideas about the kind of rolling stock it should use and the dimensions of its tube or tunnel. Consequently, London now has an underground system that can never truly be consolidated.


To Edgware & Canons Park
Edgware
Road
To North Finchley
Finchley Road
To Barnet & N. Finchley
Gt. North Rd.
To N. Finchley & New Southgate
To Enfield
Lordship Lane
To Ponders End, Edmonton & Waltham Cross
WOOD GREEN
BRUCE GROVE
MUSWELL HILL
Priory Rd
Green Lanes
MANOR HOUSE
High Rd.
RIVER LEA
EPPING FOREST
HIGHGATE VILLAGE
Archway Rd.
STAMFORD HILL
Lea Bridge Road
Wipps Cross Rd.
High Road
Leytonstone Rd.
PARLIAMENT HILL FIELDS
Holloway Road
Seven Sisters Rd.
Green Lanes
Upper Clapton Rd.
EMPIRE EXHIBITION WEMBLEY
Cricklewood Lane
Chichele Road
HAMPSTEAD
Camden Rd.
Caledonian Rd.
Harrow Rd
Church Rd
High Rd
Romford Road
RIVER RODING
Craven Pk. Rd.
Graham Rd
Essex Rd.
Kingsland Rd.
HARROW ROAD
REGENTS PARK
Cambridge Rd.
Grove Rd
High St.
Barking Road
Victoria Road
Harrow Road
Hackney Rd.
Bow Rd.
To Hanwell, Southall & Uxbridge
Horn Lane
Wood Lane
Tunnel
CITY OF LONDON
Mile End Rd.
Burdett St
WESTMINSTER
KENSINGTON GARDENS
HYDE PARK
Commercial Rd. East
Uxbridge Rd.
Askew Rd.
Goldhawk Rd.
BLACKWALL TUNNEL
RIVER THAMES
KEW BRIDGE
High Rd.
VICTORIA STATION
VAUXHALL BRIDGE
Walworth Rd.
Deptford Lower Rd.
BERESFORD SQ.
To Abbey Wood
To Brentford, Hounslow & Hampton Court
Fulham Palace Rd.
KINGS ROAD CHELSEA
BATTERSEA PARK
Old Kent Rd.
Woolwich Rd.
BARNES COMMON
Battersea
Pk. Rd.
Wandsworth Rd.
Well Hall Rd.
PUTNEY HIGH ST.
Putney Br. Rd.
York Rd.
St. Johns Hill
PECKHAM RYE
Lee High Rd.
Eltham Rd
RICHMOND PARK
HIGH ST. WANDSWORTH
Garratt Lane
Brixton Hill
DULWICH LIBRARY
London County Council Trams
Underground Group Trams
WIMBLEDON COMMON
WIMBLEDON HILL
High St.
NORWOOD
FOREST HILL STATION
Bromley Rd.
Kings Rd
Kingston Hill
Worple Rd.
L.C.C. DOWNHAM ESTATE
SOUTHEND VILLAGE
NORBURY
Richmond Rd.
Cambridge Road
To New Malden, Kingston & Hampton Court
To Croydon

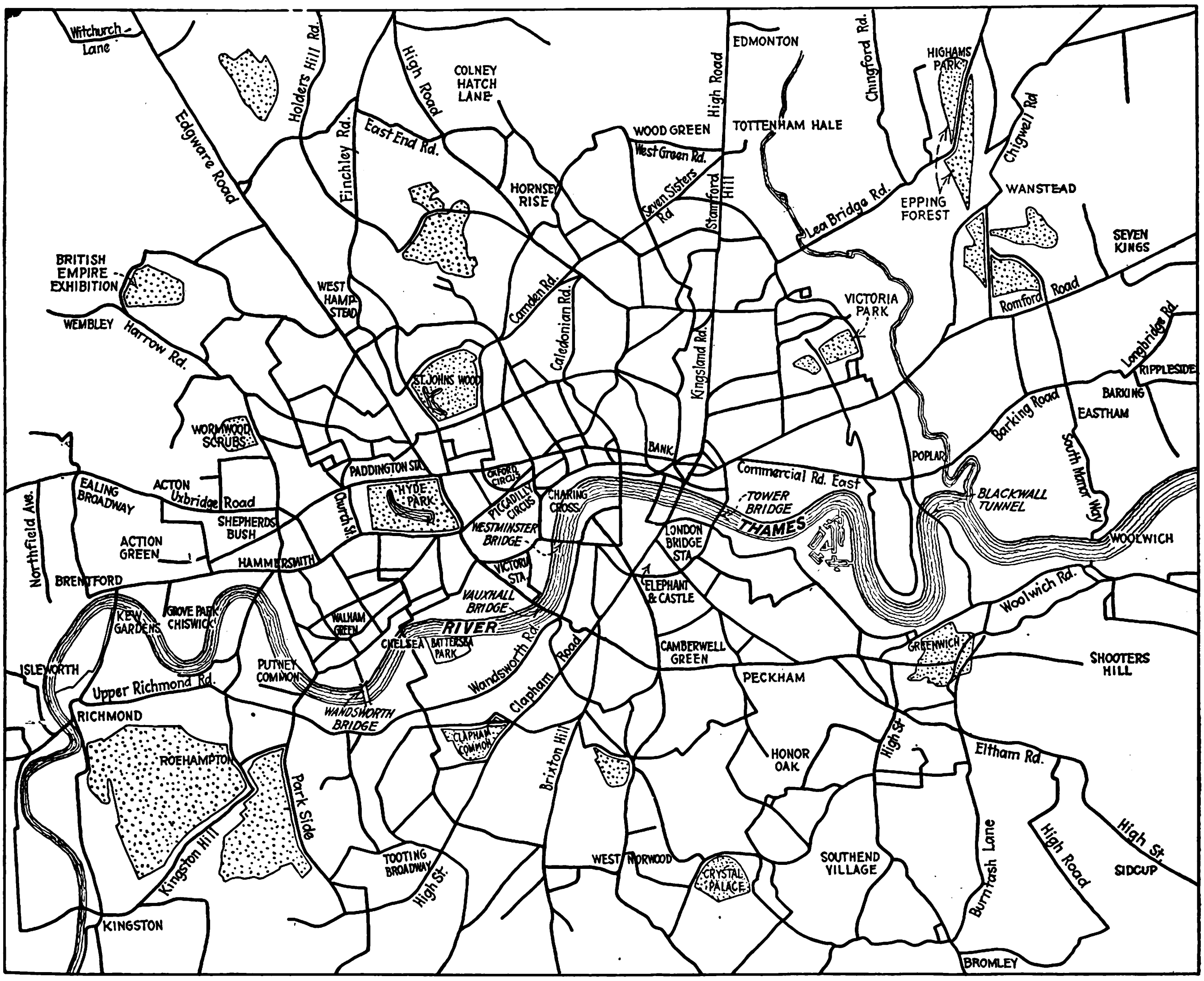
The tramways of London. Note the absence of any surface rail lines in the central business area, known as the old City of London and Westminster

The Underground management is therefore confronted with the task of joining the various lines as far as possible by numerous interchange or transfer points, using elevators and more recently escalators to shorten the time between lines, and to encourage passengers to make the long descent to ride the deep level tubes. The layout of lines, difference in clearances and varying equipment virtually preclude any extensive through routing of service between parts of the system, and the very deep level of much of the system is an almost insurmountable obstacle to traffic building. This is better appreciated when it is known that one can make as quick time on bus or tram, up to 4 miles, as he can on the tube, taking into account the time consumed in booking (buying a ticket) going down to the train platform and then getting up out of the tube again. The underground lines are thus quite susceptible to the competition of the surface systems. Accordingly they are being developed now largely with the idea of serving the long-haul riders. This is clearly more feasible than in America, because of the distance fare.

Together, the tramway lines operated by the Underground and those operated by the London County Council cover the entire city, with the exception of the central district included in the old City of London and a part of Westminster, an area about 2 miles by 6 miles in extent. The Underground tramways are mainly in the northwest quadrant of the city, while those of the London County Council are spread out through the other three quadrants, serving particularly the portion of the city south of the Thames. These two tramway systems in general are not competitive.

The outstanding difference between the London tramways and American street railways lies in their exclusion from this central area. This district comprises the main business, shopping, theater, church, and the sightseeing and governmental activities. Obviously, this exclusion, which dates back to horse-car days, is a tremendous handicap to the trams, especially now that bus operation is permitted in this inner area and covers it completely. The buses not only operate inside this territory but out into the other sections of the city in every direction, competing with both the company owned and corporation* owned tramways, and with the underground and steam railroads. People naturally prefer to board the vehicle which will take them to their destination without change, rather than ride the tram or tube part way and then change to the bus, even though this no-change ride may require a slightly longer time.

Nevertheless, London is so spread out and is so uniformly built up to four or five stories that there is a tremendous source of traffic outside the central area from which the tramways can draw traffic.


Witchurch Lane
Edgware Road
Holders Hill Rd.
High Road
COLNEY HATCH LANE
East End Rd.
Finchley Rd.
HORNSEY RISE
WOOD GREEN
West Green Rd.
Seven Sisters Rd.
Stamford Hill
High Road
EDMONTON
TOTTENHAM HALE
Chingford Rd.
HIGHAMS PARK
Chigwell Rd.
Lea Bridge Rd.
EPPING FOREST
WANSTEAD
SEVEN KINGS
BRITISH EMPIRE EXHIBITION
WEMBLEY
Harrow Rd.
WEST HAMPSTEAD
Camden Rd.
Caledonian Rd.
Kingsland Rd.
VICTORIA PARK
Romford Road
Longbridge Rd.
RIPPLESIDE
BARKING
EASTHAM
Barking Road
ST. JOHNS WOOD
WORMWOOD SCRUBS
BANK
POPLAR
South Manor Way
Commercial Rd. East
TOWER BRIDGE
THAMES
BLACKWALL TUNNEL
WOOLWICH
PADDINGTON STA.
OXFORD CIRCUS
HYDE PARK
PICCADILLY CIRCUS
CHARING CROSS
WESTMINSTER BRIDGE
LONDON BRIDGE STA.
EALING BROADWAY
ACTON
Uxbridge Road
SHEPHERDS BUSH
Church St.
ACTON GREEN
HAMMERSMITH
Northfield Ave.
BRENTFORD
VICTORIA STA.
VAUXHALL BRIDGE
ELEPHANT & CASTLE
Woolwich Rd.
KEW GARDENS
GROVE PARK CHISWICK
WALHAM GREEN
RIVER
CHELSEA
BATTERSEA PARK
Wandsworth Rd.
Clapham Road
CAMBERWELL GREEN
PECKHAM
GREENWICH
SHOOTERS HILL
ISLEWORTH
Upper Richmond Rd.
PUTNEY COMMON
WANDSWORTH BRIDGE
RICHMOND
ROEHAMPTON
CLAPHAM COMMON
HONOR OAK
High St.
Eltham Rd.
Park Side
Brixton Hill
Kingston Hill
TOOTING BROADWAY
High St.
WEST NORWOOD
CRYSTAL PALACE
SOUTHEND VILLAGE
Burnt Ash Lane
High Road
High St.
SIDCUP
KINGSTON
BROMLEY

Map of the bus routes operated by the London General Omnibus Company, which virtually cover all London

Lord Ashfield on the Future of Tram and Bus

A RECOGNIZED authority on transportation in London is, of course, Lord Ashfield, managing director of the Underground Group of trams, buses and railways (subways). The committee naturally sought from him the policies being followed in the development of the several services and his views with respect to the future place of each system in London's general transportation scheme.

Lord Ashfield does not feel that buses could carry all of the people now handled by tramways, as there is insufficient street space available. He thinks, however, that the ultimate plan will be to have only buses and rapid transit lines. Of course, he is speaking for London only. Meantime, the tramways should be used for the peak-load service primarily. And inasmuch as they are essential now in the rush hours, they can be operated in the off-peak hours too with comparatively small additional expense. He said that it would be very undesirable to supplant the tramways with buses now, as this would precipitate the immediate necessity

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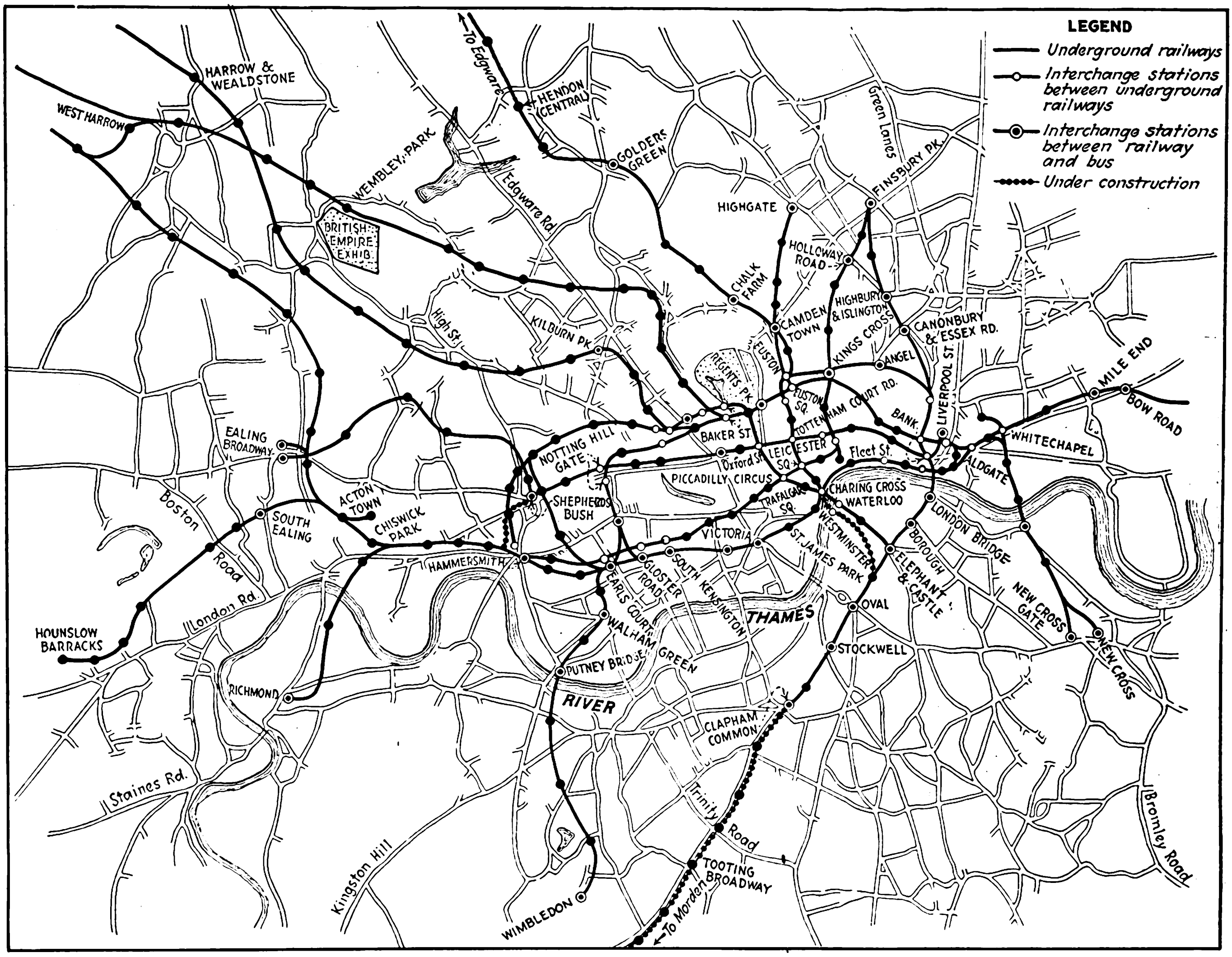
*Municipal.


LEGEND
Underground railways
Interchange stations between underground railways
Interchange stations between railway and bus
Under construction
HARROW & WEALDSTONE
WEST HARROW
To Edgware
HENDON CENTRAL
GOLDERS GREEN
WEMBLEY PARK
BRITISH EMPIRE EXHIB.
Edgware Rd.
HIGHGATE
Green Lanes
FINSBURY PK.
HOLLOWAY ROAD
CHALK FARM
HIGHBURY & ISLINGTON
CAMDEN TOWN
KINGS CROSS
CANONBURY & ESSEX RD.
High St.
KILBURN PK.
EUSTON
REGENTS PK.
ANGEL
MILE END
BOW ROAD
EUSTON SQ.
TOTTENHAM COURT RD.
LIVERPOOL ST.
BANK
BAKER ST.
WHITECHAPEL
EALING BROADWAY
NOTTING HILL GATE
Oxford St.
LEICESTER SQ.
Fleet St.
ALDGATE
PICCADILLY CIRCUS
CHARING CROSS
WATERLOO
TRAFALGAR SQ.
ACTON TOWN
SHEPHERDS BUSH
Boston Road
SOUTH EALING
CHISWICK PARK
VICTORIA
WESTMINSTER
LONDON BRIDGE
ST. JAMES PARK
BOROUGH
ELEPHANT & CASTLE
HAMMERSMITH
GLOSTER ROAD
SOUTH KENSINGTON
EARLS COURT
London Rd.
THAMES
OVAL
NEW CROSS GATE
NEW CROSS
HOUNSLOW BARRACKS
WALHAM GREEN
STOCKWELL
PUTNEY BRIDGE
RICHMOND
RIVER
CLAPHAM COMMON
Staines Rd.
Trinity Road
Bromley Road
Kingston Hill
TOOTING BROADWAY
To Morden
WIMBLEDON

Map of the London Underground lines, which indicates how the system is made up of numerous individual routes built independently without regard to the location of previously existing lines

to build extensive additions to the rapid transit system long before it would be possible to finance them and long before they are required.

Asked if all the passengers now handled by the tram, which number one billion a year, could be handled by buses, Lord Ashfield said that they could, in the event that sufficient street space, which is not now available, were provided. But the cost of widening streets would be prohibitive, he continued, so that the trams are necessary until such time as they can be replaced by underground railways.

With the growing use of the bus, this means that in some instances the tramways will have to be operated at a loss, and the only way that this can be done in the interest of the public service is that the several forms of transportation shall be under a single management with a pooling of results, so that, taken as a whole, the transportation service may be conducted as a successful business. The London General Omnibus Company and four of the companies comprised in the Underground railways are now operating under a common fund arrangement of this kind. There is also a working agreement between these companies and the tramway lines operated by the Underground people, although the tram-line earnings are not actually included in the common fund plan.

With these views about London transportation in mind, Lord Ashfield expressed himself to the effect that American operators are missing a great opportunity by not quickly making greater use of the bus in co-ordination with the railways, in order to place themselves in position to control the whole situation.

Lord Ashfield is of the opinion, as are all of his assistants, that the people of London prefer the bus to the tramway. None of them could explain why this is, but it is a fact that was perfectly evident to us from our observation in riding about the city on the various forms of transit. Some of the reasons advanced for this popularity of the bus were as follows:

JOURNEYS PER HEAD OF POPULATION IN GREATER LONDON

Year	Tubes and Tunnels	Trunk Lines (Estimated)	Total Railways	Omnibuses	Tramways	Gand Total
1909	56	39	95	51	96	242
1910	59	39	98	52	106	256
1911	59	39	98	55	113	266
1912	59	39	98	75	109	282
1913	60	38	98	100	110	308
1914	59	36	95	102	114	311
1915	61	38	99	91	113	303
1916	66	38	104	94	119	317
1917	78	42	120	88	123	331
1918	88	47	135	92	133	360
1919	94	51	145	116	142	403
1920	97	54	151	125	143	419
1921	82	47	129	125	135	389
19 2	79	46	125	143	138	396
1923	76	46	122	163	136	421

	1911	1921
Population Greater London	7,251,358	7,840,201
Population London County	4,521,685	4,484,523

1. The exclusion of trams from the central business district gives the bus what the tram officials call the "bus paradise." People must take the bus or the underground to get into or out of this central district, and as both buses and tubes continue on out into the suburbs in practically all directions, they naturally continue to ride on the vehicle first boarded. This in part explains why there are, in light traffic hours, more passengers on the buses than on the trams out where the two parallel each other on the same street.

2. The bus is a new form of transportation, while the tram is old and there have been almost no changes in its design in 30 years.

3. Buses come up to the curb, making boarding and alighting easier, especially in the congested areas.

4. The tramcar is primarily the workman's vehicle. Up to 8 a.m. he rides it at half fare by statutory provision included in the act of Parliament of 1870, under which all of the tramways of Great Britain still operate. Class distinction runs rather high in England, and many people will ride the bus who would not be seen on the tram.

5. For some reason the tram has always been unpopular. One reason assigned for this by Lord Ashfield was that in the early development stage tram lines were built in sections where they were unnecessary on narrow streets, and were thereafter somewhat of an obstruction to traffic and were disliked because of that.

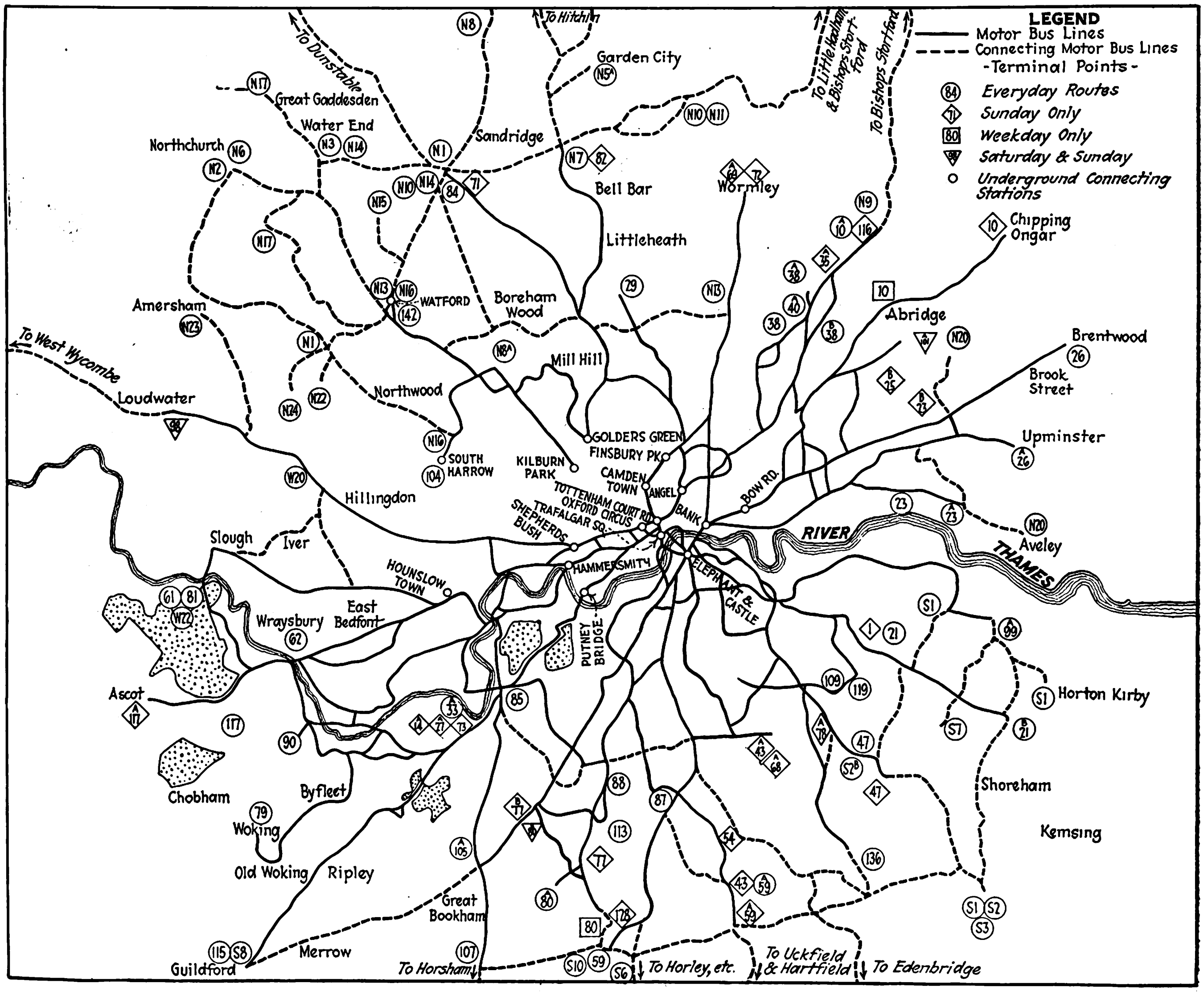
6. There is a popular impression that the bus is faster because it weaves in and out of traffic and passes other buses and sometimes trams. However, actually, there is little difference in its schedule speed.

7. A ride on the tram is rather prosaic, while the ride on a bus, dodging in and out of traffic, has in it some of the elements of adventure.

8. The open top on the bus has undoubtedly contributed to its popularity on fair weather days. However, considerable study is being given in London to closing in the upper deck so as to make the entire bus capacity available in bad weather. The principal difficulty in this connection is the rigid restriction on bus dimensions and weight imposed by Scotland Yards.

Asked what he thought about the desirability of using double-deck buses in America, Lord Ashfield said that he would not use anything else where the camber (crown) of the road and road conditions would permit, taking into account the high center of gravity of this type of bus.

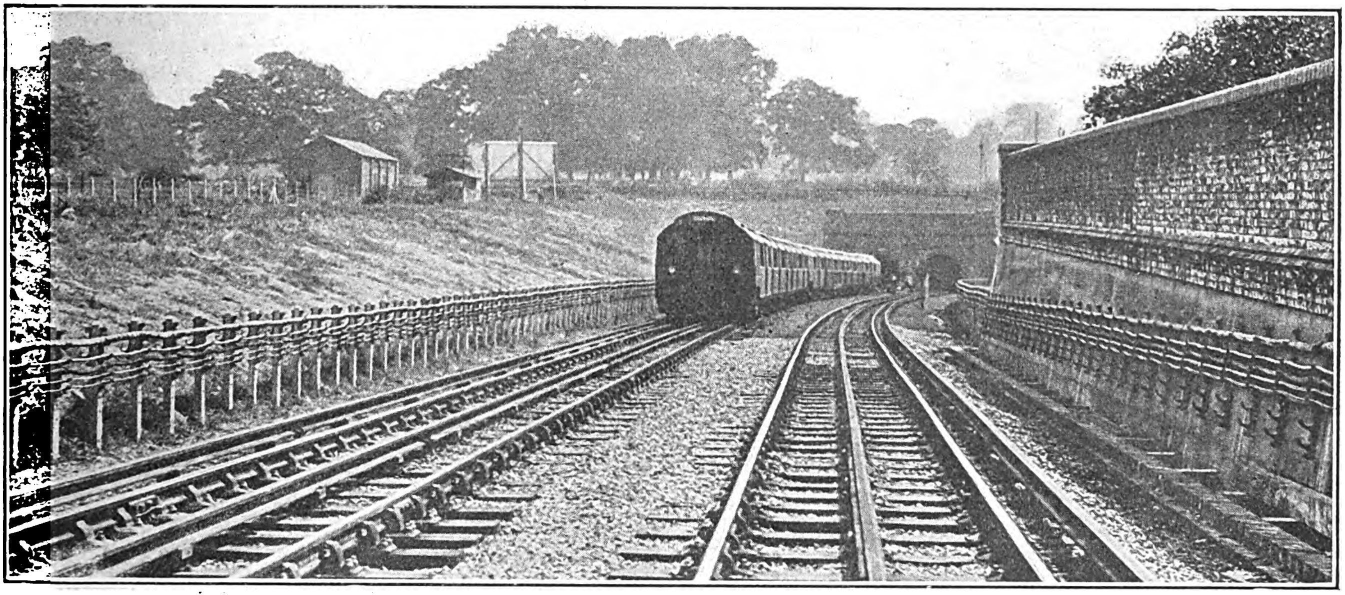
We asked his Lordship whether he thought the zone-fare system should be applied in America. His answer was "no." He reasoned that transportation benefits everyone living or doing business in a community. It is impossible to say that it benefits the man who lives far out more than the one who lives close in, and there


LEGEND
Motor Bus Lines
Connecting Motor Bus Lines
-Terminal Points-
84 Everyday Routes
Sunday Only
80 Weekday Only
Saturday & Sunday
Underground Connecting Stations
To Dunstable
To Hitchin
To Little Hadham & Bishops Stortford
To Bishops Stortford
To West Wycombe
Great Gaddesden
Water End
Northchurch
Sandridge
Garden City
Bell Bar
Wormley
Littleheath
Chipping Ongar
Amersham
Watford
Boreham Wood
Abridge
Brentwood
Brook Street
Loudwater
Mill Hill
Northwood
Golders Green
Finsbury Pk
Upminster
South Harrow
Kilburn Park
Camden Town
Angel
Tottenham Court Rd
Oxford Circus
Trafalgar Sq.
Shepherds Bush
Bank
Bow Rd.
Hillingdon
River Thames
Aveley
Slough
Iver
Hounslow Town
Hammersmith
Elephant & Castle
East Bedfont
Wraysbury
Putney Bridge
Ascot
Horton Kirby
Chobham
Byfleet
Shoreham
Woking
Kemsing
Old Woking
Ripley
Great Bookham
Merrow
Guildford
To Horsham
To Horley, etc.
To Uckfield & Hartfield
To Edenbridge

Country bus routes operated out into the territory surrounding London by the London General Omnibus Company

is no reason why he should be penalized for the longer ride he must take. In fact, he ought to be encouraged because of the longer time he is forced to spend in getting back and forth.

This naturally raises the question of why the zone system prevails in London, then. The immediate answer is, as his Lordship said, that the English people have been brought up on a very low fare for a short distance ride and it would never be possible to establish a flat rate high enough to average out a sufficient total revenue. He made the reflection that it is possible to do almost anything on the start-off, but it is extremely difficult to change a practice once it becomes established. In this connection, he thought it might be desirable in America to establish the zone system on buses when beginning their operation. This would attract the short-haul rider.



The new Edgware extension of the London Underground

Part of this is in tubes and part on the surface or in open cut or fill. Note typical construction, rock ballast, wood ties, rails supported in chairs held by screw spikes, third and fourth power rails, cable bracket racks supported on concrete posts or side wall, the cast iron tube, with inside diameter of 11 ft. 8¼ in., and the low design of cars to conform to the tube clearance.

The committee's opinion is that the fearful complications of the London zone ticket system would certainly be a deterring factor to an American operator. In fact, it was found that railway men in Great Britain generally would welcome a way to be released from the heavy expense and difficulty of handling and collecting fares which the zone system entails. For example, it makes one-man operation, which has been the salvation of many American street railways and which makes much of the prospective bus operation attractive, virtually impossible.

LONDON'S MUNICIPAL TRAM SYSTEM OPERATES NO BUSES

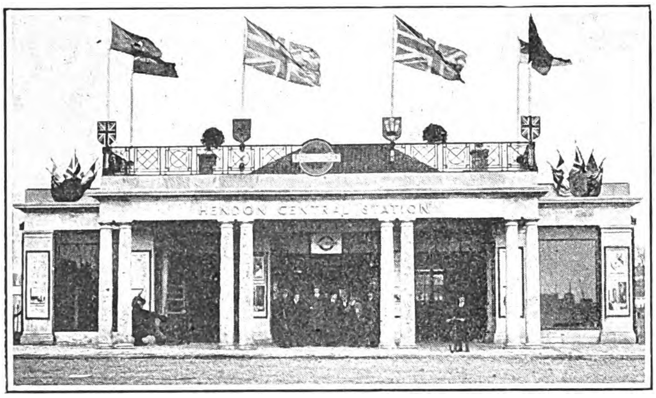
The London County Council Tramways does not operate any buses, as it is not empowered to do so—a matter of politics. Aubrey Llewellyn Coventry Fell, general manager, said in discussing the London bus situation, that there necessarily must be some overlapping of buses with the trams on account of the trams being excluded from the central area. However, in addition to the reasonable overlapping of service, there is considerable duplication. This is resulting in a substantial reduction this year in the amount of traffic handled by the London County Council trams. Mr. Fell feels that traffic conditions in London would be intolerable if it was undertaken to handle all of the passengers in buses. Considering the relative merits of the bus and tram, he said that the main consideration must always be the financial one. As long as the tramcar has such a big advantage in seating accommodations, the cost per seat-mile for operation must always be considerably less for the tram than for that of the smaller vehicle.

In considering London traffic, it must not be forgotten that the tramcars are excluded from the profitable central London area, in which the proportion of short journey riders is very high, so that figures of earnings per car-mile for tramcars and those for omnibuses in London are not strictly relative. Expressing it another way, he said that if the tramway system operated in the central London area, the revenue per car-mile would be increased, whereas there is no reason to think that the expenses per car-mile would be increased. Mr. Fell also made the general observation that in addition to the traffic taken from the tramways, the buses undoubtedly do create some traffic of their own.

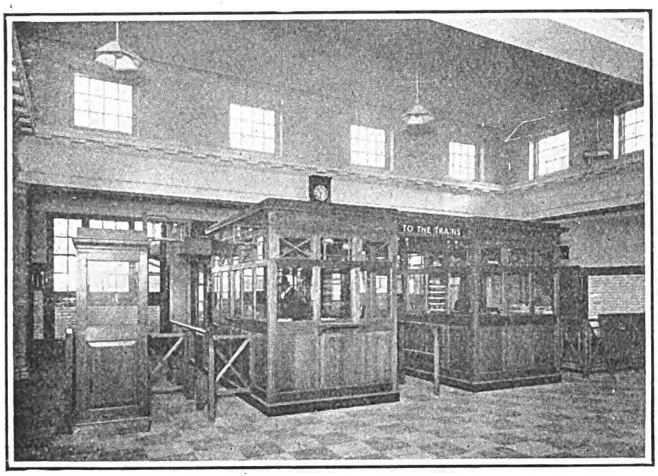
CHARACTERISTICS OF BRITISH OPERATION

At the present time it can be said that London streets are virtually flooded with bus service. This has been brought about by the fact that the only means available to the London Underground Group to keep control of the transportation situation was to meet bus competition by putting so many buses on a route that the traffic available per bus would be diluted to the point that the individual bus operators would be discouraged. Carrying out this program, the London General Omnibus Company has added about 1,000 new buses to its services during the past year. Even with this determined effort of the L. G. O. to meet competition, there are still some 300 independently owned buses in operation. Any one can go into the bus business in London who provides himself with a bus whose design meets the rather rigid requirements of Scotland Yard. This is the only requirement.

This heavy increase in bus service has brought an enormous increase in the number of passengers carried



The new Hendon station, midway out on the Edgware extension of the London Underground, recently placed in operation

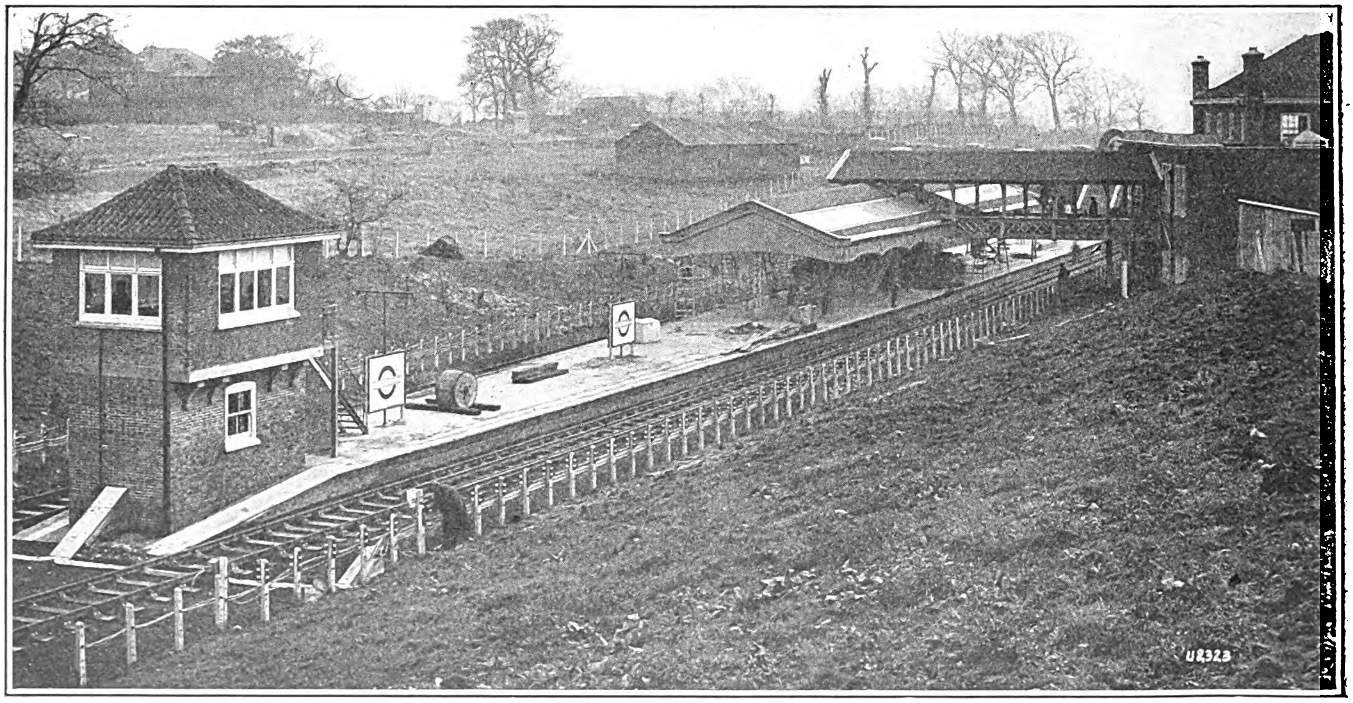


"Booking offices" and general interior view of the new Hendon central station on the Edgware extension of the London Underground

by the buses. Part of this increase has been in the nature of a newly created traffic, but a good deal of it has been taken from the tramways and the underground lines. Thus, the London Underground management is in the position of expanding its bus services at the expense of its own tram and tube lines, and at the expense of the municipal tram lines. It is even working against itself on its bus operations, for the excess of service in fighting competition has reduced the average earnings per bus-mile. The bus mileage operated by the London General Omnibus Company in 1922 was 94,124,000, and that in 1923 was 118,494,000, an increase of practically 26 per cent. For the corresponding calendar years, the number of passengers carried was 846,682,000 and 1,039,935,000, respectively, an increase of 23 per cent. The result has been a decrease of 3.62d. (7.2 cents) in gross revenue per bus-mile, while expenses were reduced 3.27d. (6.5 cents). Thus the margin of profit, after deducting all charges except those for capital, showed a decrease of 0.35d. (0.7 cent) per bus-mile. The actual revenue and expense figures are confidential and not available for publication.

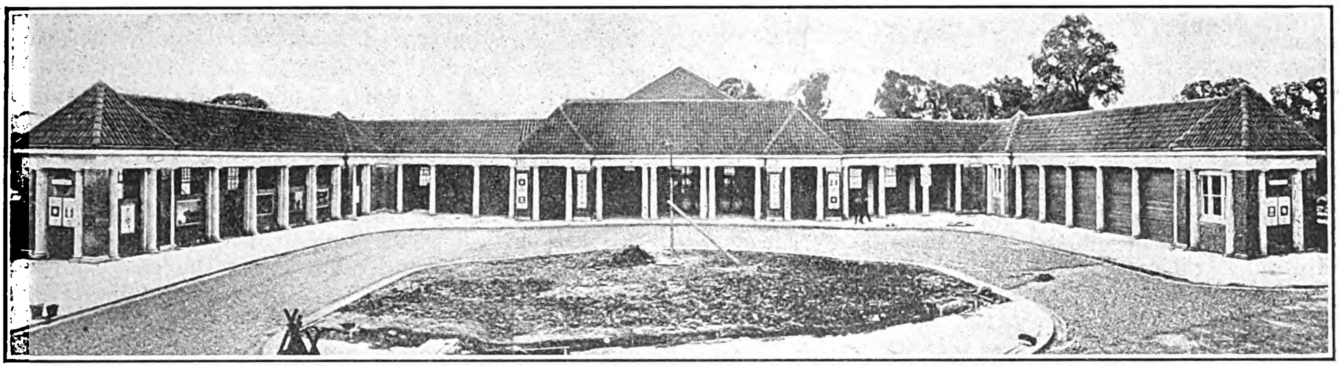
The bus undertaking in London to date is understood to be a substantially profitable one. One thing that should be appreciated in this connection is that no attempt is made to provide bus equipment for handling the peak loads. Bus operation does not begin until about 8 o'clock in the morning, as the half-fare workman's rate, a statutory provision for the tramways, naturally brings them all of this early morning riding. The bus service continues for about 12 hours while the daytime riding is good, and then is very greatly curtailed about 8 o'clock in the evening. After that hour, virtually only those routes which serve the main traffic arteries are continued through the evening. These two things relieve the bus operation from the heavy capital carrying charges which accompany the handling of the peak loads, and from the loss from operation over routes and at hours which cannot be operated at a profit. With respect to other obligations, the tram and bus compare as follows:

The tramway regulations are statutory. They must run a reasonable service at a maximum fare of 1½d. per mile. They must pay taxes on the tram lines in



The new Hendon station on the Edgware extension

The station platform, showing bridge passageway from rear of station building, and the switchman's tower. The surroundings indicate the open character of the territory into which the new line extends, but construction of which has been accompanied by very large residential building activities.



Edgware station building and forecourt at the terminus, 11 miles or 35 minutes from Trafalgar Square, of a new extension of the London Underground opened for service on August 18

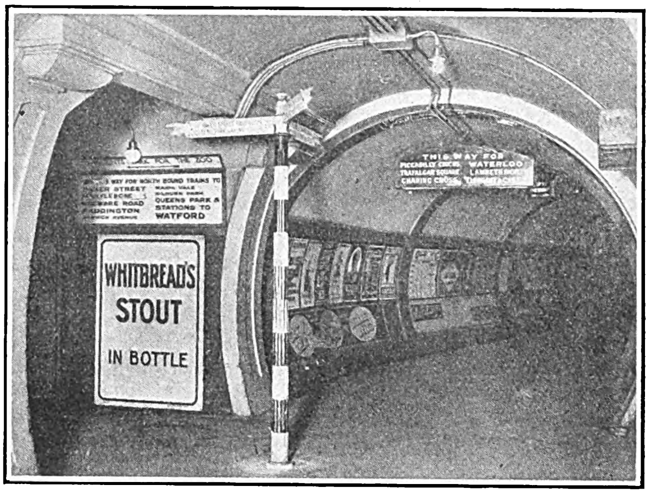
the streets as well as on all buildings. They are under the Ministry of Transport with respect to all kinds of regulations and by-laws and also are under the police with respect to licenses, quietness of operation, general condition of maintenance, and must be repainted each year. They must build and maintain the tramway paving for 16 ft. in the center of the road. Each private company is subject to purchase by the municipality 21 years after its beginning, not as a going concern, but for its then physical value. Thereafter it is subject to purchase at 7-year intervals, introducing an uncertainty which makes it impossible to finance any improvements, and impracticable to keep up repairs.

The Ministry of Transport determines the speed and size of cars (maximum speed allowed in London is 16 m.p.h. if cars are fitted with magnetic brakes). They are required to stop if hailed, and if off schedule they cannot pass up a passenger without being liable to a fine. In most cases the tramway must pay a franchise tax.

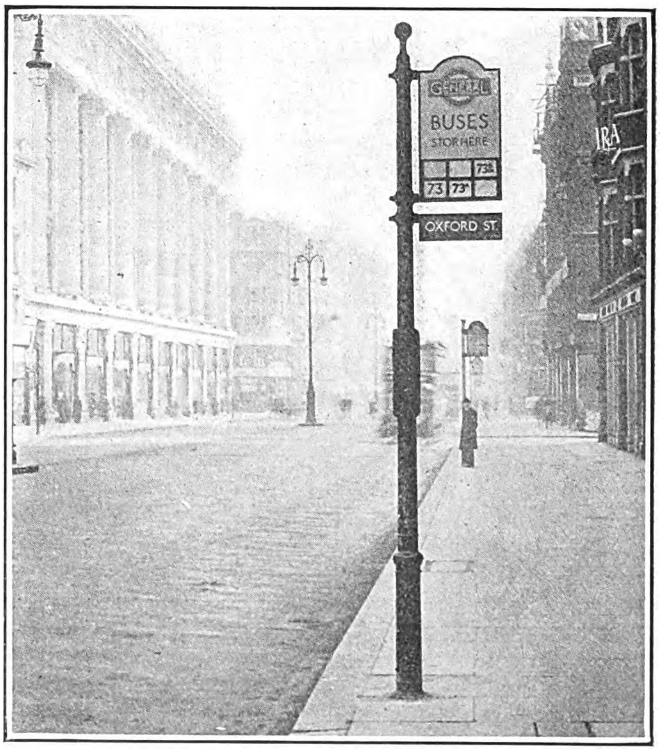
Omnibuses, on the other hand, have no statutory obligation to the public. They can charge any fare and run any service they may choose. They pay no rates (real property taxes) except on buildings. They maintain no roads directly except by the tax which is based on seating capacity (what we usually call the license tax). They are under the police in the same way as tramcars with regard to licenses and speed of operation, and weight and size are similarly limited.

The buses also escape the burdens which fall upon the tramway with the numerous road-widening projects which are under way throughout Great Britain. The London Underground Group tramways, for example, carry now a cost in capital of about £20,000 ($97,400) per mile of track which has no asset value, and which represents what they have had to contribute to civic improvements that have added nothing to the physical value of the tramways.

Those closely allied with the operation of the tramways in London now feel that either the tramways must be given some measure of relief from their obligations or that the omnibuses must be made to carry more nearly commensurate obligations. Recently a bill has been passed by Parliament which is a step in the latter direction, and which will tend to do away with the flooding of streets with bus traffic to fight competion. The measure will probably be of little help to the tramways, except indirectly as they may benefit from a more normal bus service. About all that this bill does is to provide the Ministry of Transport with authority to regulate the amount of omnibus traffic on any street.



Typical signs in the Oxford Circus station of the Underground, London. They enable patrons to direct themselves through the system of passageways, which are most intricate, especially at the junctions between lines



Stop sign adopted by the London General Omnibus Company, which not only locates stopping points but indicates the route numbers of buses which stop there

Paris Transportation Facilities

PARIS, like London, also has extensive tram, underground and bus services. There is a greater degree of co-ordination there, as all of the surface transportation facilities are under one management. There is necessarily some paralleling of bus and tram lines on the same streets, but taking the whole route of each into account, the two lines serve different localities and a different traffic.

The Paris situation is similar to the one in London in another respect, namely, that there are no tramway lines in a considerable area of the central business district. Buses serve this territory thoroughly and derive a heavy short-haul traffic, for which the tramway does not have the same opportunity.

The extent of the tramway system is measured by the fact that there are 1,875 motor cars and 750 trailers, total 2,625, operating approximately 60,000,000 car-miles per year and carrying 700,000,000 passengers per year. The bus system comprises 1,250 four-wheel buses and 50 six-wheel buses, total 1,300, which operate 29,000,000 bus-miles per year and carry annually 336,000,000 passengers. In contrast with London, all of the buses are single deck, and the great majority of tramcars also.

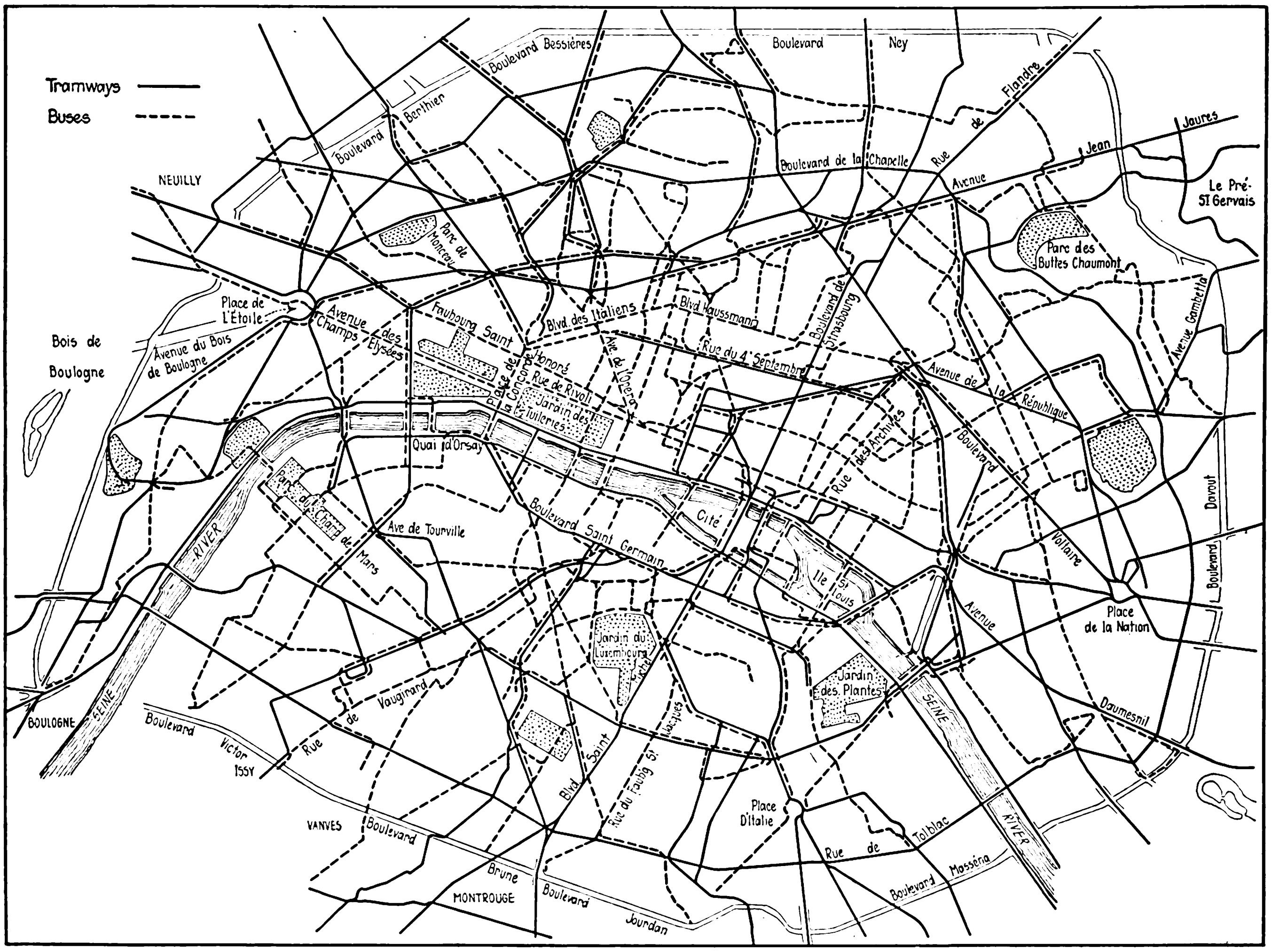
The Paris underground system, which is under separate management, comprises approximately 100 km. (62 miles) of double-track route. Like the surface transportation systems, the underground system is municipally owned, but privately operated. Some 1,700 cars are operated on the underground lines with 57,377,654 car-miles and 500,000,000 passengers annually. The accompanying Paris maps show the relation of the bus, tram and underground systems.

Unfortunately, the committee was unable to learn the views of the railway officials as to the relative place of bus and tramway in the future Paris transportation needs, as nearly all of the principal officials were away on holiday. It would seem to be the case, however, that the development of the tramway is being carried forward as well as that of the bus, inasmuch as a considerable number of new tramcars of a new design are being built, as noted in another section of this report.

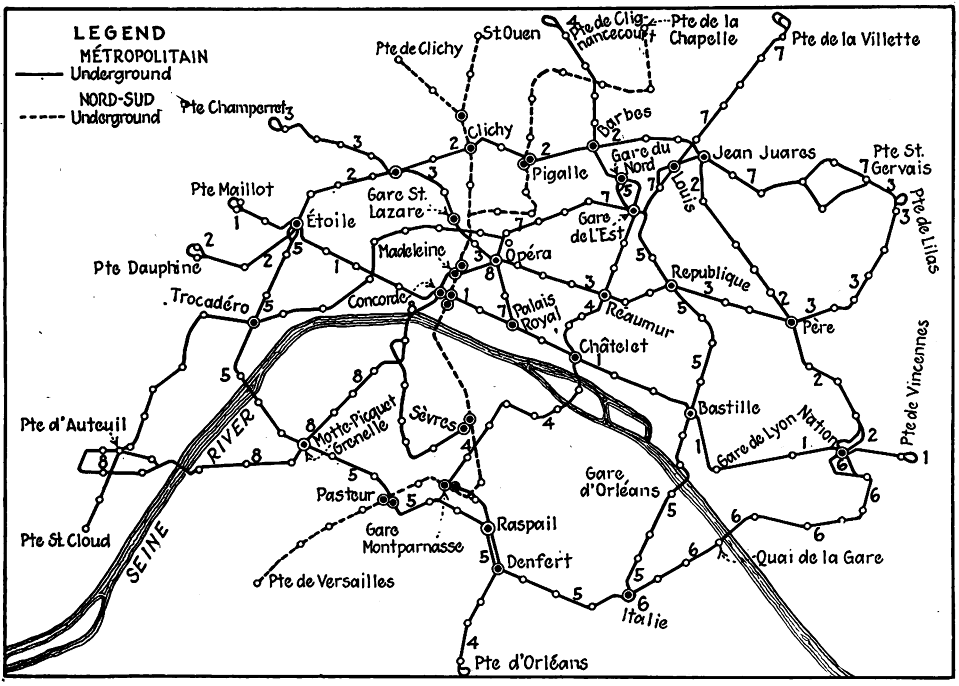
AMERICAN BUS POLICY CONFIRMED

To sum up the European policy with respect to the bus, the committee has found that the views and practices prevalent there as to the place of the bus are in direct confirmation of the leading thought of the industry in the United States. That is to say, there is a large field for the bus and it should be used as one of the modern tools of transportion. It should be coordinated with existing rail lines rather than operated competitively. The best results from operation of buses will be derived if they are under the same management as the railway. The local railway company is the one properly organized and equipped to operate buses in conjunction with the other services.

The consensus of opinion of the European tramway


Tramways
Buses
Boulevard Bessières
Boulevard Ney
Boulevard Berthier
Rue de Flandre
Jean Jaures
Boulevard de la Chapelle
Avenue
NEUILLY
Le Pré-St Gervais
Parc de Monceau
Parc des Buttes Chaumont
Avenue Gambetta
Place de l'Etoile
Avenue des Champs Elysées
Faubourg Saint Honoré
Blvd. des Italiens
Blvd Haussmann
Boulevard de Strasbourg
Bois de Boulogne
Avenue du Bois de Boulogne
Place de la Concorde
Rue de Rivoli
Jardin des Tuileries
Ave de l'Opera
Rue du 4 Septembre
Avenue de la République
Rue des Archives
Boulevard Voltaire
Quai d'Orsay
Parc du Champ de Mars
RIVER
Ave de Tourville
Boulevard Saint Germain
Cité
Ile St Louis
Davout
Boulevard
Place de la Nation
Avenue Daumesnil
Jardin du Luxembourg
Jardin des Plantes
SEINE RIVER
BOULOGNE
SEINE
Boulevard Victor
ISSY
Rue de Vaugirard
Blvd Saint Michel
Rue du Faubg St. Jacques
Place D'Italie
Rue de Tolbiac
Boulevard Masséna
VANVES
Boulevard Brune
MONTROUGE
Boulevard Jourdan

Paris tramway and bus lines operated by the Société des Transports en Commun de la Région Parisienne


LEGEND
MÉTROPOLITAIN
Underground
NORD-SUD
Underground
Pte Champerret
Pte de Clichy
St Ouen
Pte de Clignancourt
Pte de la Chapelle
Pte de la Villette
Clichy
Barbes
Gare du Nord
Jean Juares
Pte St. Gervais
Pte de Lilas
Pigalle
Louis
Pte Maillot
Étoile
Gare St. Lazare
Gare de L'Est
Pte Dauphine
Madeleine
Opéra
Republique
Trocadéro
Concorde
Palais Royal
Réaumur
Père
Châtelet
Pte de Vincennes
Bastille
Nation
Gare de Lyon
Pte d'Auteuil
Motte-Picquet Grenelle
Sèvres
RIVER
SEINE
Gare d'Orléans
Pasteur
Gare Montparnasse
Raspail
Denfert
Quai de la Gare
Pte St Cloud
Pte de Versailles
Italie
Pte d'Orléans
1
2
3
4
5
6
7
8

Underground Railway System of Paris

managers is that the bus has not the capacity to replace the tramway in providing the main transportation service in any sizable city.

European Street Congestion Notably Lighter

GENERALLY speaking, there is no street congestion in Europe that is comparable with the conditions prevailing in the United States. The major reason for this is that the number of private automobiles in use here is five or six times as many as in Great Britain, and the ratio would be even larger in comparison with the Continental cities. For example, the total number of motor vehicles of all classes registered in Great Britain on Feb. 29, 1924, was 936,662, which compares roughly with the total motor vehicle registration in the United States for 1923 of 15,092,177. The corresponding number of inhabitants per motor vehicle is 7.3 in the United States and 43 in Great Britain.

There is rather heavy street congestion at some points in the central business district in London, but this is caused almost entirely by the motor buses and taxicabs, and these two classes of traffic comprise as a rough estimate probably 90 per cent of the total vehicles on the street. The heaviest points of congestion are at such centers as Trafalgar Square, Piccadilly Circus, Oxford Circus, the Bank, Elephant and Castle, etc., where a number of streets converge into a circular traffic center. London's street layout is a maze of crooked routes with numerous centers from which streets radiate in all directions and with these radiating arteries crossing each other at all sorts of angles and without system. The only American city which compares with this at all is the older part of Boston.

Obviously, under this scheme, there is almost a total absence of parallel routes in any one general direction, this tending to bring about congestion where the travel in one direction is heavy. With the future expansion in the use of private automobiles, now showing an increasing rate of growth in Great Britain, the operation of buses, which now have nearly the whole street, will become more and more difficult. Even now, the average speed made, for example, on Oxford Street, Fleet Street and the Strand, and through the centers named above, is only 3 to 4 m.p.h. Some of the pictures taken by the committee on week-day afternoons show how completely the buses occupy the streets. (See pages 416, 436). It should be noted also that no parking is permitted, except that taxicabs may stand in a single line in the centers of some streets at certain points.

Another important factor which, in comparison with American cities, tends to make for less severe street congestion in London is that the building heights are limited by public authority and are uniformly from six to eight stories in height. There is consequently no such concentration of people during business hours as we have in our principal American cities, and the problem of all of the transportation systems is correspondingly less severe at any one point. In other words, the loading and discharging of passengers is spread out over a considerable area. This distribution of business is also an important contributing factor in the high proportion of short-haul riding which the transportation companies enjoy, especially in the off-peak hours. It tends, too, to give a better all-day load factor. The buses, of course, benefit primarily from this short business riding, as they are exclusively in the business area. But this situation in the business area, as well as the solidly built-up nature of all London, and short-haul fares are responsible for the high number of passengers per car-mile carried by both buses and trains. The average number of passengers per car-mile on the tramways in London is 10.5 and on the buses 8.75. These compare with about 7 passengers per car-mile average in the United States.

Regulation of the flow of traffic in London streets is of the simplest kind and yet seems to be very effective. No mechanical signals of any kind are used and the number of traffic officers seems to be remarkably small. The governing principle is to allow traffic to weave in and out and take care of itself to a large extent and to permit traffic officers to handle the movement as the conditions of the moment dictate. The result is that traffic is handled with little apparent evidence of the control. In fact, this traffic regulation was the best example the committee observed of the "effortless efficiency" on which London business prides itself.

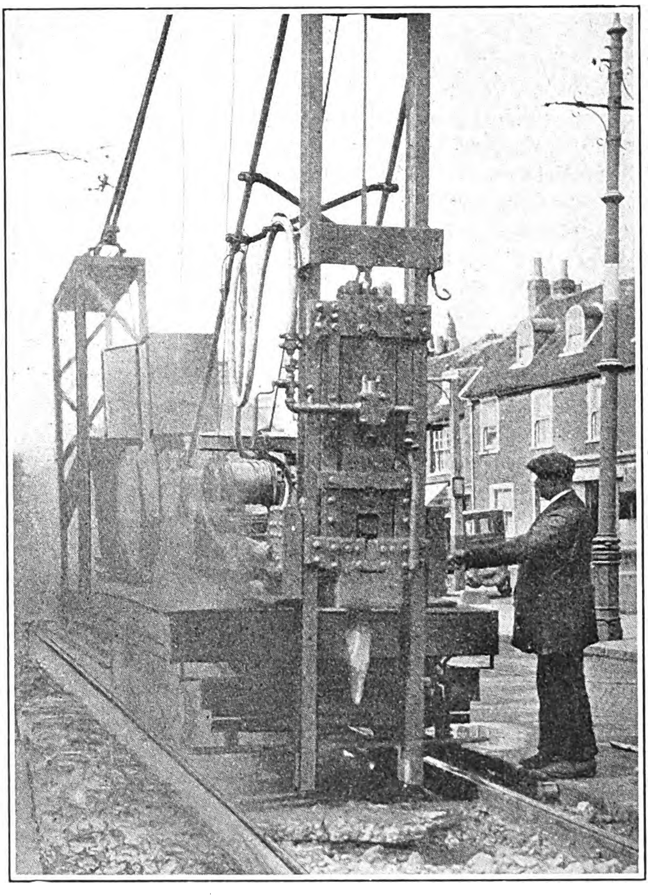
While the handling of vehicular traffic in London is effective (and much the same description would apply to Paris), not so much can be said for the protection and assistance given to pedestrians. Safety islands are provided to a certain extent, and at a number of heavy loading points the tramways have permanent loading platforms which are of great assistance to the pedestrians. But by and large the pedestrian must look out for himself. And with the confusion of traffic lanes due to the converging and diverging streets at the circles, the crossing of streets on foot is somewhat of an ad-

venture. Probably it should be said that in London the members of the committee noted this particularly because of unfamiliarity with left-hand operation.

Two factors which contribute to the difficulty of the pedestrian are that vehicles are not required to stop behind a street car while it is loading or unloading passengers, and that buses are continually passing each other while going in the same direction. This ability of one bus to pass another, which is one of its great advantages, contributes to the accident hazard and the difficulties of the pedestrian. Bus accidents of all classes increased in London for the year 1923, as compared with 1922, from 13.9 per 100,000 bus-miles to 19.4. This, of course, was due in part to the large addition to the number of buses operated, the corresponding increase in new and inexperienced drivers, and to a certain extent to the keen competition with the "pirate" buses.

Track Construction Differs from Practice Here

Particular Features Are the Absence of Cross Ties in Concreted Track, the Method of Sealing the Rail Against Moisture, and the Pressure System of Thermit Welding Joints



Pneumatic pile driver used by the London Underground Group Tramways for breaking up concrete

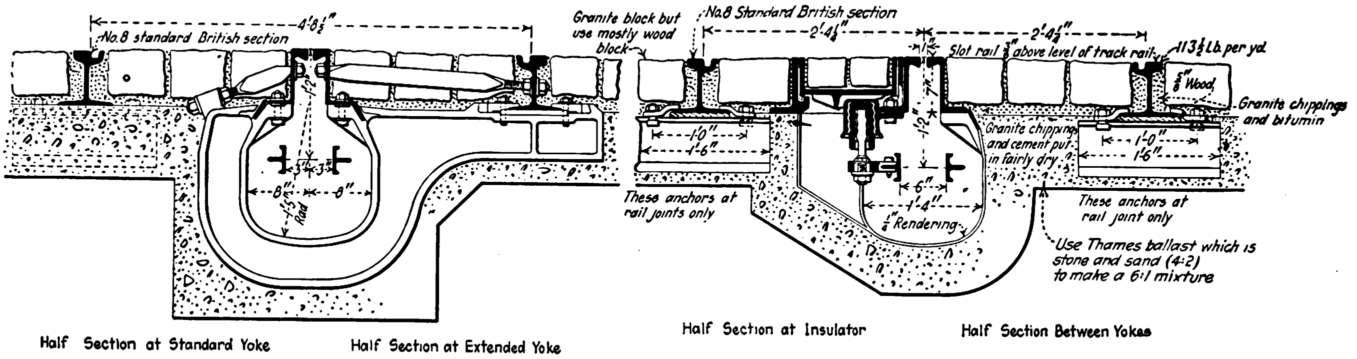
The steel point is lowered in contact with the concrete and the air hammer then put in operation, driving the steel point through the concrete and breaking it up. This was claimed to cause much less damage to underground water and gas mains and to surrounding buildings than was formerly experienced with the more usual method of dropping a heavy weight.

THE outstanding thing to an American railway man about the track construction of British tramways is that the track there is built virtually without sleepers (cross ties), or with the spacing between cross ties so great that they act merely as anchors. In paved trackwork a concrete base is used almost entirely in the newer track construction. The rails are laid practically direct upon the concrete. They are maintained at gage in some instances by means of sections of old rail spaced 7 ft. 6 in. apart, and imbedded in the concrete, and in some cases also by means of tie rods with the same spacing. Usually, some special means is used for bringing the base of the rail into full contact with the concrete. For example, on the London Underground tramway lines, a ½-in. to 1-in. space underneath the rail base is packed with granite chips and then floated with tar or bitumen. This acts as a seal to keep water out from under the rail base.

On the London County Council tramway tracks, the rail is fastened to the old rail anchors by means of clips with a ⅝-in. hardwood packing block between the rail base and sleeper. But the concrete is poured so that it comes in direct contact with the base of the rail between sleepers. A 1-in. cement and sand bedding (dry grout) is laid over the surface of the concrete to form a base for the paving sets (granite block), which are sealed between blocks and around the rail by granite chippings and bitumen.

The packing around the base of the rail which is placed underneath the base and carried up over the base of the rail, as used by the tramways of the London Underground Group, consists of a pitch packing of medium pitch and creosote oil tempered so as to be quite pliable. A small quantity of hot fine sand is added before the mixture is poured. The filler is then allowed to set at least 12 hours.

In Edinburgh the concrete foundation is left 1 in. clear from the base of the rail, and this space is then securely packed with a dry packing made up as follows: One part of ¼-in. granite chips and one part of sand to one of cement. The packing is hammered gently but firmly under the rail, men working on either side of the base. The "causeway setts" (granite blocks) are laid on a dry concrete bed 2 in. thick which is made up of two parts of ½-in. granite chips and two parts of sand to one of cement. No beater is used, the pavers laying the sets to the required level. A tar waterproofing coat ¾ in. thick is then poured between the setts to protect the dry concrete paving bed from being washed away by rain or affected by the weather. When the tar has dried thoroughly, a wet concrete grout, of the proportions two parts ¼-in. granite chips and one part sand to one of cement, is well brushed between the setts to the level of the road and allowed to set for one night. This grout settles in drying and on the following day a cement grout of the same proportion, but not quite


4'-8½"
No. 8 standard British section
Granite block but use mostly wood block
1'-2"
3" 3"
8" 8"
1'-5" Rad
1'-0"
1'-6"
These anchors at rail joints only
No. 8 Standard British section
2'-4¼"
2'-4¼"
1"
Slot rail ⅜" above level of track rail
113½ Lb. per yd.
⅝" Wood
Granite chippings and bitumin
7"
1'-2"
Granite chippings and cement put in fairly dry
6"
1'-4"
¼" Rendering
1'-0"
1'-6"
These anchors at rail joint only
Use Thames ballast which is stone and sand (4:2) to make a 6:1 mixture
Half Section at Standard Yoke
Half Section at Extended Yoke
Half Section at Insulator
Half Section Between Yokes

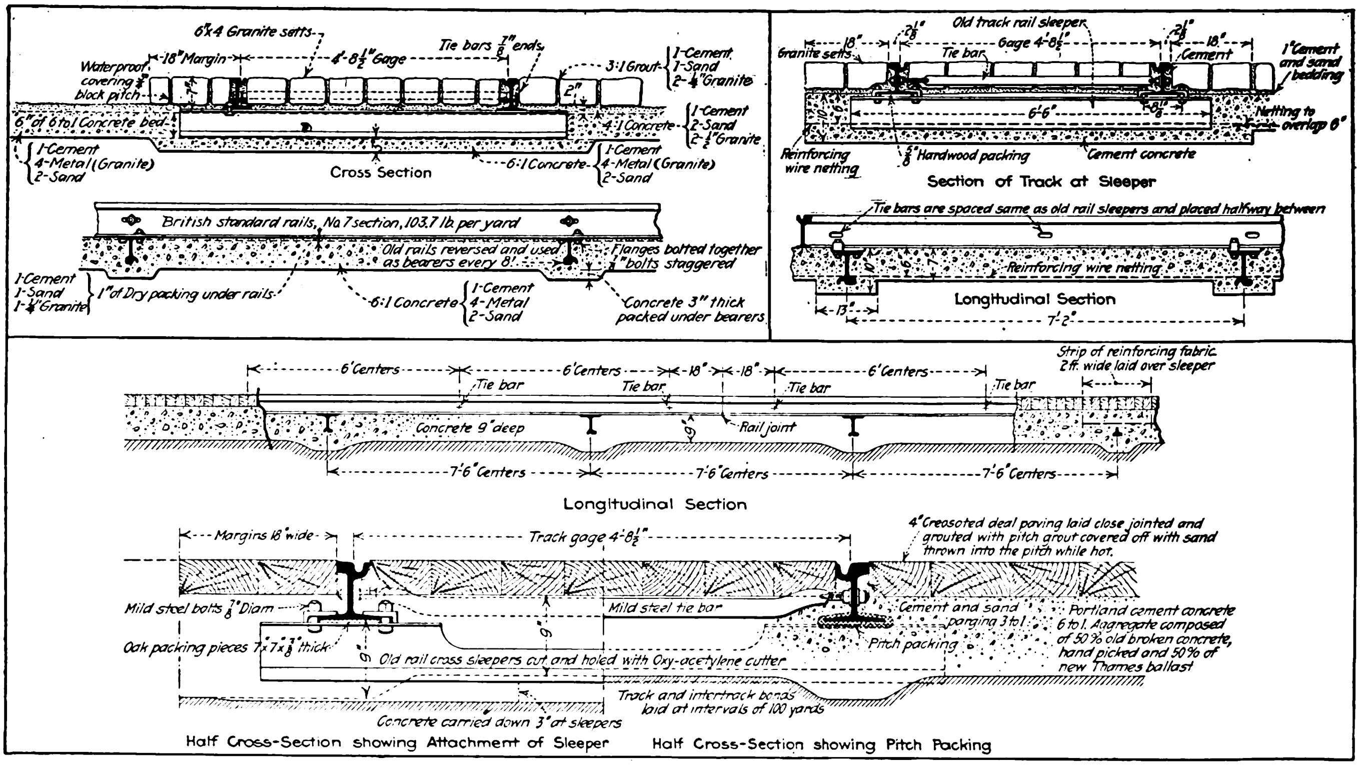
Four sections of the conduit track construction used on part of the lines of the London County Council Tramways. The extended yokes are placed on 7-ft. 6-in. centers with short yokes half way between

so wet, is lightly brushed over the road and left about ⅛ in. above the sets. No traffic is allowed on construction of this type for a period of from four days in dry weather to eight days in damp or wet weather. The Edinburgh engineers have found that should it be desired to open up a section of road for cross traffic at any point, the tar waterproof covering may be increased to a depth of 2 in., and the final coat of wet concrete grout covered with granite chips. This has been found to be very effective and shows no bad results even though the road is used within 36 hours.

In Birmingham the rail is laid directly on the concrete with no special care for waterproofing. The space between paving blocks and that around the rail is simply filled in with the wet grout after the paving had been laid. The management said that experience with this type of construction had been satisfactory and that further labor and material for special waterproofing were not considered necessary.

In Sheffield no cross ties whatever are used, the rails being maintained to gage simply by tie rods spaced 6 ft. apart. The rails are anchored to the concrete by means of bolts placed when the concrete is poured. Dry granite chips with tar pitch is the material used between rail base and concrete.

The thickness of concrete base used varies from 6 in. to 9 in. underneath the base of the running rail on the various English properties. Some of the tramway companies use reinforcing mesh to give the structure greater strength. For example, the Metropolitan Electric Tramways, London (part of the Underground group), places a reinforcing fabric 2 in. above the bottom of the concrete. This is composed of ¼ in. diameter mild steel rod, made with a 6-in. square mesh and the rod electrically welded at the intersections. This mesh is manufactured in 7-ft. wide strips and shipped in rolls. On the London County Council Tramway track a wire netting is laid 1 in. above the bottom of the concrete, and the netting for the two tracks overlaps about 6 in. Some of the companies increase the depth of the concrete base underneath the rails to form a stringer. Similarly the depth of concrete is increased at the old


6"x4 Granite setts
18" Margin
4'-8½" Gage
Tie bars ⅞" ends
3:1 Grout
1-Cement
1-Sand
2-¼" Granite
Waterproof covering ⅜" block pitch
7"
2"
6" of 6 to 1 Concrete bed
4:1 Concrete
1-Cement
2-Sand
2-½" Granite
1-Cement
4-Metal (Granite)
2-Sand
Cross Section
6:1 Concrete
1-Cement
4-Metal (Granite)
2-Sand
British standard rails, No. 7 section, 103.7 lb. per yard
Old rails reversed and used as bearers every 8'
Flanges bolted together ⅞" bolts staggered
1-Cement
1-Sand
1-¼" Granite
1" of Dry packing under rails
6:1 Concrete
1-Cement
4-Metal
2-Sand
Concrete 3" thick packed under bearers
Old track rail sleeper
2⅛"
2⅛"
18"
Gage 4'-8½"
18"
Granite setts
Tie bar
Cement
1" Cement and sand bedding
10"
6"
6'-6"
8½"
Netting to overlap 6"
Reinforcing wire netting
⅝" Hardwood packing
Cement concrete
Section of Track at Sleeper
Tie bars are spaced same as old rail sleepers and placed halfway between
10"
6"
7"
Reinforcing wire netting
Longitudinal Section
13"
7'-2"
6' Centers
6' Centers
18"
18"
6' Centers
Tie bar
Tie bar
Tie bar
Tie bar
Strip of reinforcing fabric 2 ft. wide laid over sleeper
Concrete 9" deep
9"
Rail joint
7'-6" Centers
7'-6" Centers
7'-6" Centers
Longitudinal Section
Margins 18" wide
Track gage 4'-8½"
4" Creosoted deal paving laid close jointed and grouted with pitch grout covered off with sand thrown into the pitch while hot.
Mild steel bolts ⅞" Diam
Mild steel tie bar
9"
Cement and sand parging 3 to 1
Portland cement concrete 6 to 1. Aggregate composed of 50% old broken concrete, hand picked and 50% of new Thames ballast
Oak packing pieces 7"x7"x⅜" thick
6"
Old rail cross sleepers cut and holed with Oxy-acetylene cutter
Pitch packing
Track and intertrack bonds laid at intervals of 100 yards
Concrete carried down 3" at sleepers
Half Cross-Section showing Attachment of Sleeper
Half Cross-Section showing Pitch Packing

Typical British Tramway track construction

Sections of track construction employed by Edinburgh Corporation Tramways, upper left; by the London County Council Tramways, upper right; and by the London Underground Group tramways, below rail anchors, usually to a depth of about 10 in. below the rail base, where such anchors are used.

The rail used in paved streets by the English and Scottish tramways is all of the standard English section, girder grooved, weighing from 103 to 113.5 lb. per yard. The height of this rail is usually 7 in. and it comes in 45-ft. lengths.

ALL RAIL JOINTS OF ELECTRIC AND THERMIT WELDED TYPES

Rail joints are almost entirely of the thermit and electrically welded type, with the thermit predominating. The Sheffield Corporation Tramways are using plain fishplates, 14 in. long, with the outside edges slightly grooved out to make space for the welding rod material. The simplest form of arc welding is done, using the trolley current direct, and the engineers reported that they have not had a single joint breakdown in the two-year period in which this type of joint has been employed. A rather unique feature here is that a simple pin-type bond is placed around each joint. No bolts are used with these joint plates. In general, it may be said that the British tramways have had less experience with the electrically welded joints than we have had in America.

The thermit type of welded joint seems to be much more extensively used in Great Britain than it is in the United States, and with almost universal satisfaction. The Metropolitan Electric Tramways, London, reports that many miles of track have been welded this way during the last five years, and these joints have given a practically perfect account of themselves. This work is all done by "jointers" trained and supplied by the Thermit Company. The railway simply contracts with the Thermit Company for so many joints, the latter supplying the jointers and the railway supplying the rough labor. On this basis, the total cost per joint to the tramway averages about £2 to £2.5 per joint, inclusive of the hand filing method of finishing the surface of the rail, which to Americans seems a rather expensive method of finishing. However, the English engineer considers that there is not the same danger of cupping with a hand file that exists with any rotary machine, and as a pair of men can do about eight joints a day, they seem to be satisfied with this method.

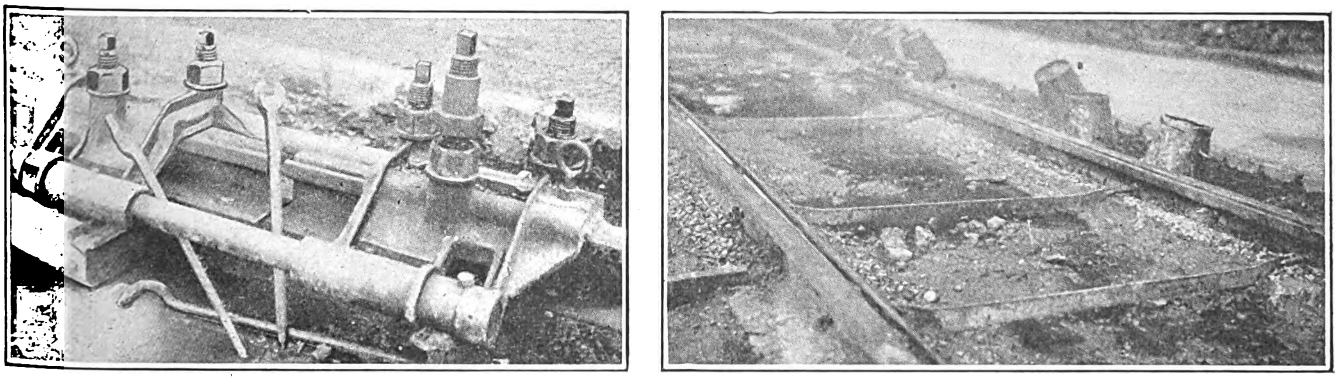
The method of making the thermit joint in Great Britain is somewhat different from that commonly employed in America, and it is possible that this may account for its more nearly complete success. The point of difference is primarily the use of a screw clamp by means of which pressure is applied to the rail ends during the fluxing of the metals. The details of the process are as follows:

"Wattle hurdles" made of willows with straw woven in between

They are laid on the rails after the concrete is poured by the London Underground Group tramways. They keep the sun off the concrete and permit a circulation of air, causing the concrete to set much more quickly. It was also claimed to assist the setting in wet weather as it provides some protection from the rain.

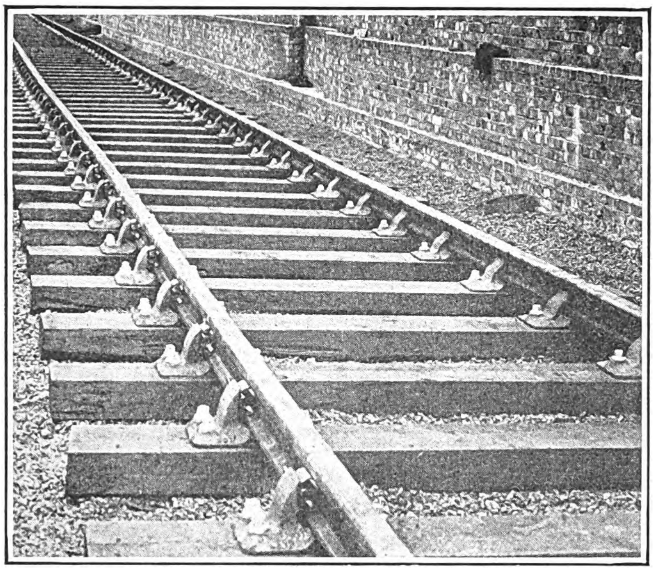
The rail ends are brightened by a ratchet device and (where high carbon rails are used) a copper shim is slipped in between the rail ends. The screw clamp, which is shown in an accompanying illustration, is then drawn up so that the rail ends are tight together. A portion of the thermit material is then poured, and after a short space of time, about 2 minutes, the powerful screws of the clamp are drawn up with long levers so that several tons pressure is put upon the joint. The result is that the rail ends are welded into a homogeneous mass and about ⅛ in. of each rail is pressed into the weld. The engineers of the Metropolitan Electric Tramways report that before this pressure process of making the thermit joints was adopted the joints were very inferior.

Having American track construction practices in mind, the absence of cross ties and the comparative lightness of the British construction was of particular interest. How it is possible to gain satisfactory results with this construction may perhaps be explained by the



Track construction practices employed by London Underground Tramways

Left, screw clamp used to produce pressure between the ends of the rails during thermit welding. Right, chipped granite and pitch packing under and around the rail base. The tie rods are offset downward so as to interfere as little as possible with the wood block paving. Thermit joints may also be seen between the first two tie rods.



New track under construction on Edgware extension, London Undergroud, showing particularly the spring steel wedge now being used with the rail chair construction instead of the wood wedge

fact that in general the cars are lighter and the speeds lower than in America. The car weights vary from 20,000 lb. for the new single-truck double-deck cars in Edinburgh to 35,000 lb. for the two-motor double-truck double-deck cars in London. The average system speeds vary from 7 to 9 m.p.h. The maximum speeds are not high, as they are limited by restrictions set in each city by Parliament. In all our observations, it was exceedingly rare to see a car running at a speed as high as 20 m.p.h., though on the outer end of some of the lines of the London County Council Tramways speeds approaching 25 m.p.h. were observed.

Except in one or two cases, the "permanent way" in every city visited was in a noticeably good state of repair. In fact, it seemed to be the general feeling on the part of each management that to keep the track and paving in first-class condition was a matter of primary obligation. A broken-down joint, noisy special trackwork, or holes in the pavement were not seen anywhere over the systems, except in two cities. All of the managers made comments in one connection or another about the very heavy expense to which they were put in maintaining the permanent way.

In connection with the street widening programs which are being carried out on an extensive scale in many of the cities of England and Scotland as a means of making employment, the corporation tramways are frequently provided with a virtually private right-of-way in a park area through the center of the street. This entitles the tramway to make use of an open type of track construction, though it seems to be customary to bring the level of the ballast up to the top of the rails and in some cases to seed the area completely to give an unbroken lawn in the parkway. In all such cases, the ordinary type of open track construction employing wooden ties and rock ballast is employed.

One railway man in England makes good use of the vanity of women. He places a mirror on the rear body corner post. When about to leave the car women passengers take a fleeting look at themselves and hence are facing forward as they alight.

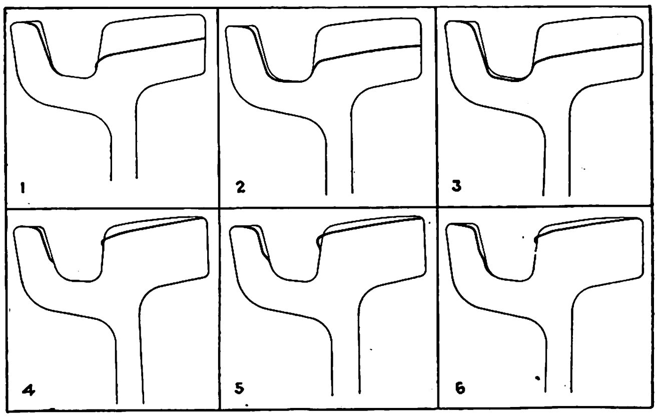
In Situ Treatment of Rails

THE British tramways have had more experience with the Sandberg *in situ* process of hardening the rail treads than we have had in America, but it may nevertheless be said that this experience is not yet of a sufficient amount to provide any definite opinion as to its merits. A number of the tramways have some of this rail installed for experimental purposes. The process is expensive, costing about as much as the original cost of the rail, and the best that can be said for it up to date is that the results have been sufficiently good so that some of the tramways are making further installations as a means of gathering further data.

The tramways of the Underground Group had several sample lengths of track dealt with in this manner a few years ago, partly with a view of seeing whether the claim of increased life was borne out in practice, and further, whether it eliminated or delayed the formation of corrugations. The result thus far is summarized by the engineers of these companies as follows:

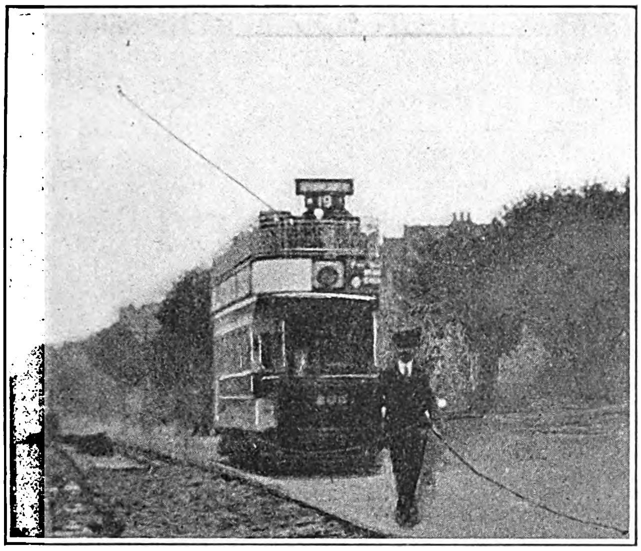
In the first place, they say that there is no doubt that the initial stage of wear on the rail is reduced from a rate of about 1/32 in. per annum to about 1/64 in. per annum. This means that on the initial life of the hardening there is a saving of 50 per cent in the wear, but as the hardening apparently cannot be as good as it goes down into the rail, it is impossible to say how the wear will be affected after a few years of life. These engineers, however, make the statement that corrugations did not reappear on the short lengths of track where the process was tried. To further the study, these companies had treated some 4 miles of additional rail about two years ago, but naturally it will not be possible to come to any tangible conclusions for about five years. The principal interest in the process seems to be in the possibility that it may check corrugation. The engineers feel that unless this is accomplished, the process will have little value.

The London County Council Tramways in 1920 made a number of experiments with this process on test lengths chosen on routes with different traffic conditions. These tests were made on double track, one track being treated and the adjacent one left untreated for comparison. The result here has been that no prolongation of the life of the rails has been obtained anywhere



Wear of Rail on Metropolitan Electric Tramways, London

These rails were laid in October, 1919, on a route where the service is about 800 cars per day. They are steam treated Sandberg silicon sorbitic steel rails. The wear recorded was taken at six different points, sections 1, 2 and 3 being at main stopping points and 4, 5 and 6 at points between stopping places. These profiles show the serious wear caused by magnetic rail braking, and also the conical wear of the British rail section which is the cause of much concern to all the tramways.



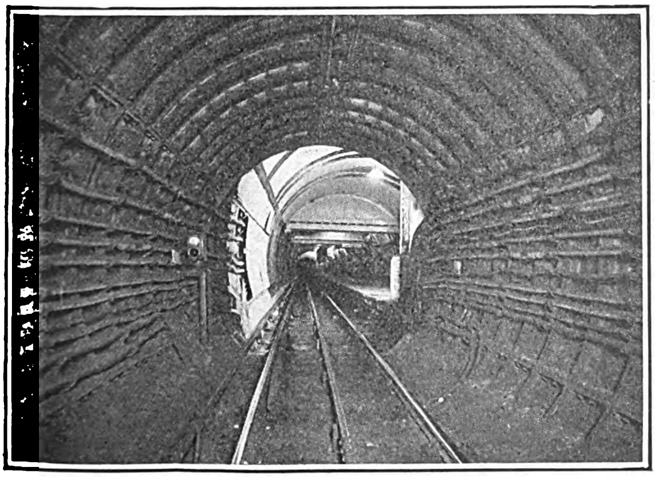
Swivel harps used on British tramways

The illustration shows how the swivel harp simplifies the operation of cars over the right-hand track (left-hand operation) when the left track is under construction. The same position of trolley pole off to one side may commonly be seen where both overhead wires are supported on one bracket from a pole line along one side of the street.

where the magnetic brake is used, but it has been successful in preventing the formation of corrugations.

One of the experimental sections of track treated was on Victoria Embankment between Waterloo and Hungerford bridges, the length being about 300 yd. of single track on a flat curve which carries about 810,000 cars per annum. This stretch of track was selected because of the repeated corrugation of the rails despite their continual removal by scrubbing (grinding). Before the treatment was applied, all the rail was scrubbed clear of all traces of corrugation and alternate lengths of rail were treated and left untreated.

Soon after the completion of the treatment in July, 1920, corrugation appeared on the untreated rail and developed to such an extent as to necessitate grinding in November, 1921. On the other hand, no corrugation appeared on the treated rail and no grinding was done. This test length of track was relaid in January, 1924, and up to that time no corrugations had appeared, though the untreated rail had been repeatedly scrubbed. As a further test, the new rails on this stretch of track were treated in April of this year. At this time all the rails on the down track were treated and those on the up track left untreated.

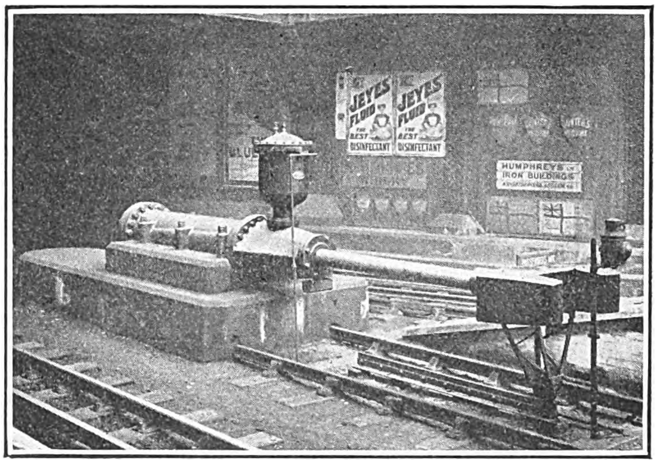


A rather neat station on the tube lines is made by use of a larger diameter tube

In applying the Sandberg process to the rails, it was necessary for the tramway to allow the contractor at least 4½ hours of uninterrupted operation after cessation of car traffic.

Overhead Construction

THE principal difference noted between European overhead construction and that employed in America is that no effort is made to center the wire over the track. Practically all of the tramways use a swivel-type harp which makes possible the successful operation of the trolley wheel or trolley shoe over a wide latitude of trolley position. Frequently, the trolleys for both tracks are supported on brackets attached to poles along one side of the street. The trolley pole of the car on the far track then takes a position of considerable angle with the center line of the car. The swiveled harp also has the advantage, in connection with new track construction where it is necessary to operate the cars in both directions over one track, that no attention need be paid to shifting the trolley wheel to the opposite wire when the car takes the other track. The wheel continues on its own wire and takes care of itself. However, the use of the swivel harp tends to increase the wire and wheel wear and it is also more expensive to maintain than the ordinary harp. Several tramway men expressed themselves as desiring to get away from the use of the swivel harp if it were possible.



Oil buffer used by London Underground Railways

This is placed on stub end tracks and also extensively used by the British steam railroads. While a car hitting this buffer receives an initial jolt, the plunger travels against the oil pressure sufficiently to avoid damage to the car, it was said, even though the speed at moment of striking may be 10 or 12 m.p.h.

In Berne, Switzerland, all of the tramway cars are equipped with bow collectors, which work very satisfactorily and require virtually no attention on the part of the conductors. Even at the ends of lines, where the car reverses direction, the bow collector takes care of itself if the conductor forgets it, though he usually pulls it over in the trailing position, while the car is standing. This is easily done, as the bow collector rides comparatively close to the vertical position. The use of the bow collector greatly simplifies the overhead construction, eliminating switches and frogs and also entirely eliminating dewirements.

One Swiss railway official who is quite familiar with practices in the United States and has connection with various systems in Switzerland said that he did not see why the bow trolley was not used in the United States.

On the properties with which he is connected, all wheels and trolley poles are being replaced with bow collectors.

Much of the trolley wire used now in England and Scotland is a 5 per cent cadmium alloy which is said to be giving a much longer life than ordinary hard-drawn copper.

Tramcar Design as Dealt with in Europe

Meager Development of the Tramcar Has Taken Place in Great Britain—Double Deck, Single Truck and Two Motors Continue as Standard Characteristics—But the Paris Tram Officials Have a Program of Building 400 Cars Which Depart in Mechanical Design from All Previous Practice —Main Features of This New Car Are Given

TRAMCAR design in Great Britain is pretty thoroughly standardized. The type most commonly used is a single-truck, double-end, double-deck car with both entrance and exit for upper and lower deck at the rear. In a few cities, double trucks or "bogies" are used, but in any event all cars are equipped with but two motors. The universal use of the double deck over there, while no double-deck cars are used in America, naturally gives rise to the query as to the reasons for this. The committee undertook to find out what these reasons were. While the double deck perhaps provides the lowest-investment means of supplying large rush-hour capacity, the main reason given everywhere for the use of the double deck was that it had always been used. Before there were any tramways, the old horse-drawn omnibuses were of double-deck design. The horse-drawn rail car was also of double-deck design. And when electrification came, the double-deck design continued. The only change that has come along is that in most of the cities the upper deck has been covered in.

The double-deck design does provide a very high seating capacity with low weight of car. On the London County Council Tramways, for example, the seating capacity is 78 and the weight approximately 35,000 lb. These cars are equipped with double trucks and are about the largest in Great Britain, with the exception of a few cars in Manchester which seat 82. The standing capacity in London is limited to 11 passengers on the lower deck, making the total carrying capacity 89. The company tries to have its conductors carry out the police restriction as to standing passengers, but it often happens that a car will carry 100 passengers.

The most modern design of tramway car is to be found in Edinburgh, where the cable lines have been electrified within the last two years. The new cars here are of double-deck design, but with the stairways arranged so that it is possible to use the front stairway for exit purposes, thus tending to reduce the congestion at the rear platform and speed up the loading and unloading. These cars seat 60, are equipped with single truck, with two 42-hp. motors. They weigh 22,400 lb. The stairway and vestibule arrangement in these cars, permitting front end exit, is indicative of a tendency in Great Britain since the competition of other forms of transportation has been causing the managers to give more attention to means of increasing the speed.

The platforms of the Edingburgh cars are long enough so that there is space at the side of the vestibule for a door underneath the stairway. One of the London tramway companies has built one car as an experiment with a stairway which can be revolved about a vertical axis, so that it may be used in one position at the rear of the car and in the opposite position at the front end to deliver passengers on the proper side of the car.

Of course, the new Edinburgh cars, like all the tramcars of Great Britain, are of the simplest possible construction and equipment. The body construction is almost entirely of wood, the seats are of the lightest wood slat type, only single floors are used, the sides are light panels without any insulation for heat or cold, the cars have no heating equipment, etc. In most of the cars there are no window sash as the glass is fixed, there are no curtains and no ventilating equipment (small sash above the side windows simply tilt in about 30 to 45 deg. to provide ventilation), there are no air brakes nor platform doors, and no safety devices. In fact, the committee was especially impressed with the fact that the tramcars of Great Britain in all the cities visited are totally lacking in the modern devices and equipment which contribute toward the convenience, comfort and safety of the passengers, but which in America add to the expense of maintaining the cars. The majority of the tramway corporations are building their cars today, in every detail, to practically the identical design that was employed 20 and 25 years ago. About the only important improvement in the tramcar that is in evidence is the replacement of the 20 and 30-year old motors with modern motors of better horsepower and of the ventilated type. These will provide higher acceleration and faster running speeds. Also, two or three companies have a trial installation of pneumatically operated platform doors, though there is virtually no use of even manually operated platform doors. Most of the tramways seem to be quite well satisfied with the single truck, despite the fact that all are greatly troubled with jazzing (nosing) of the cars, which tends to keep the speed down. The London County Council and the Birmingham corporations are rather the exception in their gradual change-over to two-bogie trucks. The main reasons given for retaining the single truck are that it costs less to maintain and rides just as well. The committee could not concur in this last claim.

The committee feels that this point should be made. Whatever may be the fate of the British tramcar, it cannot be said that it has been developed to its maximum possibility.

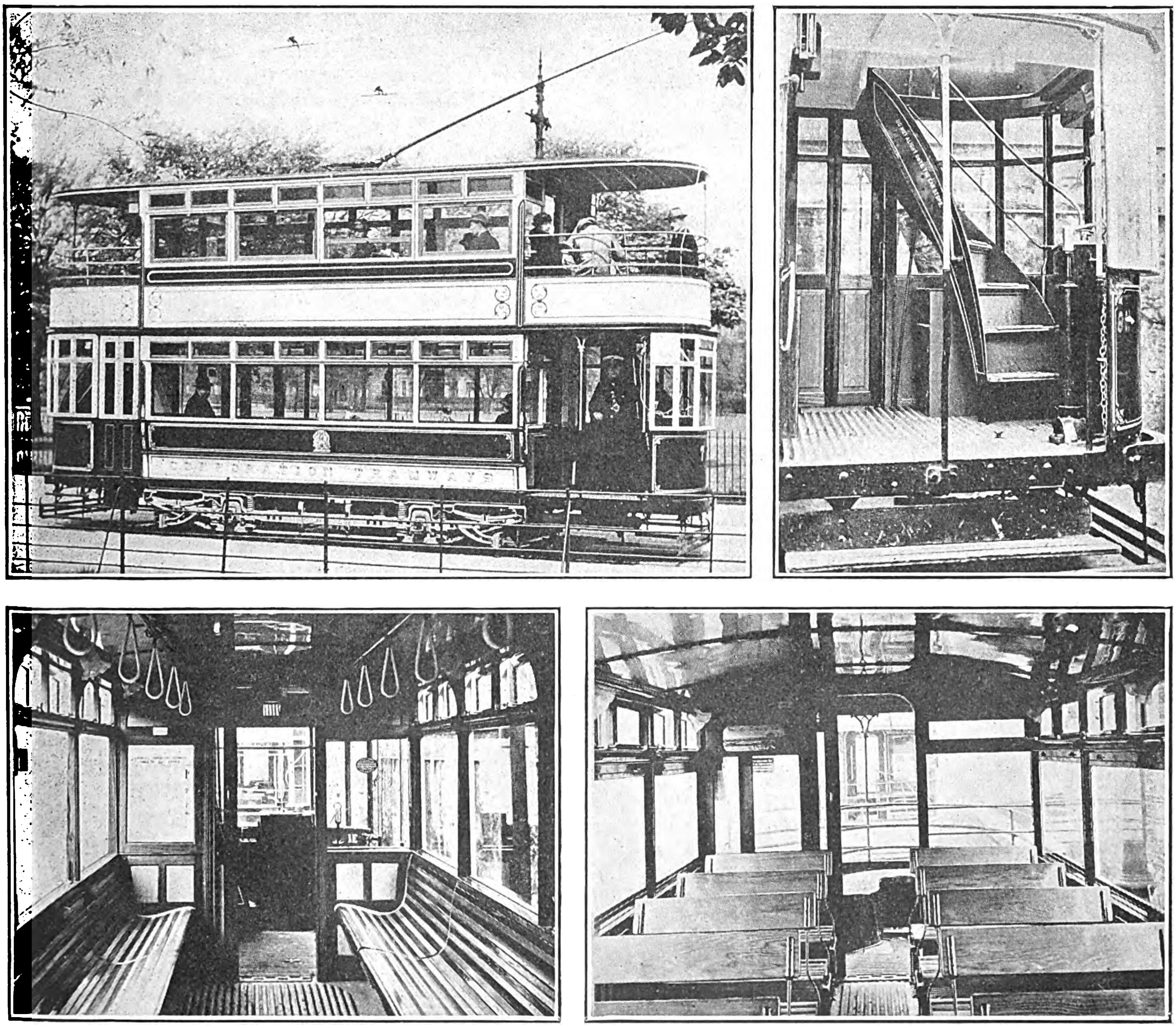
MAINTENANCE STANDARDS ARE HIGH

While British tramcar design does not interest an American railway man particularly, the latter has something to learn from his British brother in the way of keeping the cars well maintained, well painted, clean and attractive, particularly on the exterior. The cars are tight and comparatively quiet; there is no rattling of loose parts on trucks or bodies. On an average with the various properties, the cars are completely dismantled and thoroughly overhauled about once a year, including a new coat of varnish and such touching up of the paint as is needed. This frequent attention to the varnish and the very general practice of washing every car nightly account for the uniformly good appearance of the rolling stock. In general, the expenditures made for cleaning cars amount to one-third as much, or more, as the expenditure for maintenance.

Another feature which adds materially to the exterior attractiveness of British tramcars is the use of large windows and plate glass. Some of the companies are even using curved plate glass in the vestibules, producing a most pleasing effect. This is, of course, extremely expensive, but the managers using it feel that the expenditure is worth while for the merchandising value it affords.

The large windows on the sides of the cars can be used, because in many cases longitudinal seats are employed, and in others the cross-seats are placed without respect to their position relative to the windows. These large windows are usually fixed on the lower deck, but can be dropped on the upper deck, and they are fitted with pantograph sash balances. With the plate glass no sash are used, the glass itself simply sliding in felt-lined grooves in the posts.

The hand brake is still the main service brake on British tramcars. Nearly all of them are equipped, however, with magnetic track brakes, which for the most part are used for emergency stops only, or on steep grades. In two or three places a rail brake operated by hand is being used, and Edinburgh is trying the application of air to the track brake. In Sheffield a wood block (poplar) is being used on the rail brake rather than the usual cast-iron block. While some extra caution must be exercised with the wood block in wet weather, the management feels that it is satisfactory and it practically eliminates the wear on the



The Edinburgh Corporation Tramways car, shown at upper left, represents the latest design in Great Britain

The front exit door is a feature first introduced on these Edinburgh cars. Smoking is permitted on the upper deck as on all British trams.

Top right, stair and platform arrangement to permit front exit from both upper and lower deck. The motorman has to step aside to allow passengers to come down these stairs at the front end.

Lower left, lower deck. This view shows longitudinal wooden seats, fixed window glass, upper sash ventilation and general appearance of the lower deck interior.

Lower right, upper deck. The reversible slat seats have a single board back supported by two steel straps which provide a certain springing of the backs. The sash on this deck drop.

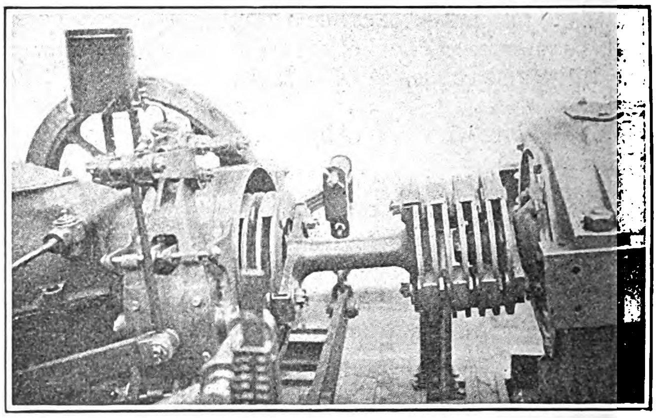
rail. The metal block used in most of the British cities causes a very serious wear on the head of the rail, which is a matter of some concern to the management. An accompanying sketch shows the increase in wear of the rail at heavy stopping points in comparison with the wear between stopping points on rails which had been hardened by the Sandberg process.

New Paris Tramcars Depart from Customary Mechanism

ON THE Paris surface lines some of the cars are of double-deck design, but the majority are single deck, and the company is not building any more of the double-deck type. Similarly, the tendency in design here is away from the double-truck type to a single-truck car of rather unusual wheelbase, namely, 11 ft. 10 in. Furthermore, the tendency is to do away with the truck altogether and mount the two axles in pedestals attached directly to the car body underframe. The reason given for favoring the single-truck car was that the double-truck type costs more to maintain. The step to do away with the truck on the single-truck car was taken as a means of reducing the weight.

Paris cars are all of the double-end type with center entrance, and one-half of the car is designated as first class and the other half as second class. This is the only place visited by the committee where an effort was made to have different classes of travel on the tramways. Standing space in the car, including the loading well, carries the second-class rate.

The thing which interested the committee most in connection with the Paris tramway was the new type of car* with which the management has been experimenting for some time and now has 100 in operation.



Assembly of motor, drive shaft and axle unit on testing stand, showing particularly the two flexible couplings and the transmission brake

They feel at the present time that this new design will be their future standard car. The unique feature is that the two motors are mounted on the body and mechanically connected to the two axles by means of a driving shaft, flexible coupling and beveled gears—a drive somewhat similar to that of an automobile. The axles, however, conform to standard railway practice, as they are of the solid type made of nickel chrome steel. The wheels and the driving gear are all pressed on.

Each axle and pair of wheels are assembled in a unit comprising the gears and gear housings, a short length of driveshaft, a transmission brake-drum assembly and the pair of semi-elliptic springs and shackles through which connection to the body is made. One of these units may then be fairly readily removed and another put in its place in case of mechanical trouble. The shackles, by means of which the axle assembly is fastened to the body, are made up of two plates of spring

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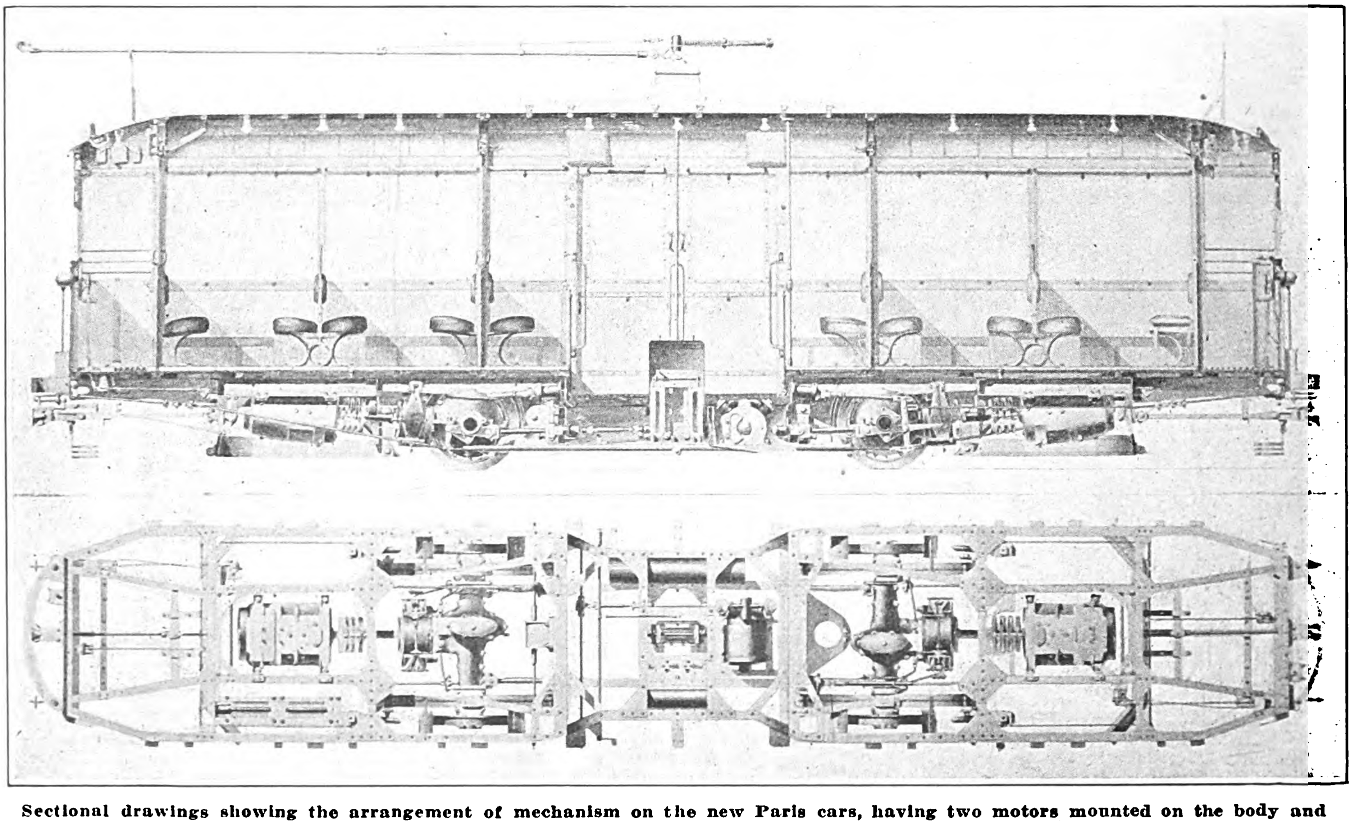
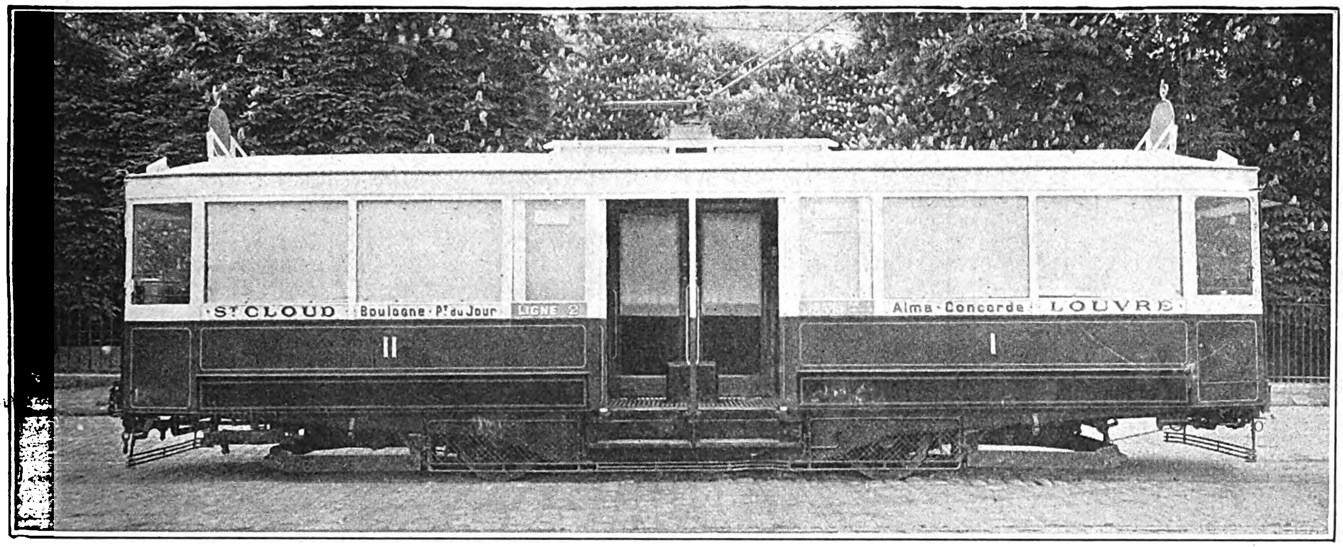
*A description of the sample car of this design appeared in ELECTRIC RAILWAY JOURNAL, Dec. 2, 1922, page 878.



Sectional drawings showing the arrangement of mechanism on the new Paris cars, having two motors mounted on the body and connected to the solid axle through drive shaft, two flexible couplings and bevel gears



Latest type Paris tram with the motors mounted on the body framing and with axles directly attached to the body through semi-elliptic springs and shackles

Note first and second class compartment designation. Length of car, 35 ft.; wheel base, 11 ft. 6 in.; seating capacity, 30, and weight, 25,350 lb.

steel. These permit of a certain amount of lateral motion and assist the car in rounding curves. The driving force in the wheels is transmitted to the car body through two radius rods, one at either end of the axle housing.

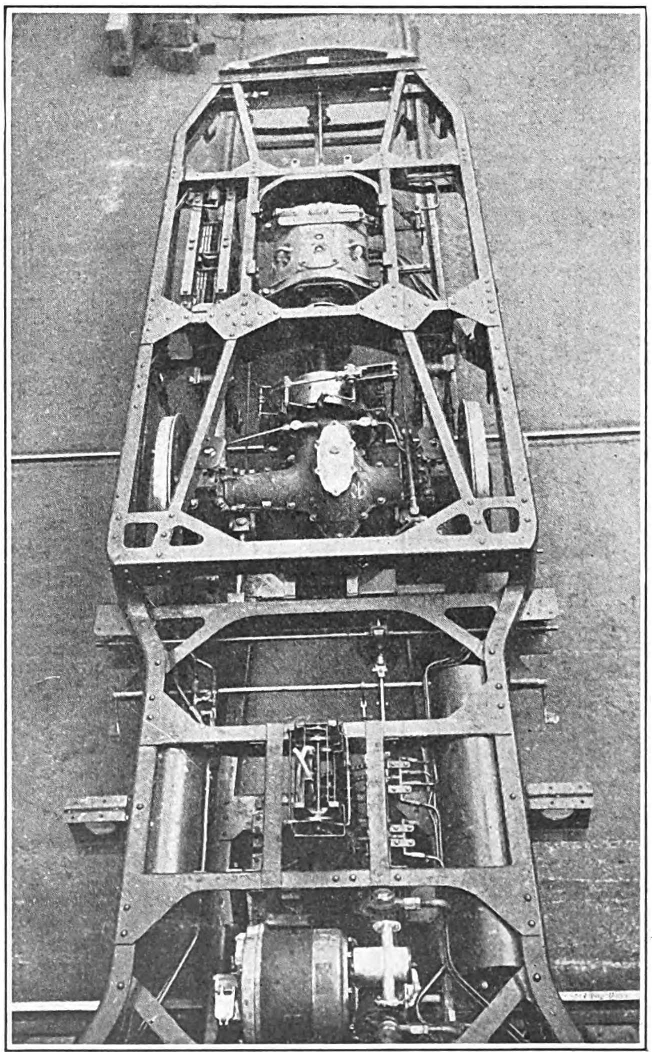
The connection between the axle assembly and the motors comprises a piece of shafting about 30 in. long with a universal joint at each end; in other words, one universal adjacent to the motor and one adjacent to the axle end. These universals, or flexible couplings, are made up of seven rings, each consisting of three plates of ⅛-in. thick chrome nickel steel, with 1-in. separator blocks placed at 180 deg. and alternated 90 deg. on adjacent plates.

Each of the motors is of 55 hp. capacity and is bolted direct to the underframe of the car body. One motor drives one axle and the other motor the other axle, each independent of the other. There is an arrangement for taking up the end thrust of the driveshaft, so that it does not all come on the armature bearings. The housing for the driveshaft on the axle is arranged with a ball and socket joint which keeps the gear and pinion properly in mesh regardless of any slight lift in the axle due to wear in the journal bearings.

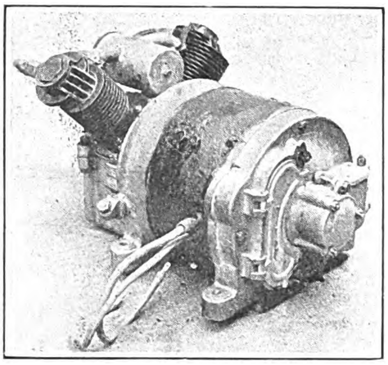
Inside journal bearings are used with lead-bronze bearings. The bearing housing can be dismantled under the car for renewal of the bearing metal by simply removing four bolts.

The transmission brake drum mounted adjacent to the axle housing, already mentioned, is used as the main service brake, and the brakeshoes on the wheels are used for emergency only. This brake band is of steel and about 10 in. wide. Four cast-iron brakeshoes, on which pressure is applied by means of air, clasp the drum and are very effective in stopping the car. The band brake was used as the service brake because it is easier to adjust. It was claimed that it required adjustment only once in fifteen days, whereas the ordinary wheel brakes require almost daily adjustment. It was also claimed that the life of the brakeshoes on the band brakes was from 40,000 to 50,000 km. (25,000 to 30,000 miles), while the life of the regular brakeshoe applied to the wheel is only 2,000 to 3,000 miles.

The air pressure employed on the band is 5 kg. per square centimeter (71 lb. per square inch). The maximum speed at which these cars operate is 50 km. per hour (31 m.p.h.) and the maximum acceleration is approximately 50 cm. per second per second (1.11 m.p.h.



Underframe of the body, new Paris cars, showing the assembly of the motors, axle units, plow housing and gearless air compressor



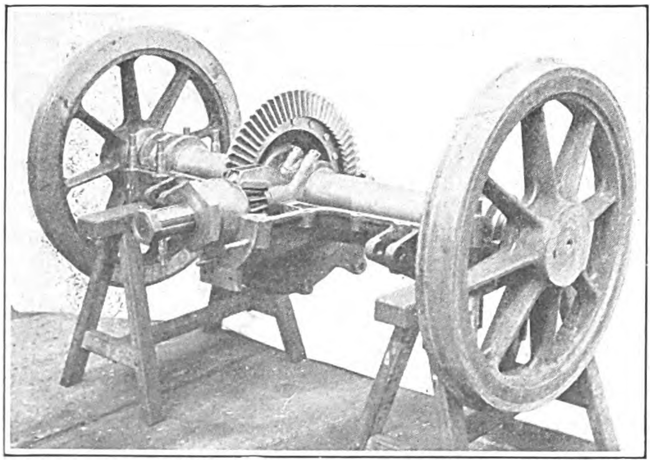
Gearless air compressor, 1,000 r.p.m., developed by the Paris tramways for use on the new cars

per second). The maximum running speed allowed by law in Paris is 25 km. per hour (15.5 m.p.h.). This applies to buses as well as tramways.

On these cars having the motors mounted on a car body, the armature speed of the motors is 800 r.p.m., which compares with a speed of 500 r.p.m. for the motors mounted in the usual way. This, of course, assists in reducing the weight of the motor per unit of horsepower. It was also claimed that it was easier to remove and replace a motor when suspended from the body than when it is mounted on the truck.

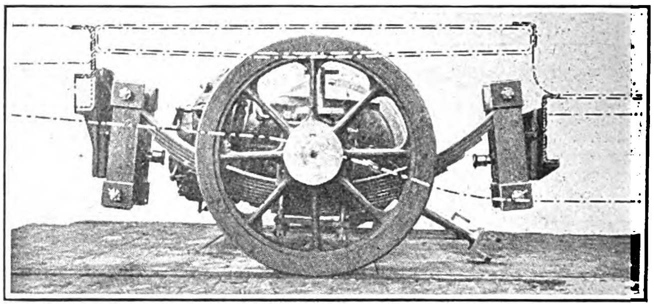
Another mechanical feature of this car is that it is equipped with a newly developed type of air compressor, whose weight is about one-third that of the ordinary gear type, assuming that the same motor is used. This new type of compressor is of gearless design, which rotates at 1,000 r.p.m. and delivers 20 per cent more air per unit of time than does the geared type. It delivers air at a hotter temperature (about 80 deg. C.) but it operates less frequently. Further details of the design of this compressor may be noted from the accompanying illustration.

The car bodies are largely of wood construction except for the steel underframes. They seat 30 and have room for 19 standees, making a total capacity of 49 passengers. The length of the car over all is 10.65 m. (35 ft.) and the wheelbase is 11 ft. 6 in. The weight of these cars fully equipped is 11,500 kg. (25,350 lb.). The weight of the standard single-truck car of the same seating and standing capacity and the same overall length is 14,000 kg. (30,860 lb.). The mounting of the motors on the car body and the other changes in mechanism involved would therefore seem to indicate a saving in weight of about 2,500 kg. (5,510 lb.), which is 17.8 per cent. The unsprung weight in the older type car is 2,800 kg. (6,170 lb.), while the unsprung weight in the new cars is 1,900 kg. (4,190 lb.). The reduction in unsprung weight thus amounts to 900 kg. (1,980 lb.), which is 32.1 per cent. Looking at it another way, the unsprung weight with the old type car amounted to 20 per cent of the total weight, while with the new car the unsprung weight is 16.5 per cent of the total weight.



The solid axle assembly with upper part of housing removed, showing the ball and socket joint for keeping gear and pinion in correct mesh

The management of the Paris tramways is sufficiently satisfied with the results obtained from the experimental cars of this design to expand the experiment to a scale which will give an extensive operating experience with the new design. Whether the new design will show ultimately better economy and have operating advantages in general is a matter that can be told only in the future. However, from a mechanical point of view, the design offers possibilities that can be watched with interest wherever it is practical to make use of light single-truck rolling stock.



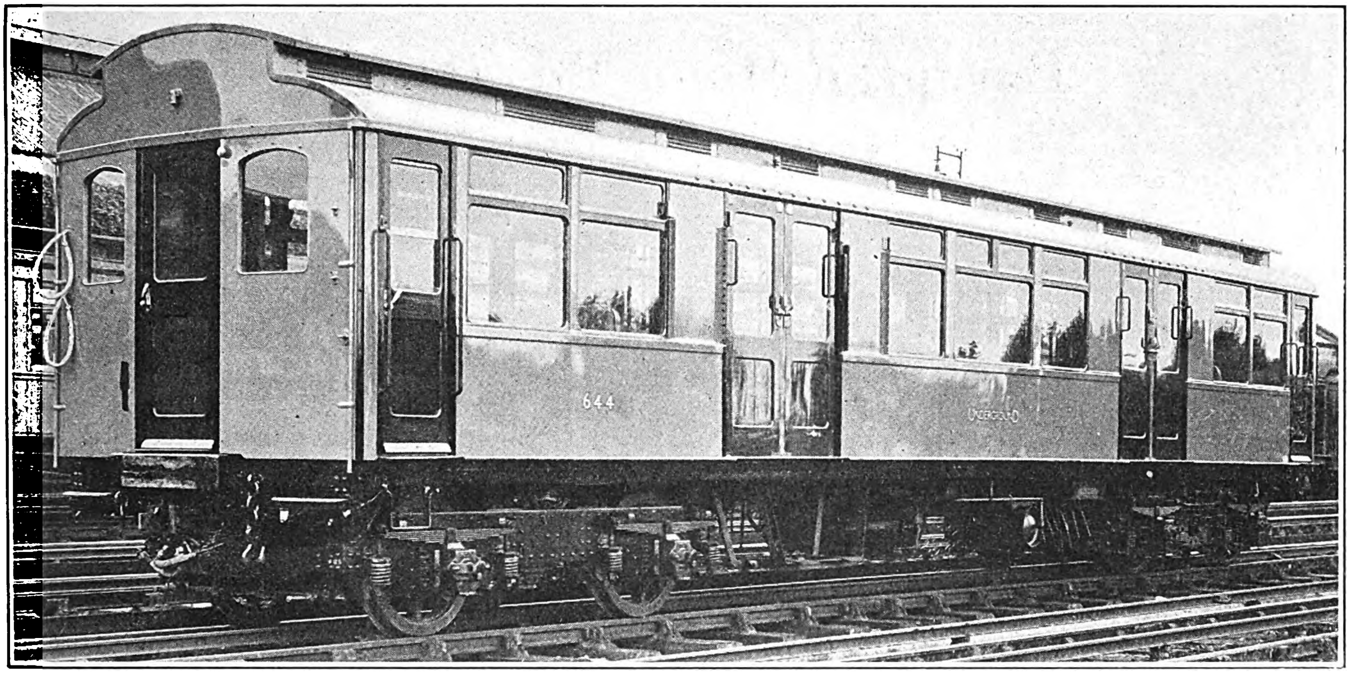
The axle unit of the latest Paris trams. The semi-elliptic springs, spring shackles and radius rods are clearly shown

An interesting type of buffer forms a part of the equipment of these new Paris cars. This consists of four straps, ⅜ in. x 6 in., of spring steel, mounted to function as a semi-elliptic spring, with the inner leaf ends forged in oblong loops, through which the vertical supporting bolts extend. These bolts are carried in two forged brackets attached to the platform end sill. This spring type of buffer absorbs any shock or collision up to its capacity and tends to relieve the strain on the car body. The length of the spring buffer between brackets is about 5 ft. The spring buffer has been of material assistance in reducing the damage to the car body in minor collisions.

Rapid Transit Rolling Stock

THE most striking thing observed with respect to the newest cars of the London Underground System was their inviting and attractive appearance. A real effort is being made to attract patronage by providing a more comfortable, pleasant ride. Large plate glass windows, a brightly painted, well-lighted interior, and figured or striped plush upholstered seats, give the cars a most inviting appearance as one sees them from the station platforms. Probably more than usual credit is due the designers because of their accomplishment in producing cars of such marked interior attractiveness, despite the difficulties and limitations placed upon them by the clearances in the small bore tubes through which many of the cars must operate. This fact also largely accounts for the peculiar exterior appearance.

The Paris subway cars are well painted, are fitted with plate-glass windows and curved plate glass at the

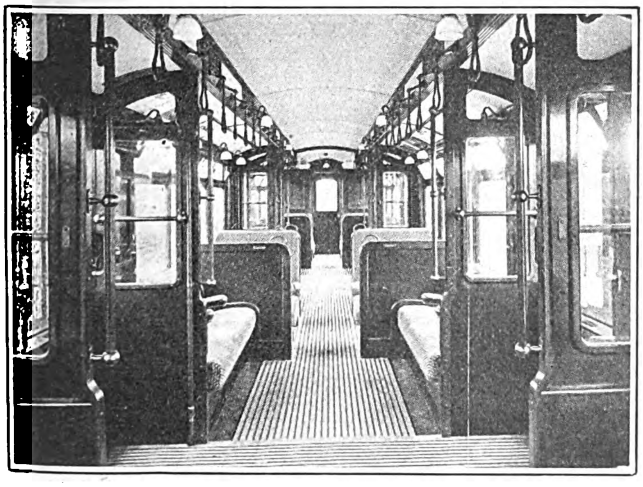


One of the latest steel cars built for use in tunnel lines by the London Underground

ends of the cars, they are well lighted, and the first-class cars are fitted with red leather upholstered seats. Altogether they present a very pleasing appearance, though with not the degree of luxuriousness nor comfort that impresses one in the new London cars.

The Paris cars have an interior seating arrangement which is designed more with the idea of providing maximum standing capacity than maximum seating capacity. The most common seating arrangement comprises cross-seats with a double seat on one side of the aisle and a single seat on the other side, and a a back to back arrangement of seats.

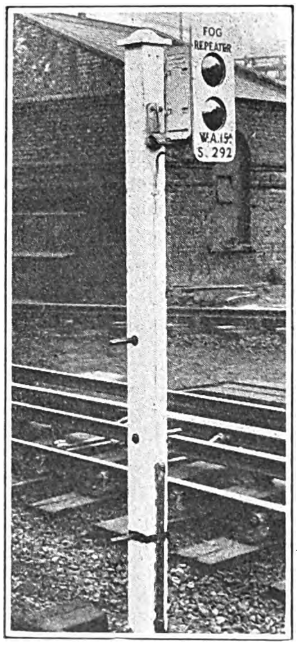
In a mechanical and structural way the committee thought these cars embodied no particularly interesting departures from practices here,* except the means employed to reduce noise. These are treated in a later section.



A combination of longitudinal and cross seats, velour upholstering and arm rests, bright paint, shaded lamps and mahogany trim are features of this latest tunnel car of the London Underground. See also pictures on page 430

Fog Repeaters Signal London Underground Trains

ON ACCOUNT of the heavy fogs which prevail at certain times of the year the London Underground Railways use a special signal, called a "fog repeater," on those portions of the tunnel and tube lines which are out in the open. This fog repeater is especially valuable and necessary there because no "distant" signals are used. It consists of a special type of light signal equipped with a 20-watt, 16-cp. lamp behind a dioptic lens, located a proper distance in advance of the "stop" or "home" signal and wired so that it repeats the indication of the home signal.



Fog repeater signal used by the London Underground

The center of the top lens is approximately 8 ft. above the track so that it is well within the motorman's line of vision. By this means the motorman is informed of the position of the "home" signal when he is a certain distance from it. The wiring is also arranged so that the towermen can put the fog repeaters in operation when fog prevails and cut them out when no fog exists.

There are 123 of these special signals in service and it is claimed that the particular type of lens in use has certain fog penetrating qualities, and that the signals have greatly accelerated movement of trains in foggy weather. The committee did not have an opportunity to see these signals in use as none of London's famous fogs made its appearance.

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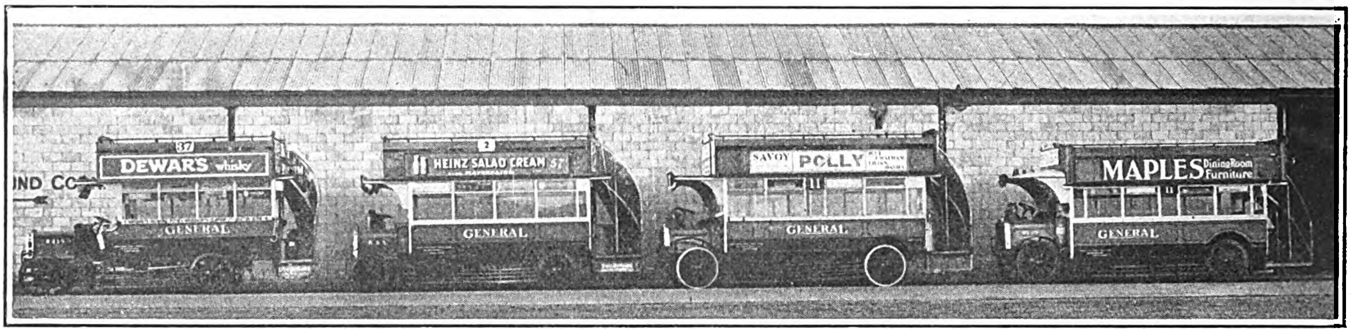
*These new London cars were treated in some detail in ELECTRIC RAILWAY JOURNAL for May 5, 1923.

European Motor Bus Design

Bus Development Has Not Been Carried Forward in Europe to the Extent It Has in America, Although the Use Is Greater—The Double-Deck Design Is Coming in More and More and an Effort Is Being Made to Inclose the Upper Deck for All Weather—Light Wood Bodies Used—Weight Limitation Imposed by Department of Police



Left to right, the type B, type K, type S, and type NS buses of the London General Omnibus Company
They were first placed in service, respectively, in October, 1910; August, 1919; December, 1920, and May, 1923. The type B's have all been taken out of regular service and only a few of the type K are now in use. More than 1,000 buses of the NS type are in service

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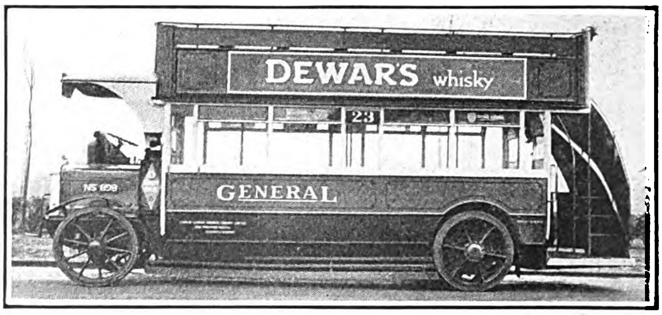
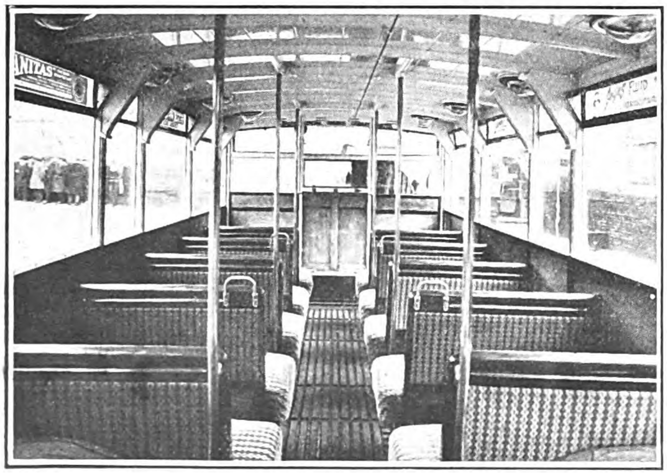
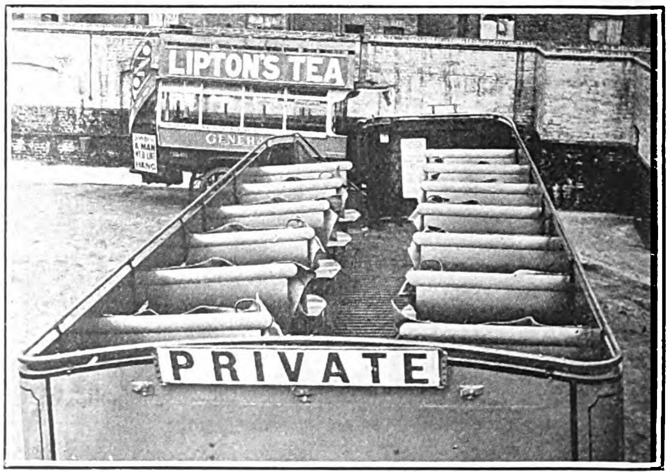
THE NS type bus of the London General Omnibus Company probably represents the latest development of the bus in Great Britain. This is a vehicle which seats 50 passengers and weighs approximately 5 tons unladen (11,200 lb.). When laden, the distribution of weight between front and rear axles for a seated load is as follows: Front axle, 3 tons 8 cwt. (7,616 lb.) and rear axle, 4 tons 19 cwt. (11,088 lb.). These buses are double decked, open top, with 22 seats below and 28 above. They are 26 ft. 9 in. long over all. They are mounted on wheels 42 in. in diameter, and the only step taken to lower the body height is a "kickup" in the frame over the rear axle. The drop type rear axle is not yet a feature of European buses, They are consequently a good deal higher than most of the buses now on American city streets.

A limitation placed upon the design of buses in London is that Scotland Yard requires that the total weight loaded shall not exceed 8 tons—5 tons on the rear axle and 3 tons on the front. The police also impose other restrictions as to the width, height and length of buses, turning radius, etc. As a result, the present bus is not all that it would be if the designers had a free hand. For example, the possibilities are that the upper deck would be inclosed, and the bodies would be wider to permit of a little more generous aisle and seat width.

The bus bodies are made entirely of wood, except for a thin steel side sheathing. In fact, every possible means has been taken to keep the weight down. The seats are of the simplest slat type; there are no window sash nor window curtains; the window glass is fixed;







The NS, latest type bus of the London General Omnibus Company, which seats 50 and weighs loaded 8 long tons
Some of the new buses are fitted with velour upholstered seats on the lower deck. Note framing and bracing of the wood body and stanchions to aid the five standees permitted. Each seat on the upper deck is fitted with an oilcloth, which the passenger may place over his lap or hold over his shoulders to shed some of London's copious rainfall. The committee observed, however, that bus tops were not popular on rainy days. The L. G. O. C. is experimenting with inclosed top designs.

SEATING CAPACITY OF VARIOUS TYPES OF DOUBLE-DECK BUSES OF THE LONDON GENERAL OMNIBUS COMPANY, LTD.

Type, Length	Inside	Outside	Total
B	16	18	34
K	22	24	46
S	26	28	54
NS	24	26	50

WEIGHT WITH PASSENGER LOAD

GP-6	Front Axle, Lb.	Back Axle, Lb.	
B, double deck	4,480	8,960	
B, single deck	4,480	6,720	(Seats about 20)
K	5,980	9,460	
S, double deck	7,720	11,200	
S, single deck	5,980	8,220	(30 seater)
NS	7,420	11,200	

experimental bus seats 52 passengers, and except for the headroom and width, it is practically identical with the London bus. Most of the buses in use in the British cities outside London are at present single deckers, but the tendency is clearly to make the bus conform to the old standard on the horse omnibus, horse car and tram—two decks.

Nearly all of the buses in use in Great Britain are arranged for two-man operation, the necessity for a conductor being determined primarily by the zone fare system, which is everywhere in use. A few of the country buses are arranged for one-man operation.

Differing quite distinctly from the buses of London, those in Paris are all of single-deck design, but again are all arranged for two-man operation on account of the zone fare. The most interesting thing about bus design in Paris is the use of six wheels on the newer types. There are 50 of this type in operation and 1,250 of the four-wheel type. The use of six wheels made it possible to increase the seating capacity from 28 to 40 passengers, and keep within the weight limitations per wheel imposed by the police. The six-wheel bus weighs 7,340 kg. (16,185 lb.) as compared with 5,380 kg. (11,860 lb.) for the four-wheel type. The horsepower of the engine was correspondingly increased from 30 to 36, the engines being identical except for the size of the bore. In addition to the seating capacity of 28 and 40, respectively, for the four-wheel and six-wheel bus, a standing load of 10 for the four-wheel bus and 8 for the six-wheel bus is permitted, making the total capacity 38 for the four-wheel bus and 48 for the six-wheel bus.

The extra pair of wheels on the six-wheel bus is added as a sort of trailer axle behind the driving axle and serves mainly to support the long overhanging rear platform. This extra axle is very much like the front axle, being connected to the body through a pair of semi-elliptic springs and with the wheels arranged to turn in spindles. In steering the bus, these wheels are turned in unison with the front wheels, being simply connected to the driver's steering mechanism by rods and levers. A particular six-wheel bus which weighed 7,200 kg. (15,875 lb.) had the following weight distribution on the three axles:

	Front Axle	Driving Axle	Trailer Axle
Weight, empty, lb.......	4,851	7,497	3,528
Loaded (48 pass.), lb...	5,512	12,128	5,512

An unusual feature of the Paris buses is that the entrance and exit is directly in the center of the rear end of the bus. The reason given for this was that it was thought that in heavy traffic an entrance and exit in the usual location at the side of the platform would cause passengers to be brushed off by passing traffic. The location of the exit at the rear of the platform, however, practically forces every one to step off the bus facing backward.

Paris is the only place visited by the committee where an effort is made to provide two classes of transportation on buses and tramcars. Here the front end of the bus body is divided off by a partition and the space in front of this devoted to first class passengers, while the space to the rear of it and the standing room on the rear platform is second class.

The Paris police impose a rather unique obligation on the operators of buses looking toward the protection of pedestrians. This consists of a scheme for eliminating to a large extent the spattering of water by the hard-tired wheels. The bus wheel rims are made wide enough to give space to install at the outer edge of each wheel 1 in. from the outer edge of the tire a thin rubber mud ring or flange which is a little smaller in outside diameter than the outside diameter of the tire. When the tire is under compression as it comes in contact with the pavement, this mud flange is practically in contact with the pavement also, and any water thrown out by the tire tread is intercepted by this flange.

All Paris buses are equipped with these flanges and the officials seem to be satisfied that they accomplish the purpose intended.

As to tires used on buses, the great bulk of the work is done with hard tires. Virtually all double-deck and single-deck buses used in city service are equipped with solid tires, and only a part of the buses used in cross-country work are equipped with pneumatic tires. In general, it may be said that the use of pneumatic tires in Europe is still in the experimental stage, and not developed quite as far as in America.

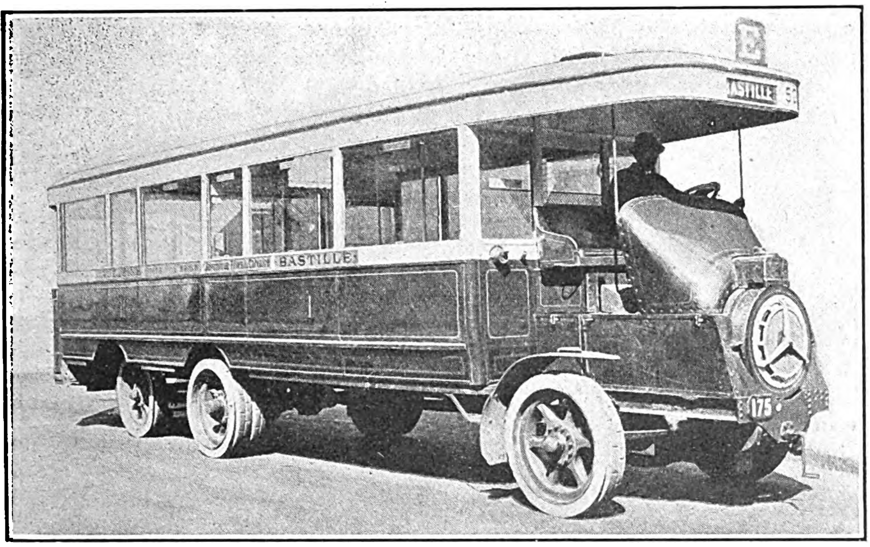
STEAM BUSES UNSUCCESSFUL

There has been quite a little talk in America about the use of steam buses in England. On investigation, the committee found that there are at present no steam buses in operation, though three or four different companies have undertaken in the past to give transportation service with vehicles of this type. All of these companies have failed and gone out of business. Some of these were quite sizable undertakings. The National Steam Omnibus Company had 60 buses in its fleet. It ceased operation three or four years ago mainly because of boiler trouble. The Metropolitan Steam Omnibus Company operated 40 buses on city and suburban routes and went out of business about eight years ago. These buses burned oil.

The only steam operation of road vehicles now going on is that of numerous manufacturers, railroads and trucking concerns which employ the steam lorry (truck). This is nothing but a small-sized steam threshing engine, with a vertical or horizontal boiler projecting out in front in full view. The fuel used is coke. The steering is just like that on a traction engine with worm and gear and a heavy chain attached to the two ends of the axle. The steering is done by one man and the engine controlled and boiler fired by another. Lorries of this rather crude type are very extensively used in the cities throughout Great Britain, particularly for heavy material haulage work. All reports gathered indicate that they are very successful and economical, taking into account that they haul from 5 to 10 tons and, in addition, often pull one to three loaded trailers.

GASOLINE-ELECTRIC BUSES ON TRIAL

The London General Omnibus Company has had in use for about 9 months 166 gasoline-electric buses manu-


Six-wheel bus, of which the Paris tramway, bus and boat management has 50 in service forming part of a fleet of over 1,300 buses

It seats 40 and stands 8. The extra pair of wheels is on a trailer axle and the wheels steer in conjunction with the front wheels. Note rubber flange at outer edge of each wheel, which is supposed to prevent spattering water on pedestrians.

factured by Tilling Stevens Motors, Ltd. The principal difference between these buses and the standard London bus is that the usual gear box and clutch are done away with, and an electric generator and motor substituted therefor. The principal advantage of this type of drive is the smoothness and rapidity of acceleration. The noise and jerks of gear shifting are done away with.

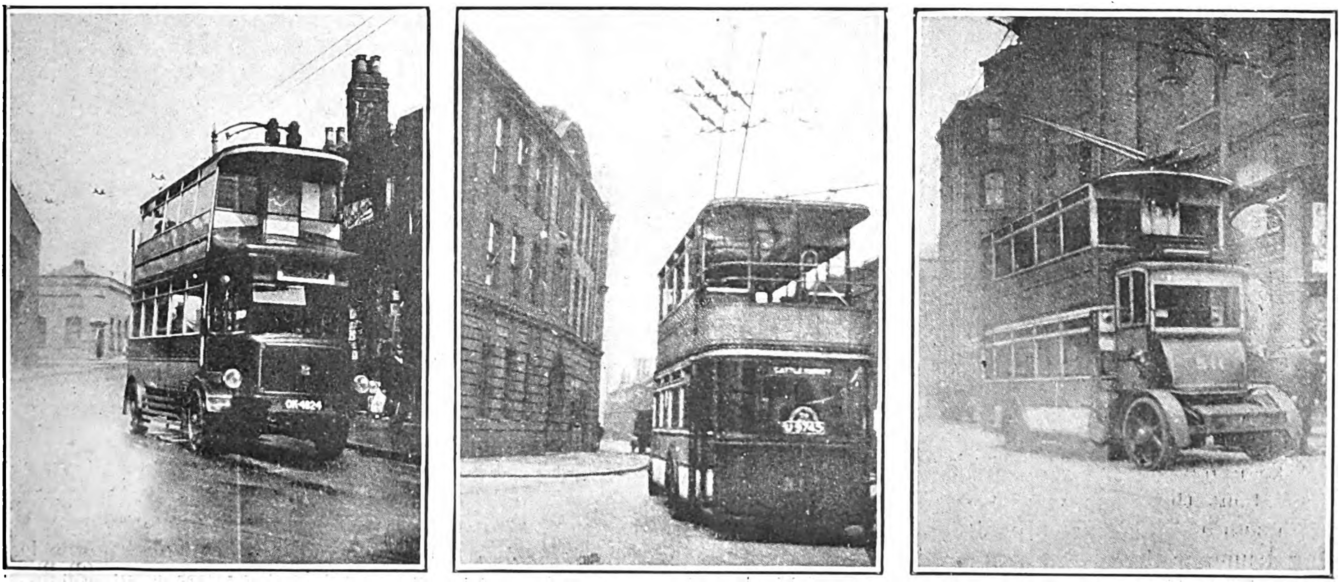
The performance data available were not very complete, but it is expected that the principal saving, if there is any, will come from lower maintenance cost owing to the easier starting conditions. In London, on account of the greater weight of the gasoline-electric drive, it is necessary to reduce the seating capacity to 48, in order to keep within the limitations set by Scotland Yard. This reduces the earning capacity of the bus slightly and militates against its adoption, unless the maintenance saving is larger than is now anticipated by the L. G. O. officials, based on the limited present experience. The committee agreed that the gasoline-electric bus rides notably smoother during the acceleration period than the London gear-box bus, but its speed on hills is lower owing to the characteristics of the electrical drive.

This type of bus is also being operated to a limited extent as an experiment by the Birmingham Corporation Tramways. This company reported that the acceleration performance of the Tilling Stevens bus is ideal and approaches that of steam vehicles. The petrol (gasoline) consumption is greater than with the ordinary mechanical drive, the bus drives easier, and the tires give a longer life. This company was of the opinion that the total cost of operation, however, will be more than with the usual gear-box type bus. The Birmingham & Midland Company, large cross-country bus operator, has used gas-electric buses exclusively for years, but they have not shown any notable economy.

In general, the committee was unable to find any particular enthusiasm for the gas-electric type bus among the operating people.

TRACKLESS TROLLEY DESIGN IN EXPERIMENTAL STAGE

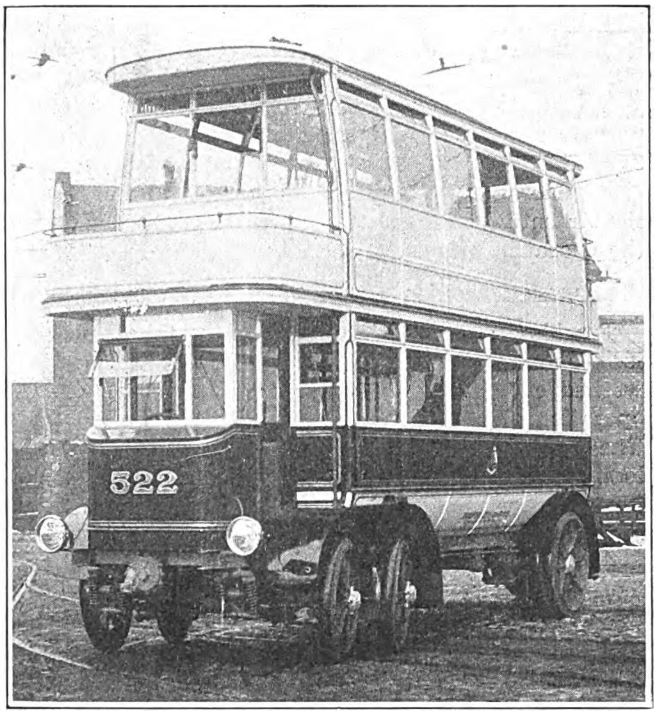
Trackless trolley design in Europe at the present time is largely a matter of experiment, different ideas being worked out in nearly every city in which they are in operation. Some of the designs are quite unique. The tendency in Great Britain is to make the trackless trolley of double-deck design, following out the general practice with trams. Some managements have considered that in this respect the trackless trolley had an inherent advantage over the motor bus, as its lower center of gravity made a double-deck design safe where there was doubt about this quality in a double-deck motor bus. However, inclosed double-deck buses are now being tried out and give promise of meeting requirements.


Types of trackless trolleys used in three English cities

At left, type of double-deck trackless trolley used with good success in Birmingham to replace tram line on narrow street where riding was good and street too narrow to permit double tracking. In center, Leeds trackless trolley with low floor and motors mounted on front axle. Overhead double-trolley intersection where loop in downtown section is completed. At right, Leeds Corporation Tramways trackless trolley with the two motors mounted on the front axle and each driving one wheel through internal gears mounted on each wheel. This driving scheme permitted a stepless floor level and a double-deck design.

In Leeds, with double-deck trolley buses, the two driving motors are mounted on the front axle, one in front of the axle and one behind it, with each motor driving one of the front wheels through an internal gear mounted on the wheel. To steer the vehicle, it is necessary to turn the entire axle with its load of motors about a center pivot. In order to do this, it was necessary to have a very low gear ratio in the steering mechanism and consequently it is very difficult for the driver to make any quick or short turns.

The management claimed that the front drive avoids excessive weight on the rear axle and makes it possible to bring the body down to a height which provides a stepless lower deck and permits a double deck height within the clearance limits existing in Leeds. It was also said that it avoids the trouble which had been experienced in previous designs with the differential on the rear axle. It was also considered superior to the type installed in 1911, which had a double chain drive.



Six-wheel trolley bus built as experiment by Bradford Corporation Tramways to get weight per wheel down sufficiently to permit of the double-deck body

The latest design of trolley bus in Bradford, England, employs six wheels, with the four-wheel truck at the front of the bus. The drive is a single 70-hp. motor mounted on the body or chassis with a single chain drive. The idea of using the two pairs of wheels in front was to get the load per wheel down within the limit specified by the local police. The four front wheels carry 50 per cent of the load, and all four front wheels steer on somewhat the same principle as an automobile. This trackless trolley weighs 7 tons (15,680 lb.) and was claimed to be making an average schedule speed of 9.6 m.p.h. on one route under very light traffic. It has about the same maximum speed as the tramcar. Two sets of brakes are provided, the hand brake engaging drums on the rear wheels and the foot service brake engaging a transmission drum by means of blocks. In addition to this six-wheel trolley bus, which seats 59 passengers, the Bradford company has 20 other trackless trolleys of various types.

The 12 trackless trolleys in use in Birmingham, England, are of double-deck design, seating 52 passengers and weighing, laden, 9 tons (20,160 lb.). They are driven with two 35-hp. motors mounted on the body and connected by driveshaft to the rear axle. The control of power to the motors is through a hand controller very similar to the type employed on a tramcar.

Noise of Operation

THE committee observed that in Great Britain the tramcars seem to be more quiet in their operation than the street cars in America, speaking generally. Without going into the subject exhaustively, the committee concluded that the principal reasons for this were as follows:

In the first place, all tramcars are almost totally of wood construction, which makes them inherently more quiet than if built of steel. The cars and the track are in better mechanical repair, as a whole. Special attention is given to keeping all parts of the car bodies and trucks tight and free from rattle. The window sash are largely fixed, and heavy plate glass windows also reduce the vibration and the transmission of noise.

Similarly, track joints and special trackwork are kept in first-class condition. On the majority of properties visited, bad joints were almost wholly absent, and the cars made almost no extra noise while passing over special trackwork. The fact that most of the tramways use some sort of pitch filler between the base of the rail and the concrete foundation may possibly contribute something to the lower degree of noise. Corrugation is also kept down, though this is a source of considerable expense and trouble to all of the British tramways. The cars are of lower weight than ours, and the speed of operation is lower. The rate of acceleration is slower, the maximum running speeds are lower, and the general impression gained is one of leisurely schedules. All these factors have a bearing on the noise of operation.

The London Underground organization has done a great deal of investigation work trying to reduce the noise for the riders on the tube and tunnel lines. They feel that the result obtained is not commensurate with the effort and expense involved and not up to expectations. The wood finish of the newer steel cars on which special attention was given toward obtaining noiselessness, the use of insulating material in the roof and sides, fixed windows with plate glass and ventilators with a special tortuous passage are the features which have helped most and which probably will be continued. Other experimental measures taken, such as shrouding the trucks in leather hoods, have been abandoned because they interfere with inspection and maintenance and were too expensive for the results obtained.

Probably the most important factor in reducing the noise is that the windows are fixed in the closed position, which is practicable because London has no extreme temperatures of either cold or heat. The seats are also all of a fixed wood frame construction, having no movable parts to become loose. Similarly, there are no curtain fixtures, and many other miscellaneous fittings found in most American cars, which can become loose and add to the general rattle if proper attention is not given to them, are absent. In fact, it is notable that a great many of the fixtures and features which add to the comfort and convenience of passengers in

America are totally absent on all forms of transportation in Europe.

"THE QUIET RUBBER-TIRED BUS"

The popular idea in America is that to substitute rubber-tired buses for street cars will bring about a great reduction in noise. However, the committee was impressed with the fact that in the central London area, where there are no tramways, the noise of the buses caused by gear shifting, the exhaust and other motor noises and the pounding of bus wheels in depressions in the pavement is very bad. It was also noticed that on streets over which both tramcar and bus operate, where the noise of both types of vehicles could be directly compared, the buses on the average made more noise than the tramcars. London buses are more noisy than our modern buses and the tramways there are less noisy than our street railways. Nevertheless, the committee feels that American people are going to be disappointed in their hope that the use of buses will mean any particular reduction in street noise. And the noise of our street cars in many cities can be materially reduced by adoption of more thorough maintenance practices with respect to cars and track.

Kinds and Rates of Fare

THE zone system of fares is in use on tramways, subways and buses in all of the cities visited. The only exception is the flat fare which prevails on the underground lines in Paris. The most common minimum rate is a ride of 1 mile for 1 penny (2 cents). Glasgow has the lowest rate with an average zone length of 1.13 miles for a ¾-penny token. The most interesting thing about these fares to an American is the very high proportion of the total riders who pay only the minimum fare. Nearly 50 per cent of the riders, as seen in the accompanying table, pay only 1 penny. This reflects the closely built-up nature of most of the European cities.

Low as the minimum fare is, many of the tramways are required to give a return trip ticket to a workman for a fare as low as one-half the normal minimum for the two-way ride. This applies for rides taken boarding up to approximately 8 a.m. There are also a great variety of other special tickets, particularly in London, which offer cheaper rides during certain parts of the day or over certain parts of the system or for other special conditions of riding. The Sheffield Corporation Tramways, for example, has a minimum fare of 1 penny, but a passenger can ride all the way from or to the center of the city for 2d. The London County Council Tramways and the Underground Group tramways in London, as well as some other tramways, have a special rate of 2d. all the way which applies for passengers boarding the cars between 10 a.m. and 4 p.m. When these mid-day fares were put in force on the London County Council Tramways in 1920 as a means of dealing with competition, as nearly as it could be determined, there resulted an increase of about 60 per cent in traffic, which yielded about 20 per cent increase in revenue.

AVERAGE DISTANCE FOR MINIMUM FARES FOR TRAMS AND PETROL BUSES

	Tram		Petrol Bus	
	*Minimum Fare	Distance for Minimum Fare (Miles)	Minimum Fare	Distance for Minimum Fare (Miles)
London General Omnibus Company	....	....	1 d.	1
London Underground Group Tramways	1 d.	1	....	....
London County Council Tramways	1 d.	1-1¼	....	....
Glasgow	(a) ¾ d.	1.13	....	....
Edinburgh	1 d.	1	1 d.	.87
Leeds	1 d.	1	....	....
Bradford	1½ d.	2	....	....
Sheffield	1 d.	1	1 d.	⅞
Manchester	1 d.	1½	1 d.	¾
Birmingham	1 d.	1½	1 d.	1
Paris—First class	45 cent	1 stage (b)	45 cent	1 stage (b)
Second class	30 cent	1 stage (b)	30 cent	1 stage (b)

* By statutory provision workmen (all riders boarding cars before 8 a.m.) get a return ticket, good any time during the day, for a single fare.
(a) Use a token for the minimum fare.
(b) Not known whether the stages, upon which tram and bus fares in Paris are based, are of the same or different length.

Of course, in all these cities, the normal fare increases with the length of ride up to 5d. and 6d., and even 9d., as in Glasgow, according to the size of city and length of route. In London, the fares go up to 1s. (24 cents) and occasionally even more. In America, as the average ride taken on a street railway is about 3 miles, this would mean a fare of about 3d. or 6 cents. This is lower than the average in American cities, but it should be borne in mind, as the committee found, that the density of population is higher than in our cities and the hourly wages of trainmen and tramway employees generally in Europe are now only from one-third to one-half as much as they are here.

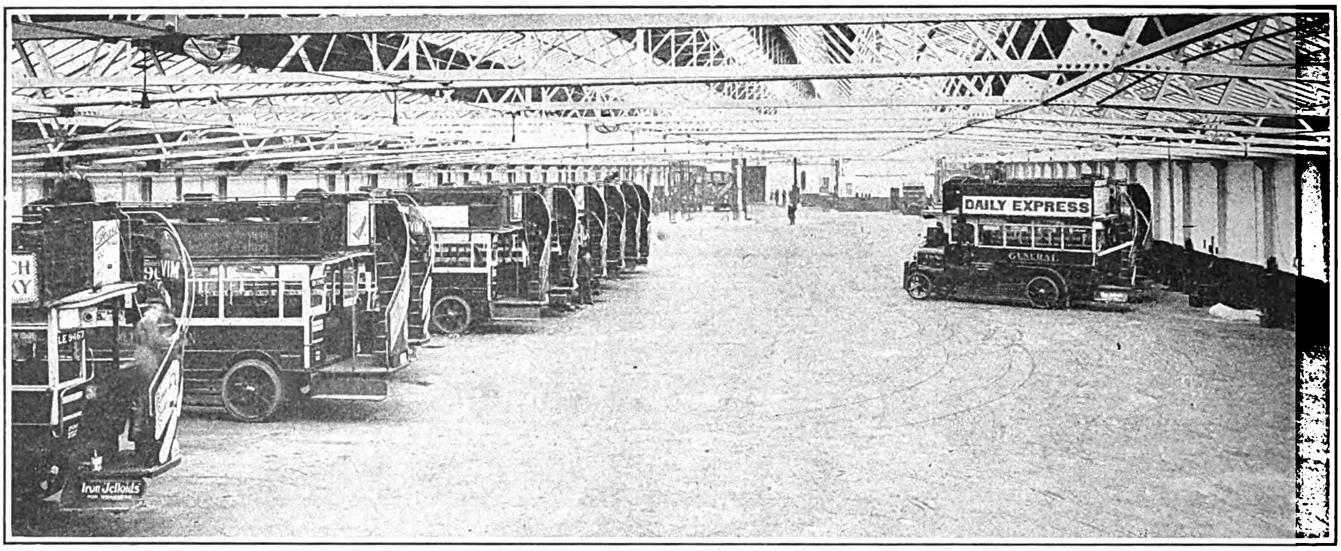
The zone system necessitates that a ticket be issued to every passenger and punched by the conductor to indicate the distance for which the fare is paid. This ticket is retained by the passenger; the conductor does not collect it nor examine it as the passenger gets off. The only check on the honesty of the passenger is the occasional check-up by inspectors, a considerable force of whom is employed for this purpose.

With the large passenger load handled by each conductor and the frequent turnover of his load, it is impossible for him to have any definite idea of the distance for which each passenger has paid his fare. In other words, the committee is satisfied from its own experience and observation that over-riding can and does take place. How serious it is in amount of money

PERCENTAGE OF TOTAL PASSENGERS CARRIED AT DIFFERENT RATES OF FARE, 1923-24

	¾d	1d	1½d	2d	2½d	3d	3½d	4d	4½d	5d	Total
Tramways											
Glasgow	21.68	35.48	26.85	10.06	3.20	1.50	0.63	0.55	.....	0.05	100
Edinburgh	.....	57.93	0.16	27.56	.....	11.18	.....	2.22	.....	0.95	100
Manchester	.....	47.16	22.67	13.78	6.30	3.37	1.72	0.65	0.45	0.43	100 (c)
London County Council	.....	56.89	0.35	27.68	0.11	5.40	.....	5.60	.....	3.63	100 (c)
Rapid Transit											
London Underground	.....	.....	10.11	16.15	2.41	12.70	19.30 (a)	.....	.....	.....	100 (b)
Motor Buses											
Edinburgh	.....	59.99	0.67	27.85	.....	7.69	.....	1.49	.....	2.31	100
London General Omnibus Company	.....	51.73	1.70	25.86	.....	10.24	.....	4.93	.....	5.54	100

(a) Includes all figures above 3d.
(b) The following additional per cent is included to make 100 per cent: Local and through season ticket passengers 16.52 per cent. Through ordinary and workmen passengers with foreign companies 22.81 per cent.
(c) To make 100 per cent an addition of 3.47 per cent is added which represents the proportion of half-fare tickets sold in Manchester; similarly 0.34 per cent is added for half fares on the London County Council trams.



General view in the Forest Gate garage, one of the newer ones of the London General Omnibus Company

lost, of course, the committee had no way of determining, but it is believed that such a system in America would be productive of large losses.

The zone system has the further serious drawback that the preparation and handling of tickets and the checking of turn-ins requires a large staff of clerks. This makes a heavy expense and involves an uncertainty in the operation, from which several of the officials expressed themselves as desirous of relief. So it may be said that the zone system has its bad features as well as its attractive features. For one thing, its use practically precludes the possibility of any one-man operation in city service—bus or tram.

The zone fare is used everywhere on buses as well as tramways. In general, the rate is a little higher, that is, the length of zone is a little shorter for the minimum fare than on the tramway. This is shown in an accompanying table of fares.

Only one class of fares is provided for on the trams and buses in Great Britain, but in Paris both tram and bus carry first and second class passengers.

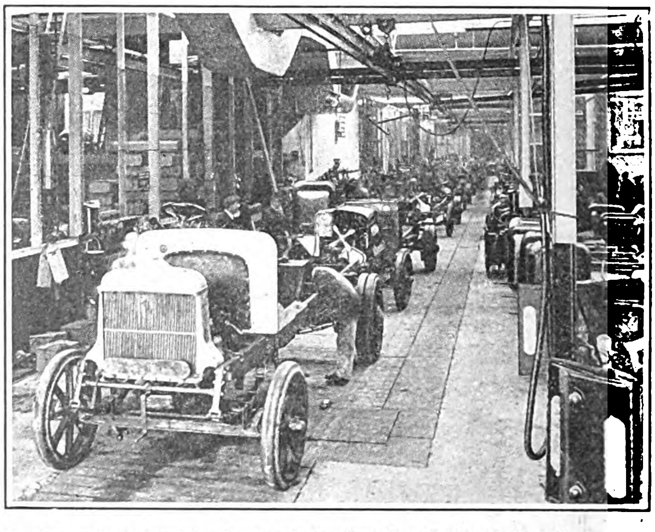
The underground lines in both London and Paris carry two classes of fares. In London, provision is made for the two classes in various ways. On some trains there are entire cars for first-class passengers, on others there are cars which have first-class compartments, and on some of the lines there is only one class of fare. The only check that a passenger riding in a first-class compartment has paid first-class fare is the occasional inspector. The collection of the first-class rate for all passengers riding in the first-class compartment is also complicated in London by the fact that when all third-class seats are full, third-class passengers may ride in the first-class section. The provision for two classes of fares is not considered a very desirable plan for underground lines by those in charge of the London operation. The first-class rate is about double the third-class rate. The third-class rate is 1½d. for 1 mile, minimum. Beyond that it is at the rate of about 1d. a mile up to 4½ miles, and then the length of zone is increased for each zone up to 12 miles, for which the rate is 8d. After that, the rate is 2 miles for 1 penny.

In Paris, the two classes of traffic are handled on the underground lines by having a separate car which occupies the central position in each five-car train, the standard unit. This car is painted red, while the other cars of the train are painted green, and this car carries a special conductor who punches the ticket of each passenger. This makes it definite that each passenger on this car has paid the first-class rate.

A flat rate of fare of 60 centimes for first-class and 40 centimes for second-class are charged, and this entitles the rider to a free transfer between the various underground lines. At the rate of exchange prevailing when the committee was abroad, these first and second-class fares were respectively equivalent to 3.3 and 2.2 cents. Because of the differences in fare, the first-class cars on the Paris subways are always more lightly loaded than the other four cars of the train.

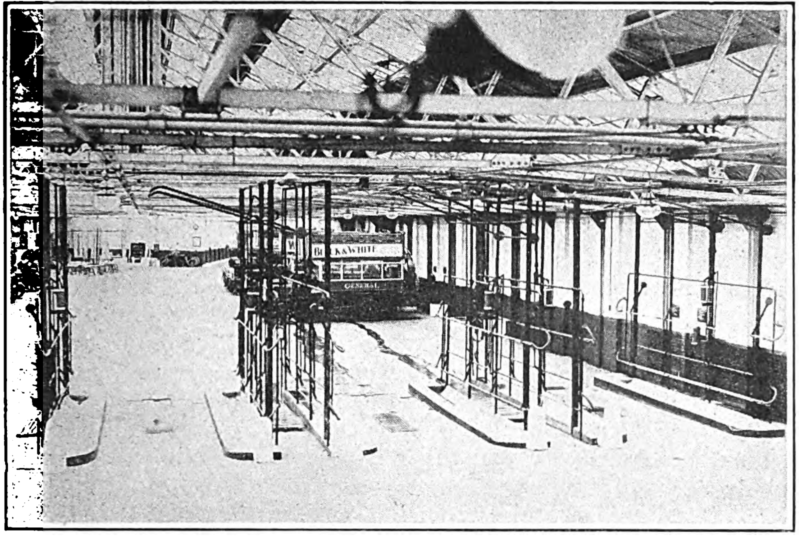
How Omnibuses Are Maintained in London

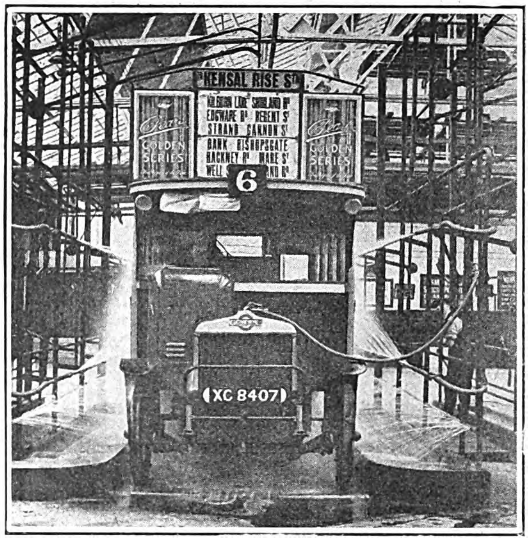
THE London General Omnibus Company has a very thorough system of maintaining and overhauling its buses. Garages are located in various parts of the city in which the buses are stored, cleaned, inspected and



At the new Chiswick shops of the London General Omnibus Company manufacturing methods are applied to the maintenance work as far as practicable

In this picture the moving floor carries the chassis along as they are assembled, giving a definite time element in which the work must be accomplished. This is typical of the work plan on each of the parts.





When buses come in from their runs in the evening they stop for a moment in these special racks, are given a quick but effective wash, moved on to their places and are wiped down

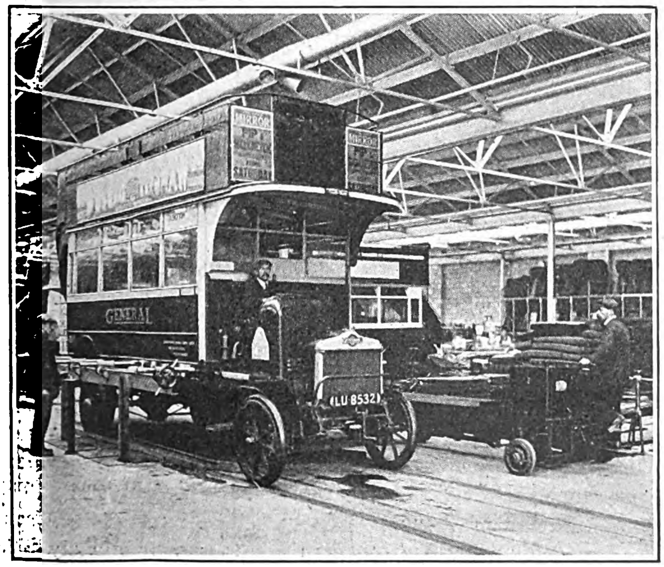
ordinary running repairs made. The majority of these garages have a capacity of 100 buses each, although the practice now is to build garages for 200 to 250 buses as all overhaul work has been transferred to and concentrated at the new omnibus repair shop known as Chiswick Works.

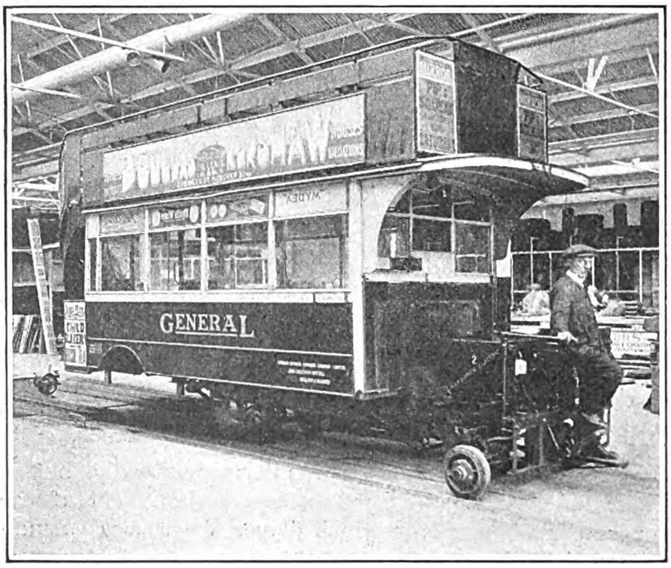
Upon entering a garage to be laid up for the night, each bus stops just inside the building at the gasoline and oil pumps and is filled with gas, oil and water. The crankcase oil is never completely replaced except at the overhaul periods. The used oil then removed is burned, not reclaimed. While the filling is going on a cleaner sweeps off the upper deck. From the filling pumps the bus is driven to the washrack, where fine streams of water are directed on its sides from a system of pipes in a special stand pictured herewith. Filling and washing consume but 5 minutes.

Upon leaving the washrack the bus is placed in a storage space, the windows are dried and polished, the outside of the body wiped down and the interior cleaned. In case the driver reports any defects requiring adjustment or repairs, these are attended to before the bus goes out on its run in the morning.

Every 3 weeks each bus is held in the garage for a sufficient length of time for a thorough inspection and testing of all parts of the chassis and body, including the removal of wheels to examine brake linings and bearings and special attention to the steering mechanism. The garages have several pits to facilitate this special inspection work. A running log showing the gasoline and oil consumption and all defects reported accompanies each bus that is to be so inspected, and the inspectors have this information for their guidance. The average daily mileage per bus is 118.

The new Chiswick shops, built last year to handle the total overhaul work of the company's 4,500 buses, have 13 acres under cover and employ over 3,000 hands. They will handle the complete overhaul of 85 buses a week. By virtue of the modern layout and equipment of this great works, and the application of manufacturing methods as far as practicable to maintenance work, the time required to overhaul a bus has been reduced more than half. The former practice of overhauling in the garages necessitated the driving of a bus to a coach manufacturer to shed the body, return of the chassis to the garage for overhaul, and then back again





When a bus due for overhaul arrives at the Chiswick shops this special lift raises the body off the chassis. The chassis is driven on to one part of the shop. The storage battery truck is backed under the body, which is lowered on the truck and moved to the body department after the body. Now all the work is done at one place. When a bus has been in service for one year it is sent to the Chiswick shops for general overhauling. The body is removed from the chassis and placed in the body shop, where it is stripped of all of its equipment and fittings. Such repairs and replacements as are necessary are made and the body completely painted and reassembled with all of its fittings ready to be placed upon a new chassis. The chassis and motor are completely dismantled. Motors are overhauled on a six months schedule and 5 per cent extra engines are owned to permit this program. Each one of the parts is gaged and tested and then scrapped or reconditioned for service. Practically new chassis and motors are reassembled from the parts available in much the same manner as would be done in a manufacturing plant. After the motor and chassis have been assembled and tested a body is installed and the completed unit is ready for its final test and adjustment before it is put into service.

As a matter of fact, the overhaul of buses at Chiswick is so complete that it is difficult to say whether a unit leaving the shop is an overhauled or a virtually new bus. It really is a new assembly of reclaimed or new parts which probably were not associated together before.

The cost of complete overhaul is £212 per bus, of which about £30 is for new parts and in the nature of improvement. If no changes were made, it was thought that the straight overhaul job would cost about £150 per bus. None of the work in the shop is done on a piecework basis, but the piece-work principle is practically accomplished by the use of moving platforms and tables which introduce a definite time limit in which each piece of work must be done. The employees are aware of this policy but fall in line because the rates of pay are 5 cents an hour above the standard London scales.

Mercury Arc Rectifier Substations

THE committee inspected three mercury arc rectifier substation installations. One was serving the Metropolitan subway in Paris and was located at the Nation Station of the underground. The second one was at Berne, Switzerland, and was supplying energy to the local tramway system. The third was on a trunk line electrification and was located at the Lourdes substation of the Midi Railroad in southern France. The Midi has several such substations.

This substation at the Nation Station of the Metropolitan subway in Paris is the only one in use by that company. It consists of a pair of mercury rectifier tanks of 540 kw. each, which work in parallel and furnish direct current at 600 volts d.c. The high-tension service comes in at 5,000 volts, 25-cycle, three-phase. This substation has been in continuous operation for about one year, and the Metropolitan engineers reported that there had been no trouble and that it was very successful. They plan to install several more substations of this type in connection with subway extensions which will soon be started. The engineers reported that the vacuum is maintained without difficulty. The vacuum pump is run very little except during the peak load, when it is run continuously. It is not cut in and out automatically, but is operated as needed according to the judgment of the operators. The motor which drives the rotary vacuum pump is 0.6 hp.

In Berne the mercury arc rectifier unit consists of three tanks operating in parallel and having a total capacity of 750 kw., and delivering 550 volts d.c. It has been in service five years and has been very satisfactory. Only recently has it been necessary to open any of the tanks. In general, the operation has been so satisfactory that a new 1,200-kw. unit is now being installed in the same station.

The Lourdes substation of the Midi Railroad will have been in service two years in October, and the mercury arc rectifier here has never been touched, according to the substation operator. There are three sets of rectifiers, each having two tanks in parallel and delivering 600 kw. per set at 1,575 volts direct current. At the present time the load on the substation does not require the use of all of the units and the present plan is to change off among the sets, working each unit four days at a time. Later, with completion of the electrification work, the load will require two pairs in continuous use and there will be one spare unit.

The high-tension line coming into the Lourdes substation supplies power at 60,000 volts, 50-cycle, three-phase. This is stepped down to 12-phase, 1,425 volts. The vacuum pumps here are run for 2 hours out of each 48 hours, and it was said that this maintained the vacuum satisfactorily.

Two men are kept on duty in this substation continuously. While the committee was in the station, short circuits occurred out on the line twice, which caused the circuit breaker to open. The process of putting the unit back on the line was most simple and there was no difficulty about it. A large choke coil on each d.c. feeder line formed a part of the substation equipment. The substation operator said that two or three shorts out on the line occurred daily, but these had caused no difficulty with the rectifier equipment.

We understand that up to date the first cost of the equipment for a mercury arc substation is about the same as that for a rotary converter substation, due principally to the high development costs which must be absorbed on a comparatively few installations. The feeling seems to be that when the mercury arc rectifier is placed on a commercial basis the cost will be appreciably less than for rotary converter stations.

Operating Characteristics of Trams Compared

IN THREE accompanying tables an endeavor has been made to present some of the principal statistics covering the operations of the tramways in seven of the English cities visited, and to compare them with the conditions in comparable cities of the United States. For the purposes of this discussion, London is excluded, as it is rather a special case, just as New York is in this country.

To the American the outstanding feature is the density of population. In evidence of this the number of people per square mile is approximately 36 per cent greater than in the American cities selected of about the same size, and therefore the track mileage needed to serve a given population is correspondingly reduced. In addition, the practice in Great Britain has been less liberal than in America as to the amount of track constructed per unit of area served. The combination of these two factors has resulted in a condition which gives American cities approximately 2.75 times greater mileage of track per unit of population and nearly twice the mileage per unit of area. This

SOME COMPARISONS OF RAILWAY OPERATING CONDITIONS BETWEEN SIX BRITISH AND SIX AMERICAN CITIES OF SIMILAR SIZE

City	Population of City	Population Served	Area of City Square Miles	Population per Square Mile (City Only)	Track-Miles per 10,000 Population Served	Miles of Track per Square Mile of Area in City	Rides per Inhabitant: Revenue	Rides per Inhabitant: Revenue and Transfer	Rides per Car-Mile: Revenue	Rides per Car-Mile: Revenue and Transfer	Average Speed	Average Length of Ride, Miles
Glasgow	1,034,074	1,422,336	30	34,470	1.78	8.42	302	No Transfers	14.5	No Transfers	7.57	1.29
Edinburgh	420,281	420,000	51	8,241	1.71	1.40	284		12.3		8.50	1.53
Birmingham	919,438	(b)	68	13,521	1.43 (d)	1.91	256		†12.2		8.30	1.44 (e)
Manchester	730,551	1,000,000	34	21,487	2.29	6.76	298		14.1		(b)	1.49
Sheffield	519,239	524,200	49	10,596	1.61	1.71	278 (c)		14.0		(b)	1.38
Leeds	466,700 (a)	557,000	44	10,607	2.14	2.68	249		.....		7.77	1.51
Average	....	....	....	16,486	1.82	3.61	278		13.4		8.03	1.44
Boston	748,060	1,200,000	47.8	15,649	4.43	11.13	318	363	7.05	8.06	9.2	
Cleveland	796,841	1,000,000	56.6	14,078	4.14	7.32	301	414	7.86	10.83	....	
Baltimore	733,826	800,000	91.9	7,986	5.43	4.74	295	422	6.55	9.36	8.3	
Washington	437,571	450,000	69.2	6,323	5.44	3.54	333	433	6.78	8.80	8.7	
San Francisco	506,676	545,000	46.6	10,872	6.73	7.80	471	611	7.65	9.93	9.1	
Milwaukee	457,147	495,000	25.8	17,718	3.81	7.24	263	371	6.88	9.68	9.5	
Average	....	....	....	12,104	4.96	6.96	330	436	7.13	9.44	8.96	3*

* Estimate used by the Committee on Mail Pay before Interstate Commerce Committee as representing average street railway conditions for the whole country
† Birmingham tramway figures include trolley bus figures. (a) Estimate—June, 1922. (b) Figures not available. (c) Tramway only. (d) City only
(e) Tramway figure includes motor bus.

factor profoundly affects the transportation problems in the two countries.

The riding habit as measured by the number of annual revenue rides per capita is a little higher for America. But as no transfers are issued abroad and as a "transfer" passenger there pays another fare and is thus counted twice, perhaps it would be more logical to compare riding habit on the basis of total rather than revenue rides here. On this basis the riding per inhabitant in the six American cities shown in the table is more than 50 per cent greater than in the British cities. This of course is again a direct result of the greater track mileage per unit of population and per unit of area. There is another important difference, too, that in England and Scotland approximately 50 per cent of the passengers ride less than 1 mile,

OPERATING STATISTICS OF TRAMWAYS, TRACKLESS TROLLEYS AND MOTOR BUSES IN SEVEN BRITISH CITIES

Note: English money was converted into American money on the basis of £1=$4.85

	Glasgow	Edinburgh (a)	Birmingham	Manchester	Sheffield	Leeds	London (London County Council Tramways Only)
Annual report for year ending	May 31, 1924	May 15, 1924	Mar. 31, 1924	Mar. 31, 1924	Mar. 31, 1924	Mar. 31, 1924	Mar. 31, 1924
Miles of tramway—route	129.75	36.65	71.235	124.55	46.02	89.26	164.14
Miles of tramway—single track	252.85	71.83	130.41	229.93	83.82	117.98	324.50
Miles of bus routes	......	35.25	(b)	(b)	(b)	(b)	......
Number of tram cars	1,088	329	658	830	371	362	1,962
Single deck	......	......	......	......	......	......	50
Double deck	1,088	329	658	830	371	362	1,912
Number gas buses and chars-à-bancs	......	88	79	25	53	8	......
Single deck	......	80	78	10	52	(b)	......
Double deck	......	8	1	15	1	(b)	......
Number of trackless trolleys	......	......	12	......	......	14	......
Single deck	......	......	......	......	......	......	......
Double deck	......	......	12	......	......	14	......
Car-miles operated:							
Tramway	29,645,098	8,162,330	17,861,137 (d)	20,927,291	10,357,352	10,119,964	64,118,565
Bus	......	1,857,535	2,179,439	543,618	(b)	158,067	......
Passengers carried:							
Tramway	430,226,561	100,394,122	219,263,263 (d)	294,555,618	145,708,494	(b)	689,015,086
Bus	......	18,939,780	16,524,739	3,823,355	(b)	(b)	......
Gross receipts:							
Tramway	$11,306,076	$3,201,892	$6,630,671	$8,929,280	$4,114,368	(b)	$21,286,350
Bus	......	643,536	689,089	169,205	468,891	......	......
Operating expenses, excluding taxes:							
Tramway	$9,496,192	$2,348,149	$4,603,995	$6,286,891	$3,006,742	......	$18,631,922 (f)
Bus	......	576,534	529,186	146,140	355,124	......	......
Operating ratio:							
Tramway	83.13	73.38	69.43 (d)	70.40	73.07	(b)	87.53
Bus	......	89.58	76.80	86.37	75.73	(b)	......
Taxes (corporation income tax)	$197,003	$138,983	$169,588	$191,901	$93,327	$163,443	$180,060
Passengers per car-mile:							
Tramway	14.5	12.3	12.2 (d)	14.1	14.0	......	10.75
Bus	......	10.2	7.6	7.0	......	......	......
Gross receipts per car-mile:							
Tramway	38.1c.	39.2c.	36.8c. (d)	42.6c.	39.57c	......	33.07c.
Bus	......	34.6c.	31.6c.	31.0c.	......	......	......
Operating expenses per car-mile:							
Tramway	31.9c.	28.7c.	25.6c. (d)	29.9c.	28.9c.	......	28.94c.
Bus	......	31.0c.	24.0c.	26.8c.	......	......	......
Seating capacity:							
Tram	......	60	54 and 70	70 and 82	70	56	78
Bus	......	s.d.25	s.d.–25 d.d.–52	s.d.–25 d.d.–52	s.d.–25 d.d.–52	......	......
Trackless trolley	......	......	d.d.–52	......	......	d.d.–60	......
Passengers per mile of track	1,771,390	1,407,460	1,681,376	1,281,072	1,738,350	......	2,123,326
Passengers per mile of route:							
Tramway	3,315,607	2,740,014	3,078,023	2,364,997	3,166,199	......	4,197,779
Bus	......	537,298	(b)	(b)	(b)	......	......
Gross receipts per mile of track	$46,551	$44,888	$50,845	$38,834	$49,086	......	$65,598
Gross receipts per mile of route:							
Tramway	$87,132	$87,388	$93,082	$71,692	$89,404	......	$129,686
Bus	......	$18,256	......	......	......	......	......
Average fare per passenger:							
Tramway	2.60c.	3.09c.	2.94c. (d)	3.01c.	2.79c.	3.05c.	3.01c.
Bus	......	3.23c.	4.17c.	4.40c.	......	......	......
Rides per capita	302	284	256	298	278 (c)	249	(b)
Average speed, miles per hour:							
Tramway	7.57	8.50	8.30	(b)	(b)	7.77	9.49
Bus	......	8.25	(b)	(b)	(b)	(b)	......

(a) Edinburgh—Tramway figures include one month's operation of the old cable system now electrified. (b) Figures not available. (c) Tramway only. (d) Birmingham—Tramway figures include trackless trolley figures. (e) Estimate—June, 1922. (*f*) Figures include net expenditure on renewals charged to evenue account. (d.d.) Double deck. (s.d.) Single deck.

and the average ride is less than 1½ miles. In America the proportion of long riders is much greater and the average length of ride is more like 3 miles.

The average speed in the British cities is approximately 8 m.p.h., while the average speed in the six American cities is about 9 m.p.h.

The number of riders per car-mile, which is one index of the intensity of use of the facilities, is considerably higher than in America, averaging 13.4 as compared with 9.4 here.

Another favorable condition for transportation service abroad is the effect which the short routes have in reducing the number of cars and hence the investment required to provide the service. Combined with this is the universal use of the double-deck car, providing seating capacities of 50 to 80 passengers, as compared with the average of 40 to 60 in America. As a result, substantially fewer cars are able to handle an equivalent number of riders abroad than in America.

The cost of bus operation per bus-mile seems to be about the same as per car-mile for the trams, but the relative capacity of the two vehicles is about 3 to 1 in favor of the tram, since virtually all of the buses outside of London are single deckers seating about 25. The fares generally on the buses are higher than on the trams. They are about 50 per cent higher in Birmingham, twice as much in Manchester, and in Edinburgh and Sheffield the rate is about 15 per cent greater than on the tram in the same city.

Trunk Line Electrification Progress

THE committee spent some time in studying the electrification of trunk line steam railways in France and Switzerland.

The Paris-Orleans Railway is electrifying approximately 200 kilometers (125 miles) of line between Paris and Orleans with overhead trolley carrying 1,500 volts and a transmission line voltage of from 80,000 to 90,000. About twenty years ago approximately 20 miles of line in the suburbs of Paris was electrified with the 600-volt third rail system. Some of the trains on the 600-volt electrification are handled with electric locomotives and the remainder are made up of multiple-unit cars. The 600-volt section will be changed over to 1,500 volts in accordance with the standard adopted for all French railway electrification.

The Midi Railway in southern France is being electrified with overhead trolley carrying 1,500 volts d.c. The transmission line voltages are 60,000 and 150,000. The point of particular interest on this property is the use of the mercury arc rectifier substations which are spoken of in another portion of the report.

The electrification of the Federal Railways of Switzerland is progressing quite rapidly and the decision has definitely been reached that all future installations will be single phase with a trolley voltage of 15,000. The early three-phase installations have been satisfactory, but it is desirable to adopt one system as standard so that equipment will be interchangeable. The committee rode on electric locomotives on both the three-phase and single-phase electrifications, making the trip from Berne to Thun on a single-phase locomotive, from Brigue to Sion on a three-phase locomotive and from Sion to Lausanne on one of the new single-phase locomotives. The line from Sion to Lausanne represents the latest type of single-phase construction and the type which will be used for future electrification. The electrification of this line is now under construction between Lausanne and Geneva. The committee was especially well impressed with the overhead construction on this line* and the performance of the new locomotives.

Trunk Line Operation Compared

STEAM railroads in England and Scotland differ from those in the United States in many particulars. The committee spent some time in studying the operation, equipment and roadway of these railroads. There seems to be quite a general impression among American visitors abroad that the passenger trains run at higher speeds than in America, but that the speed is not noticed due to the smoothness of the roadbed. The observations of the committee indicated that the maximum speeds on the British railroads are not higher than on the American railroads, but that very good schedule speeds are made due to elimination of stops and slowdowns. The distances are comparatively short and the traffic between the various centers of industry heavy, so that express trains are operated without a stop between these cities and also between these cities and London.

The railroads are constructed on rights-of-way which are protected from all other traffic and intersecting railways or highways are almost totally at a different grade. This enables a train to get up to speed immediately upon leaving a station and maintain a high speed until the next station stop is reached. The acceleration is more gradual and the rate of braking is less severe than on most American railroads.

The track rails are supported in chairs screw-spiked to the ties and held in position in these chairs by means of wooden wedges driven in between one side of the running rail web and the chair. The rail joints are placed opposite each other and are suspended between two chairs, this construction making it possible to use a heavy fish plate which in many cases extends down below the base of the rail.

The majority of the track and special work is very well maintained so that there are few low joints and little noisy or rough special track work. This results in a smooth riding track comparatively free from noise. The smooth riding is due, in our estimation, more particularly to the high standard of maintenance than to the chair type of construction, as we rode on track of this type which was not so well maintained and was not particularly smooth or quiet.

The cars are almost entirely constructed of wood, are divided into comparatively small compartments and are much lighter in weight than cars used on American railroads. The heaviest axle loads are from 20,000 to 25,000 lb., while on American railroads axle loads of from 50,000 to 70,000 lb. each are not uncommon. The spring buffer and turnbuckle draw-bars eliminate the slack between cars, and the jerking upon starting and a great deal of the noise originating at the platform connections of American railroad cars are absent.

Particular attention is paid in the maintenance of car equipment to keeping parts tight.

The Great Northern Railroad, which is now a part of the London & Northeastern Railroad system, has been experimenting for several years with a group of

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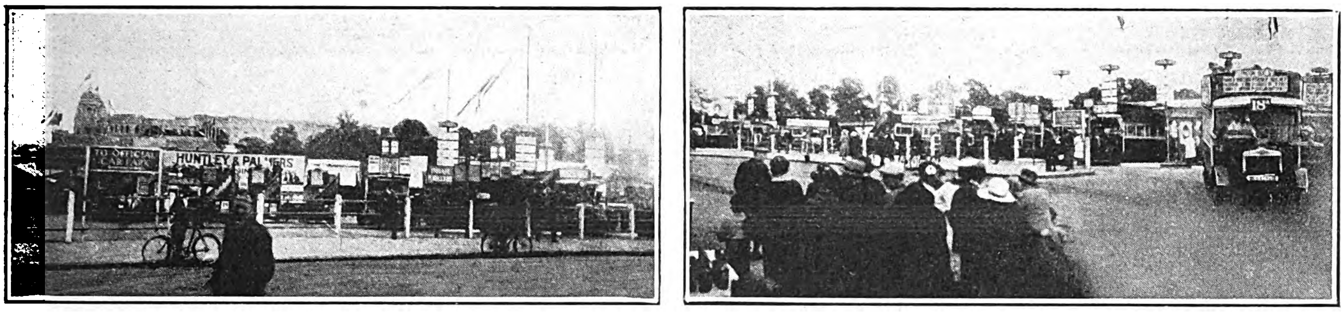
*A description and views of this latest Swiss overhead construction will be published in a later issue of ELECTRIC RAILWAY JOURNAL.



Two views of the omnibus terminal at the British Empire Exhibition, Wembley, London

articulated cars running between London and Leeds. The unit is composed of five cars with a kitchen car in the center, a third-class dining car adjacent on one end and then a third-class passenger coach. At the other end of the kitchen car is a first-class dining car and then a first-class coach. Additional third-class and first-class coaches are placed on their respective ends of the five-car unit as the service requires.

The committee rode this articulated train from London to Doncaster. The distance from London to Doncaster of 155½ miles was made in 3 hours and 3 minutes, or an average of 50.2 m.p.h. The return from Doncaster was made over the same line on a train made up of cars not articulated, in 3 hours and 10 minutes—practically the same running time. The conductor on the articulated train said that while this was a particularly good piece of track he thought that the articulated cars rode better than their standard cars. The test unit had been in service for three years and had been so satisfactory that five more units are being built and will be placed in service shortly.

It was the opinion of the committee that the articulated cars, both coach and diner, rode noticeably smoother than the standard coach in which the return trip was made. The articulated design seemed to have the effect of damping the oscillations of the cars, so that the lateral motion was more gentle and less noticeable. This company has also constructed and is using a number of two-car articulated units in its suburban service in and out of London.

Condition of Axles Systematically Reviewed

MANY equipment engineers have been endeavoring to place a limit upon the life or service of car axles and it is of great interest to know that the engineers of the London Underground lines have adopted a definite plan for the renewal of car axles.

All axles are grouped into classes by manufacturer and number of the heat of the steel from which they were manufactured. Unless removed on account of mechanical wear or damage, axles are allowed to run for 500,000 miles, whereupon 3 per cent of each group of axles is withdrawn from service. The axles in this lot are then subjected to the same physical, chemical and drop tests as cover the purchase of new material.

If all of these test axles withstand the test satisfactorily, those remaining in service are allowed to run for another year, at the end of which time another 3 per cent are removed and tested. If, however, any one of the 3 per cent of axles removed fails under any one of the tests applied, a second 3 per cent of this heat and group would be immediately removed from service and tested. If one of these second 3 per cent should fail, the whole heat or group would be removed and scrapped as quickly as possible.

The examination of the axles continues year after year in this manner until a failure is found, or until the axles have run one million miles, when they are withdrawn from service anyway.

A Terminal for 450 Buses an Hour

ONE of the largest transportation projects undertaken by the London General Omnibus Company was in connection with the movement of passengers between London and the British Empire Exhibition at Wembley during the past summer. While the service supplied by the Underground lines and the railroads was of an excellent nature and the great bulk of the people traveled that way, nevertheless a surprisingly large number, considering the distance, patronized the buses.

In order to facilitate the loading and unloading of passengers at Wembley the company paid £1,000 rent to the exhibition management for a large area of ground and equipped it with suitable platforms, shelters and route destination signs to serve as a terminal. The total cost of the work was £5,500, but £3,000 was paid back to the bus company for work done in behalf of the exhibit. The capacity of this terminal was such that from 330 to a maximum of 450 buses per hour are dispatched from the terminal. Altogether the number of buses operated on various routes to and from the exhibition ran as high as 958 on some of the "bank" holidays.

Pass Helps Situation in Bradford, England

THE pioneer installation of the weekly pass, as we know it in this country, was made in Bradford, England, last April 1. At that time there was considerable agitation for a reduction in the rate of fare, which was a minimum of 1½d. for 2 miles. The demand was for a reduction to a minimum of 1d. The management succeeded in retaining the 1½d. fare by introducing the weekly pass with the saving it provided for frequent riders. The sale of passes averages about 12,000 per week, which means that 17 to 18 per cent of the total passengers use passes. Revenue has increased £4,900 from April 1 to July 1, but to offset this, additional service has had to be operated because of the pass, costing at the rate of £10,000 per year additional over the service given prior to the inauguration of the pass. In other words, the pass is conceded to have cost the company a certain loss in revenue, but had it been necessary to reduce the minimum fare to 1d., this would, it is said, have cost the system £100,000 revenue loss annually.

The News of the Industry

Carmen's Plea Heard

Lively Session When Cleveland Railway Charges Duplicity—Issue Critical for Riders

The question of whether or not the Cleveland Railway will have to abide by the decision of the board of arbitration last June, raising the pay of the carmen 12 cents an hour, effective last May 1, and the question of whether the company will continue to be enjoined from putting open shop conditions into effect in the Cleveland street car system are now being considered by Judge Close of Upper Sandusky, Ohio. Hearing of the case was concluded on Sept. 15 with arguments by attorneys for both sides. At the conclusion of the oral arguments Judge Close allowed both sides two weeks in which to file written briefs. A decision is not expected before the next month.

The suit is on the application of the carmen's union to make permanent an injunction to prevent the Cleveland Railway from discharging any union men and trying to enforce open shop conditions in the city of Cleveland. The union also seeks to have the court declare the arbitration board's 12-cent wage increase legal and binding upon the company.

The company has refused to abide by this increase on the ground that J. W. Holcomb, the fifth and supposedly neutral member of the arbitration board, was prejudiced in favor of the union.

Evidence so far adduced before Judge Close shows that Mr. Holcomb, several months before being made union arbitrator, asked the secretary of the Cleveland Carmen's Union, to indorse him for the post of Federal Customs Collector in Cleveland, that the union secretary did write letters indorsing Mr. Holcomb for this post to the two Ohio United States Senators and that the secretary of the Cleveland Federation of Labor also wrote a letter indorsing Mr. Holcomb for this post. The letter of the secretary of the union indorsing Holcomb for the federal post in Cleveland was written three days before the arbitration hearings began.

The two arbitrators for the railway have also testified that they had to withdraw from the arbitration hearings because Arbiter Holcomb was distinctly hostile to the company and because of their feeling that he showed plainly that he intended to increase the carmen's wages, without regard to the evidence before the board.

Up to Sept. 11 most of the evidence submitted in the hearings had already been public property since June, when the company withdrew from the arbitration hearings and the union threatened to strike. On Sept. 11, however, the Cleveland Railway introduced dictagraph records of reported conversations of Mr. Holcomb while a guest of Fred Fields the last two weeks of August. In these records Mr. Holcomb is quoted as expressing sentiments indicating his dislike of many Cleveland Railway officials.

It is expected that the hearings will close shortly.

If the union wins its point and the court upholds the 12-cent wage increase, car riders in Cleveland will have to pay between 8 and 10 cents fare in order that the company may meet its expenses. To charge this rate of fare the present ordinance will have to be amended, as the company is now operating at its maximum rate of fare of 6 cents. If the Council refuses to amend the ordinance to permit a higher rate of fare and the company cannot pay the 6 per cent dividends virtually guaranteed under the Tayler franchise complete control of service will rest with the company itself. On the other hand, if the company wins, and if President Stanley continues to insist that the contract has been abrogated by the union, open shop conditions may prevail.

Regardless of which side wins in the lower courts, it is almost certain the case will be appealed to the Court of Appeals and to the State Supreme Court.

Chicago Negotiations Deadlocked

Unification of Lines Regarded as Essential to Successful Future Operation—Renewal of Present Franchises Suggested as Part of Comprehensive Scheme

NEGOTIATIONS between the city officials of Chicago and officers of the Chicago Surface Lines looking toward the municipalization of the properties and city management of the lines have ended. The question of price has deadlocked the conferences.

Under the terms of the ordinance of 1907, which provided for the purchase of the lines at the expiration of twenty years at the option of the electorate, the price of the lines was set at the capital account—approximately $162,500,000. This price Mayor Dever declared exorbitant. The negotiations were entered into with a view to reducing the cost to the city.

A group of bankers, representing the security holders of the lines, in a formal message delivered to the Mayor, declared they could not consent to a reduction in price. A paragraph in their letter read:

> We feel that the purchase price fixed in the ordinances is contractually binding on both the city and the companies; that the good faith of the city of Chicago is involved in the recognition and acceptance of this purchase price, and that as bankers having sold these securities we cannot recommend to the security holders that they accept any concession from the valuation agreed upon and fixed by the settlement ordinances of 1907.

The bankers further declared that the actual present value of the properties exceeds the price at which the city can buy the properties. A suggestion was made that the question of value be referred to a competent and disinterested board of appraisers. This proposal, made a number of times during the conferences of the past six months, was refused by the Mayor.

In his reply to the bankers Mayor Dever said:

> The 1907 ordinance is unsound both legally and morally. In the first place the 1907 ordinance merely gave the city an option to purchase the property at the capital account value. The city is not pledged to the acceptance of the offer. The bankers further stated that they submitted a proposal for an appraisal of the property. This is true. The difficulty of this proposal, however, was that the appraisers were to determine the "present fair value."
>
> This would mean that the cost of the properties would be determined on the basis of reproduction costs at the present high prices. A constructive, alternative plan, which includes the immediate construction of subways, is to be submitted at the first meeting of the City Council.

Two days after delivering his ultimatum that the city was to go into the traction business, with elevated lines in sections now without rapid transit, buses being used as feeders and with the start of a subway, U. S. Schwartz, chairman of the aldermanic committee on transportation, began to open the way toward resumption of negotiations which the bankers had declared futile.

This was brought about through a declaration of the Alderman that the city's traction fund of $40,000,000 would go but a very little way toward the construction of a "comprehensive" system such as would be necessary if the city intended to compete with the existing lines.

John J. Mitchell, president of the Illinois Merchants Trust Company and one of the bankers representing the security holders of the Surface Lines, gave his views on the matters connected with the transportation problems of Chicago. He declared that the ideas of the Mayor were ridiculous if they were intended to improve conditions. He advocated giving the lines a forty-year franchise, now forbidden by act of the Legislature. Among other things Mr. Mitchell said:

> What the people want is service. That can be brought about only through extensions, new routes, subways and the employment of the principle of one city, one fare.
>
> The Surface Lines cannot borrow capital to make improvements because their franchises expire in three years. Unification with the elevated lines, therefore, is out of

> consideration for the same reason. Now I have a high regard for Mayor Dever, but his plan is ridiculous if it is aimed to improve conditions. A third system would take you nowhere and some would have to pay three fares to get to their destination. Another competitive line would draw on the revenues of the existing systems and that would prevent these companies from making the expenditures necessary for improvements.
>
> The Mayor's plan calls for the sale of certificates which would be a lien on the property after it is created with the money borrowed from the purchasers of the certificates. People will not buy such paper. That being so, how could the city raise enough money to create an independent system large enough to give service?
>
> We could not agree to recommend the sale of the Surface Lines for less than the $162,500,000 valuation when we know it is worth more than that today.
>
> But even if an agreement had been reached, the voters would never approve of it, regardless of the price. The people have voted for the principle of municipal ownership, but they never have been asked to buy property to make it effective. The press is hostile to the valuation price and the owners cannot suffer the loss that would result from a lower figure.
>
> The city and the companies should get together and ask the Legislature to remove the restriction which permits the granting of a franchise for only twenty years. To raise the capital necessary for meeting the needs of the community, the companies would have to have a forty-year grant. The city could then build subways under the loop and lease them. Unification would result and we then would have rapid and adequate transportation at a single fare.

Mr. Mitchell declared that in the event no settlement is reached before the expiration of the Surface Lines' franchise, the companies would probably petition the federal court for a receiver to continue operation of the system. He said that it is inconceivable the public would permit the tracks to be torn up and the cars shunted into the carhouses.

Detroit United Plan Approved—One-Man Cars in Port Huron

The service-at-cost plan of the Detroit United Railway has been approved by five or six municipalities near Detroit at a special election. The plan proposes construction of a double track through the six places with operation of buses. Improvements are estimated to cost $300,000 and fares will be fixed so as to give the company 6½ per cent above actual operating expenses with 2 per cent for depreciation. The municipalities which voted favorably include River Rouge, Wyandotte, Ecorse, Sibley and Trenton. Riverview will vote on the question on Sept. 20.

The agreement also provides for the formation of a board of representatives on which River Rouge and Wyandotte will have three members, Ecorse and Trenton two and Sibley and Riverview one each. This board will decide rates of fare and other questions.

At the same time the Port Huron City Commission granted permission to the City Electric Railway, a Detroit United Subsidiary, to operate one-man cars on the streets of the city. The company also is operating buses under a temporary permission. The city recently voted overwhelmingly in favor of the one-man cars. As related at length in the ELECTRIC RAILWAY JOURNAL for Aug. 16 the question put to the public was: Do you prefer one-man car operation at 5 cents to two-man car operation at 7 cents?

Interurban Bus Runs Planned

Massachusetts Electric Lines Authorized to Start Services Over Protest of Steam Railroads

Two long-distance bus lines will be started soon out of Boston, both of them to run out of Park Square. One is to be operated by the Eastern Massachusetts Street Railway from Boston to Lowell as a through line and the other is to be operated by the Boston & Worcester Street Railway between Boston and Worcester. Both services have been authorized by the Massachusetts Public Utilities Department against the protest of the railroads with which they will compete for through passenger business. The authority of the Public Utilities Department was necessary because some of the cities and towns to be traversed objected to the lines.

An important principle in connection with bus lines is established by the Public Utilities Department in its orders pertaining to these two lines. That body concedes the railroads are entitled to protection against competition, but holds that the street railways also have an interest in the passenger traffic possibilities and should not be denied a right which is open under reasonable restriction to any other corporation or individual under existing Massachusetts law.

The opinion on which the order to the Eastern Massachusetts Street Railway was based is a very interesting one and in some respects quite unusual. It follows in part:

> The company desires to operate a through bus line between Lowell and Boston and to charge a $1 fare therefor. The route in question is to a considerable extent covered under previous orders of this department, but not entirely. The Boston Elevated Railway has no objection to the Eastern Massachusetts Street Railway operating such buses in Boston, Cambridge and Arlington upon the route stated, because the latter company has agreed with the former to do no local business whatever in the three last-mentioned communities.
>
> There can be no question that this additional facility is for the public convenience. This case, therefore, resembles many similar applications which have received the approval of this department except in one important and novel respect. Such express, long-distance automobile service is likely to diminish, perhaps substantially, the revenues of the Boston & Maine Railroad, which operates between the same points. It is not apt, of course, to affect regular passenger traffic on the railroad, but there can be no question that it will probably draw from it occasional, sightseeing or pleasure-riding passengers. This seems to us a real consideration, as the Boston & Maine Railroad needs all the revenue it can get. It is true, on the other hand, that the Eastern Massachusetts Street Railway also needs revenue, if it can properly obtain it. If these were the only two considerations involved, we might feel that, no matter how hard it bore upon the street railways, they ought not to invade a field which still belongs more properly to the railroads.
>
> There is, however, one other factor of serious weight in this connection. It is this. There is no law which prevents any individual, firm or ordinary corporation from engaging in just this type of service and from thus competing with railroads, as well as street railways, if the necessary municipal permits are obtained. This is not only a possibility but an actual fact. There are many such lines now actively engaged in this type of competition with both street railways and steam railroads. The better way to deal with this situation, in our opinion, would be to put those individuals, firms and ordinary corporations upon the same footing as street railways and require them also to get some form of approval from this department similar to that which street railways require before being free to operate such vehicles. Unfortunately, this is not the law, and the Legislature, although this matter was called directly to its attention by a special report of the Department of Public Works, dated Jan. 9, 1924, making a similar recommendation, has deemed it better not to change the existing law and to leave the situation above described.
>
> We know of no reason for anticipating a change in this legislative policy in the immediate future. If we did, we might feel differently. As it is, we must deal with the facts and the laws as they are. The controlling consideration in our minds is that we see no reason why we should refuse street railways the right to engage in this form of transportation when any individual, firm or private corporation is free to secure municipal permits without being obliged to secure our approval. While there is force in the contention of the railroad that it ought to be protected from all invasion of its proper field, we do not think that we ought to hold in substance that street railways should be excluded from an opportunity which is available to everybody else, in a case like this, where the injury to the railroad is likely to be both indirect and comparatively slight.

The order of the department to the Boston & Worcester Street Railway is similar to this one in purport.

Wages of Peoria Men Cut

A reduction of 7 cents an hour in wages to be paid car operators is provided in the award of the board of arbitration to which was referred the matter of wages by Division No. 416 of the Amalgamated Association and the Peoria Division of the Illinois Power & Light Corporation. The arbitration award was handed down on Sept. 13 after the board had been in session since May 7. The contract between the employees and the company expired on May 1, 1924. Failing to reach an agreement by negotiation, the question was left to arbitration with the understanding that a decision of two of the three members should be binding on both parties to the arbitration.

Briefly, the finding of the board was that the wages of the shop employees should remain the same; that the wages of men employed in operating the street cars should be substantially reduced, and that the new wage scale should be effective Sept. 15, instead of being retroactive to May 1 as provided by the original agreement between the company and the men.

The award was signed by L. E. Fischer, arbitration representative for the Illinois Power & Light Corporation, and W. V. Williamson, third member of the board, selected and agreed to by both the employees and the company. Henry Mansfield, arbitration representative for Division 416, did not concur in the award.

The text of the award is as follows:

> By written agreement dated May 7, the question of wages to be paid to the members of local Division 416 of the Amalgamated Association was submitted to this board for determination. After careful consideration of the evidence submitted in this case, we are impelled to believe that a substantial reduction in the wages of the men operating cars is not only necessary but justifiable.
>
> We find, by reference to the contract, that the differential in wages paid to motormen and conductors operating one-man cars in excess of that paid motormen and conductors operating two-men cars is fixed at 5 cents an hour, and we assume it is not within the province of this board to change that differential.
>
> The contract provides that the wages fixed by the board of arbitration should be retroactive to May 1, 1924. As four months have elapsed since May 1, it is our opinion that it will work a hardship to require a restitution for the excess of wages

paid since May 1 and that the collection of the same would be more or less difficult. We, therefore, fix Sept. 15, 1924, as the retroactive date, instead of May 1.

In view of the fact that practically all cars are now operated with one man, the fixation of the wage for two-man operation is therefore of little consequence as a whole. However, in order to carry out the provision of the contract, we find that wages for two-man operation shall be as follows: Class C, 41 cents an hour; Class B, 43 cents an hour; Class A, 45 cents an hour.

Automatically, one-man operation will be 5 cents an hour higher. This wage scale shall be retroactive to Sept. 15, 1924.

There has been little testimony offered on the subject of wages paid to shop men; in fact, so far as the record is submitted, we find little to guide us, but taking into account such testimony as was offered and our knowledge of the situation, we are of the opinion that the wage scale now paid the shop men shall be continued throughout the year, and we therefore fix the existing wage scale as the scale to be paid under this consideration.

Detroit Voters Approve Rapid Transit System

An important step forward and one which makes the rapid transit proposal in effect a reality was taken at the Sept. 9 election in Detroit when the voters approved a charter amendment providing for a system of rapid transit in the city. The result of the ballot was 136,798 in favor of the amendment and 51,308 against it. The favorable action on the ballot provided a method whereby the city will be able to proceed with the construction of a rapid transit system under a scheme for financing that will pay for the project during the course of construction, and it also provided authority for the appointment of a permanent rapid transit commission to carry out the work.

The charter amendment provides that the acting mayor is vested with power to appoint the five members composing the rapid transit commission, to whom will be intrusted the problem of completing plans for the rapid transit system, building it and placing it in operation. The terms for which the commission's members will be appointed will be from one to five years, one commissioner's term expiring each year. Appointments thereafter will be for terms of five years.

Routing plans will be prepared as the next step, it being necessary to submit the routing plan to the voters before actual construction can be begun. This next stop will probably be submitted to the voters at the spring election.

The routing plan, it is announced, is advanced to a stage where it can be perfected in time for the spring ballot, as during the past three years engineers under the present commission, which has been acting in an advisory capacity, have made studies which will enable them to complete a plan of routes this winter.

More One-Man Cars in Newark and Jersey City

More than 135 cars on three lines, two in Newark, N. J., and one in Jersey City, were placed under one-man operation by the Public Service Railway on Sept. 14. The lines operating in Newark are the South Orange and Orange lines, while the Jersey City line is the Greenville route. On the South Orange line fifty-four cars are affected; on the Orange line forty and on the Greenville line forty-three. Placing of the South Orange and Orange lines under one-man operation leaves but few of the larger lines in Newark under two-man control. Among those retaining the old system are the Broad, Roseville and Bloomfield lines. One-man operation is now in effect on all the cross-town lines, the Kearny, Harrison, Springfield, Central, Newark and Elizabeth lines.

Akron Voters Will Consider Seven-Cent Fare

A new franchise, calling for a four-year contract, is to be submitted to the voters of Akron at the general election in November. The contract has received the tacit indorsement of the City Council, although the Northern Ohio Traction & Light Company is initiating petitions to place the proposed ordinance on the ballot. The proposed contract provides:

That the company will put into effect a fare of seventeen tickets for $1, four tickets for 25 cents, seven-cent cash fare, free universal transfers.

That the company shall have the right to abandon any car line and substitute buses any time the street containing the car line is paved or repaved.

That the company shall have the right to operate double-truck one-man cars.

That the company shall have the right to establish an express bus service with consent of the city at a 10-cent fare, but such service shall be in addition to the regular service provided.

That the city has the right to order bus line extensions into undeveloped territory, but if such lines are found to be unprofitable they may be abandoned after a trial of 60 days.

That the city has the right to lease or purchase the system any year during the life of the contract, upon a 30-day notice, valuation of the property to be fixed by arbitration.

That the present car lines of the company are to be operated and in addition fourteen bus routes are to be operated.

Four thousand signatures were required to place the franchise before the people for a vote at the November election. These signatures were easily obtained. While there is some opposition to the proposal, city authorities appear to be fairly well satisfied and the prediction is made that the franchise will be ratified at the November election.

The company is now operating under a franchise which expires on May 1, 1925. The fare is 5 cents, with a 1-cent transfer charge. Under the terms of the franchise, an audit was made showing that the cost of carrying passengers during the year 1923 was 5.5 cents, excluding return upon the investment, which, according to the franchise provisions, would send the fare to 6 cents Dec. 4 in case the proposed franchise is rejected. This audit was made under the direction of the city. It was made by Ernst & Ernst and showed the cost of carrying passengers on the street cars for the year was 5.32 cents; on the buses, 6.76 cents, excluding return in both cases. The figures included taxes and depreciation.

While the figures made on behalf of the city did not include any operation during the year 1924, the company supplied the city with costs covering the period up to Aug. 1. These figures showed a heavy increase in operating expenses during the seven months of this year. In fact, the average cost per passenger for this period on both street cars and buses was 6.27 cents, with February excluded, the month when no cars were operated by the company.

Westchester Transit Problem Before H. M. Brinckerhoff

Henry M. Brinckerhoff, transit expert, has been engaged by the Westchester County Rapid Transit Commission to study the problem of traffic congestion in New York City from the angle of the Westchester commuters. In addition to railroad transportation the county commission has requested Mr. Brinckerhoff to study the part that the automobile plays in the present transit problems. Mr. Brinckerhoff is busily engaged collecting data. He has stated that the attempt to find an answer for the Westchester problem is the most difficult of all. A solution for New Jersey and Long Island, he claimed, would not be so difficult because the commuters can enter the tube at many places, while Westchesterians must come into Manhattan through an entrance that is limited as to capacity. He will consider a plan that will be practical from a railroad and financial standpoint. He will co-operate with the existing transit authorities, the board of transportation, the New York Transit Commission and the Port Authority. Mr. Brinckerhoff is a member of the engineering firm of Parsons, Klapp, Brincherhoff & Douglas, New York. He has had a long and varied experience in transit work.

Metropolitan Railway Men Will Organize

An organization meeting of the Metropolitan Section of the American Electric Railway Association will be held in the Engineering Societies Building, 29 West Thirty-ninth Street, New York City, on Tuesday, Sept. 23, at 8 p.m. The object of forming this Metropolitan Section is to foster the interests of its members and to establish cordial relations with kindred associations and between the members of the section. An election of officers will be held and afterward William L. Ransom, formerly counsel for the Public Service Commission of New York and now general counsel for the Consolidated Gas Company, New York City, and other public utilities, will talk on "Co-Operation, as applied to the Operation of Public Service Utilities." Informal discussion will follow Judge Ransom's talk. Inasmuch as this is the initial meeting of the Metropolitan Section of the A.E.R.A. it is hoped by C. E. Morgan, chairman community section committee, that all charter members, as well as all others interested in the industry, will be present.

One-Man Car Controversy Breaks Out Again in Worcester

The controversy in Worcester, Mass., over the use of one-man cars by the Worcester Consolidated Street Railway has broken out afresh. Its revival followed the move of the Consolidated placing all its lines on a one-man-car basis. This caused widespread protest, with the result that the street railway after an exchange of letters between Mayor Michael J. O'Hara and General Manager Henry C. Page agreed to run two-man crews on the principal lines during the busy part of each day. Since then much of the opposition has faded. The Consolidated's answer to Mayor O'Hara's letter brought a return of two-man cars on the main lines and a promise that further changes of that nature would be made should it prove necessary for the convenience of the public.

The letter set forth as the reason for the one-man cars on the main lines the necessity for reducing expenses to meet the advance in wages granted by the board of arbitration, together with the big decrease in traffic this year as compared to last year, due according to Mr. Page, to the business depression.

"Pass" Price Advances in Tacoma

The Tacoma Railway & Power Company, through Manager Richard T. Sullivan, has announced an increase in the price of the weekly street car pass from $1 to $1.25. The $1 pass has been in operation for 112 weeks. Sales have averaged about 12,000 weekly for some time now. The new rate becomes effective upon approval of State Department of Public Works. The traction company has repeatedly warned the citizens that unless relief was extended to the company in other directions, the $1 pass could not be continued, as it has not been a financial success in itself. The refusal of Mayor A. V. Fawcett and the City Council to permit the proposed traction ordinance to come to a vote of the people is believed to have precipitated the increase in the pass rate. The proposed ordinance provided relief for the company by removing some of the onerous franchise and paving requirements contained in the present grant.

Youngstown Jitneys May Go Back to Square

According to a unanimous decision of Ohio Court of Appeals, ordinances of the city of Youngstown regulating jitneys to points a considerable distance from the Public Square are in conflict with the licenses granted by the State Utilities Commission under the Freeman-Collister act. Judge Farr in his opinion said that the State Utilities Commission had granted the plaintiff, John H. Hogan, acting for the Youngstown Jitney Association, the right to operate over a certain route and that the City Council thereupon passed an ordinance setting the jitneys back to a certain place and refused them the right to operate over part of the route which the state had given them permission to travel. There was a conflict, he said, between the ordinance and the rule of the commission, which had, of course, the force of a state law.

Section 3 of Article 18 of the state code gives municipalities the right to have home rule and to pass such regulatory provisions as they may desire, when not in conflict with the general laws, but the Appeals Court has reluctantly concluded, Judge Farr said, that in view of the conflict in the present case the state order takes precedence over the ordinance of Council.

The decision marks another step in the battle in Youngstown between the jitneys and the railway. Youngstown operates under a service-at-cost franchise, which fact has been an aid in securing remedial legislation from the municipality so far as the latter's powers could go. This aid took the form of successive ordinance which pushed the jitneys further and further away from the Public Square until they had been made practically harmless. The latest decision apparently throws the matter wide open again.

Discontinuance Waits on Agreement with Employees

Judge Carroll of the Massachusetts Supreme Court after a hearing on the petition of Zenas W. Bliss, receiver of the Interstate Consolidated Street Railway, Attleboro, Mass., for leave to discontinue operation of the line continued the case one week to see if satisfactory arrangements could be made whereby the services of 76 employees of the company would be retained. Judge Carroll said that unless an agreement is reached between the receiver and the employees it will be his duty to grant the petition as the court cannot allow a road to be operated at a daily loss to its creditors.

Mr. Bliss told the court the wages of the employees were recently increased by an arbitration finding from 66 to 76 cents an hour. He said if that schedule was maintained it will be useless to run the road. The operating loss is now about $120 a day.

The judge inquired if there were any practical solution of the difficulty, and Mr. Bliss replied that, if the employees would accept the former schedule of wages and the road could use 100 per cent one-man cars and also a bus on some portion of the line he believed a small profit might result from such conditions.

James H. Vahey, arguing for the employees, said that the petition was pure subterfuge to set aside an award for an increase in wages honestly made.

Increased Fare in Philadelphia Blocked—No Decision Reached

The temporary 8-cent cash fare did not go into effect in Philadelphia, Pa., on Sunday, Sept. 13. A court order issued on Sept. 12 forbade the raising of the fare. The blocking of the increase was brought about through the action of Judge William B. Linn of the Superior Court. He passed favorably upon the city's petition for a stay setting aside the order of the Public Service Commission permitting the increase and making non-effective the tariff filed by the company with the commission. The matter was then deferred until Sept. 18, when five judges in the Superior Court of Pennsylvania considered the legality of the temporary increase. They listened to arguments, heard testimony and looked over an array of exhibits, statistics and documents for three hours, but unsatisfied, they adjourned to study and digest the more than 500 pages of printed record of the case. Until the decree is handed down the Philadelphia Rapid Transit Company will continue to charge a 7-cent cash fare with four tickets for 25 cents.

Mayor Rejects Brooklyn Company's Bus Offer

An offer by the Brooklyn-Manhattan Transit Corporation to operate buses for a 5-cent fare with free transfers to its subway, elevated and trolley lines for an experimental period of three months was rejected on Sept. 15 by Mayor Hylan.

The offer was made early in the day in a letter addressed to Chairman John H. Delaney of the Board of Transportation, and signed by Gerhard M. Dahl, chairman of the board of directors of the B.-M.T.

Its acceptance would have meant that the company would put buses into operation on routes covering Kings Highway, a large part of Brownsville, and a proposed Richmond Hill-Jamaica line. Passengers would have been able to obtain free transfers to and from all intersecting B.-M. T. transit lines.

It would also have meant that the results of this three months' period of operation would be used as a basis for negotiations between the city and the company for continued bus service.

The following day Mayor Hylan directed Commissioner of Accounts Hirshfield to furnish him with information concerning the value of the stock of the B.-M. T., and asked if it has not been "rigged by gentlemen in control." One of the questions the Mayor asked was: "Is there any method by which this $25,000,000 increase in value of the stocks can be reclaimed for the treasury of the B.-M. T.?" His reference was, of course, to the appreciation in the market value of the securities of the company. Mr. Dahl characterized the proposition as "really too ridiculous to discuss." It is sufficient to call attention to it.

Frank Hedley, president of the Interborough Rapid Transit Company, in a letter to Mayor Hylan and the Board of Estimate, said the Interborough is willing to "operate such buses as the public authorities deem necessary, as feeders to our subway and elevated roads for a 3-cent fare, so that for 8 cents a passenger may ride on both buses and rapid-transit lines." He suggests also buses for an 8-cent fare on streets occupied by subway or elevated to relieve congestion during rush hours and will be glad to consider free transfers from buses to rapid transit lines. He suggests a conference with the city's experts.

Financial and Corporate

Brooklyn City Income Off

Report for Year Ended June 30 Reflects Cost of Increased Service and Higher Wages

A summary of the financial results from the operation of the Brooklyn City Railroad and its subsidiary, the Brooklyn City Development Corporation, for the year ended June 30, 1924, was made public on Sept. 12. The gross revenue from transportation increased approximately $59,000 during the fiscal year. During this period the company expended for maintenance or credited to the reserve for that item approximately $2,800,000. This sum was regarded as adequate to meet all current maintenance and was an increase of $177,000 as compared with the previous year. The cost of operating cars increased approximately $246,000. This was due largely to increased service and higher wages.

INCOME STATEMENT OF THE BROOKLYN CITY RAILROAD

	Year Ended June 30, 1924	Year Ended June 30 1923
Passenger revenue	$11,774,853	$11,715,813
Other car revenue	75	150
Total transportation revenue	$11,774,928	$11,715,963
Advertising and other privileges	100,818	85,870
Rent of land, buildings, etc.	131,700	131,660
Rent of tracks and terminals	52,962	50,755
Miscellaneous revenue	2,690	2,004
Total operating revenue	$12,063,099	$11,986,252
Operating Expenses		
Maintenance—Way and structures	$1,243,751	$1,246,176
Equipment	1,584,105	1,404,317
Power	1,026,068	1,023,282
Operation of cars	4,111,427	3,865,305
Injuries to person and property	361,892	419,436
General and miscellaneous expenses	530,007	512,592
Total operating expenses	$8,857,250	$8,471,108
Net operating revenue	$3,205,848	$3,515,144
Taxes assignable to operation	849,552	889,532
Operating income	$2,356,296	$2,625,612
Non-operating income	163,160	210,941
Gross income	$2,519,456	$2,836,553
Income Deductions		
Interest	$308,158	$367,453
Rent of cars, tracks, etc.	209,578	213,884
Total income deductions	$517,736	$581,338
Net income	$2,001,720	$2,255,215

H. Hobart Porter, president of the company, explains that at the time the company resumed possession of its property its books of account reflected neither the cost nor the value of the property. To meet this condition the company on April 22, 1924, advised the Transit Commission that it proposed to set up a figure of $30,000,000 as its fixed capital account. This the officers of the company believed was a very conservative estimate of the value of the fixed capital and far less than would be established in case of rate or valuation litigation.

In November, 1923, after prolonged negotiations, a settlement of the guaranty fund controversy was made with the Brooklyn-Manhattan Transit Corporation. Under this settlement the Brooklyn City Railroad received $2,027,000 of its own bonds, being the $1,627,000 face amount of its first consolidated mortgage 5 per cent bonds and the $125,000 refunding mortgage 4 per cent bonds previously held in the guaranty fund and $275,000 refunding mortgage 4 per cent bonds in place of the $275,000 B.R.T. bonds previously held in the guaranty fund; also $387,507 of matured coupons on such bonds and interest.

These bonds are now held in the treasury of the Brooklyn City Railroad. The first mortgage bonds of the Brooklyn, Queens County & Suburban Railroad to the par value of $2,000,000 formerly held in the guaranty fund were delivered to the reorganization committee of the Brooklyn Rapid Transit Company, with the agreement that they should be returned to the Brooklyn City Railroad if the Brooklyn Heights Railroad failed to make any recovery upon the so-called "Construction Account" claim, and in the event of recovery, these bonds could be used at their face value in satisfaction of the judgment.

Since the close of the fiscal year the Transit Commission has approved the application of the company for permission to issue $4,000,000 of additional stock on the acquisition by the Brooklyn City Railroad of the rolling stock and equipment of the Brooklyn City Development Corporation and the dissolution of that company. With the Development Corporation dissolved and the cars and other equipment turned over to the Brooklyn City Railroad the directors, on Aug. 12, declared a stock dividend of $4,000,000 payable on Sept. 30 to stockholders of record Sept. 5, 1924. The owners of each three shares of existing stock are entitled to receive one additional share of stock. Script will be issued representing fractional shares.

During the year the company reconstructed 62,107 ft. of single track and replaced the old 94-lb. rail with new rail weighing 122 lb. per yard. The Brooklyn City Development Corporation received during the year 200 new passenger cars and they have proved efficient in operation and acceptable to the traveling public. Four quarterly dividends of 25 cents each were paid during the year on the stock, which is $10 par value. The company operates 231 surface electric railway lines. No statistics of operation are contained in the report.

Buys Bus Line.—The Grays Harbor Railway & Light Company, Aberdeen, Wash., has purchased the capital stock, buses and equipment of the Twin City Transit Company, operating a stage line between Aberdeen and Hoquiam.

Sale Under Foreclosure at St. Louis Likely Oct. 1

Foreclosure on the United Railways properties of St. Louis, Mo., on Oct. 1 under the terms of the indenture which secures the issue of 5 per cent general mortgage bonds of the St. Louis Transit Company looms up as likely. The Transit Company issue totals $9,790,000. It will mature on Oct. 1. With the reorganization still unsettled bankers in touch with the United Railways affairs have expressed the belief that foreclosure is inevitable. If the reorganization plans are carried through successfully it is probable that a "friendly" foreclosure sale will be conducted in order to satisfy conditions contained in the mortgage securing the issue of Transit Company bonds. The holders of that issue recently paid out of their own pockets the last semi-annual interest payment of the $30,300,000 United Railways general mortgage 4s, an issue ranking in lien before the Transit 5s.

Another six months' interest on the $30,300,000 of United Railways 4 per cent bonds will be due on Jan. 1, next. The Transit company bonds are also a junior lien on the properties of the St. Louis & Suburban Railway.

Fox River Line Reclaimed

The deal has been closed by which the Fox & Illinois Union Railway, Aurora, Ill., comes into possession of farmers and others along the line who subscribed funds to purchase the road. It had been planned to dismantle the road. Of the $40,000 subscribed $25,000 went to Arthur Evans, president of the road, in cash along with a note for $50,000, which will run five years with interest at 5 per cent. The committee will use $15,000 out of the $40,000 to pay outstanding debts.

After the conclusion of the deal at which local people took over the road officers were elected as follows: Harvey Gunsull, president; Randall Christian, vice-president; I. V. Cryder, secretary; E. S. Fletcher, treasurer; T. T. Fletcher, director.

These officers will have charge of the operation of the road, at least until a permanent organization is formed.

Sale of Famous Niagara Line Reported

The Niagara Gorge Railway, Buffalo, N. Y., extending along the lower Niagara gorge on the American side of the river from Niagara Falls to Lewiston, has been purchased by the Niagara Falls Power Company, according to reports in financial circles in Buffalo. The famous scenic line is expected to be abandoned to give way for a huge power development plan now contemplated by the Niagara Falls Power Company and the Niagara, Lockport & Ontario Power Company. None of the executives of companies reported involved in the deal will discuss the negotiations. The purchase price is reported to be approximately $2,000,000.

The Niagara Gorge Railway operates a belt line from Niagara Falls to Queenston, Ont., via the Park & River division of the International Railway along the top of the Canadian Niagara escarpment, across the lower Queenston-Lewiston bridge owned by the International Railway and returning to Niagara Falls via a private right-of-way through the lower gorge adjoining the rapids.

The company owns a large number of old-type open and closed cars, baggage and express cars, a double-track line along its private right-of-way, several bridges in the lower gorge, a carhouse and an electric power station.

Application Made for Receivers for Oklahoma Railway

Judge F. E. Kennamer of Tulsa will hear in Oklahoma City on Sept. 29 the application of the Mississippi Valley Trust Company, St. Louis, for appointment of a receiver for the Oklahoma Railway. The action is brought in the interest of the holders of $290,000 junior mortgages which are declared due for failure of the railway to keep its city lines in proper repair. The city of Oklahoma City is seeking to intervene in the case, alleging the conditions complained about by the bondholders were caused by mistakes of management.

John W. Shartel, president of the railway, states that the receivership application is the inevitable result of the attitude of the Mayor and City Commissioners of Oklahoma City toward measures declared by the railway for the last two years as necessary if the company was to continue to operate. Mr. Shartel states that legislation regulating traffic on the streets has been promised but that the only legislation enacted has been in the interest of buses, the operation of which will further cripple the electric railway. He also states that the attitude of the city officials in filing suit for the restoration of the 5-cent fare, which suit is still pending, caused the railway to drop plans for purchasing and electrifying a railroad line from Oklahoma City to Atoka, which would have helped out the revenues of the company. The Mayor denies an attitude of hostility toward the company, but states that he will issue permits for buses whenever the terms of the new jitney bus ordinance are complied with.

The receivership application asks for authority to abandon service on eight city lines and shorten runs on practically all of the rest.

Abandonment Hinted.—Unless a division of rates on business originating on its line for off-line points that will insure profitable operation is granted, the Spokane & Eastern and the Inland Empire Electric Railway may be abandoned. This was intimated at a recent hearing before J. B. Campbell, Interstate Commerce Commissioner, and A. C. Wilkins, examiner of the commission. Representatives from large lumber interests in the district and the Cœur d'Alene Chamber of Commerce testified that a curtailment of the electric service would be extremely detrimental to the Cœur d'Alene Valley and urged any necessary revision of rates.

To Issue Stock.—Savannah Electric & Power Company, Savannah, Ga., has filed application with the Public Service Commission for permission to issue $250,000 in first preferred debenture stock. The funds are to be used for the betterment of the company's properties and the acquisition of additional properties. Hearing on the petition has been set for Sept. 30.

Deferred Installment Dividend Announced.—At the meeting of the board of the Interborough Rapid Transit Company, New York, N. Y., on Sept. 16, payment was authorized on Oct. 1, next, of the deferred installment of Manhattan dividend due Jan. 1, 1924, at the rate of $1 per share. Action on the installment for the current quarter due on Oct. 1 was deferred until next week. The dividend rental will be paid to stockholders of record at the close of business Sept. 22.

A Line Discontinued.—The Cincinnati, Newport & Covington Railway, Covington, Ky., has discontinued the line which operated between Fort Thomas and Cold Springs, Ky. The officials said it was a losing proposition. A bus line was immediately installed by private interests to accommodate residents of the outlying section.

Operation Discontinued.—The Salem, Ore., City Council on Sept. 10 granted the Southern Pacific Company, owner and operator of the Salem railway lines, permission to abandon railway service and substitute bus service. Insufficient income was assigned by the company as the reason for seeking discontinuance. The difficulties in Salem have been referred to previously in the ELECTRIC RAILWAY JOURNAL

Property Formally Taken Over.—The property of the Buffalo & Lake Erie Traction Company, operating between the Erie city limits and Buffalo, was formally transferred to the new owners at midnight on Sept. 14 and became the Buffalo & Erie Railway. The management of the line is now in charge of George MacLeod as representative of the new owners. Operating officials have been retained as follows: Superintendent, George J. Baker; auditor, H. S. Rykert; traffic manager, P. J. Gallagher; road master, C. M. Harrison; superintendent of overhead line, William Jefferson; master mechanic, Y. C. Bell; superintendent of substations, Leo Bigler; claim agent, John Pinieuski. No new operating officials have been added. The terms of the organization were reviewed in ELECTRIC RAILWAY JOURNAL, Sept. 13, page 406.

Personal Items

G. M. Dahl Made Chairman of Board

At the annual meeting of the stockholders of the Brooklyn-Manhattan Transit Corporation on Sept. 15, all of the present directors were re-elected. Gerhard M. Dahl was elected chairman of the board. He has heretofore been chairman of the executive committee. A. H. Wiggin was re-elected chairman of the finance committee, the members of which were re-elected, as were the members of the executive committee of the company.

W. E. Boileau, general manager of the Peoples Railway, Dayton, Ohio, since early in 1920, has severed his connection with that company. Mr. Boileau's experience in railroad and electric railway fields has been very broad. In 1888 he started in on electric railway work and spent a number of years constructing and operating properties in the South. He went to Dubuque in 1904, where he was put in charge of the construction of a power house, carhouse and rebuilding of tracks for the Union Electric Company. A year later he became identified with the New York, Westchester & Boston Railway, New York. At one time he was general manager of the Chattanooga Railway & Light Company, the Lookout Mountain Railway and the Lookout Incline Railway, Chattanooga, Tenn. He was appointed manager of the Scranton Railway in 1914. It was in this capacity he was serving when he was asked to accept the managership of the Peoples Railway in Dayton.

Henry S. F. Lansdown, Clive Leese, Herbert C. Davy and Alfred W. Green, all connected with the Metropolitan District Railway, London, England, expect to attend the convention of the American Electric Railway Association in Atlantic City next month.

Obituary

George W. Kuemmerlein, for fifty years actively connected with the street railway of Milwaukee, died in that city on Aug. 20, following an operation. Mr. Kuemmerlein not only saw the change from horse to electric power in Milwaukee but was an operator during the development of Milwaukee's railway systems from a few miles to the tremendous dimensions which it possesses today. Mr. Kuemmerlein was born in Germany in 1848. While he was still a boy Mr. Kuemmerlein was brought to the United States by his father. He became connected with the Milwaukee railways more than half a century ago as a driver, but was gradually promoted to the position of superintendent of transportation of the consolidated system. Mr. Kuemmerlein later resigned this position to take charge of the street railway system at Racine, also controlled by the Milwaukee Electric Railway & Light Company. He retired from this position about twelve years ago. It is interesting to note that the position of superintendent of transportation of the Milwaukee Electric Railway & Light Company is now held by his son, George Kuemmerlein, Jr.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Large Improvement Program Undertaken in California

Track construction and reconstruction work totaling nearly 19 single-track miles and costing $1,382,818 has been undertaken this summer by the Pacific Electric Railway, Los Angeles, Cal. In general, the construction involves the use of 7-in., 128-lb. grooved girder rail, rock ballast machine tamped, continuous joints, flat and brace tie plates, 6-in. x 8-in. x 8-ft. treated Oregon pine ties, double concealed bonds, heat-treated track bolts and Hi-power nut locks.

In Burbank it is proposed to reconstruct 4,086 ft. of single track, replacing old 70-lb. A.S.C.E. rail with the type of construction described above. An extension of 5,400 ft. in the same town will be built with 75-lb. C. S. revised section rail.

At Long Beach 970 ft. of second main track will be built with standard construction. Solid manganese 7-in., 93-lb. T-rail special work will be installed. Elsewhere in the same town 3,520 ft. of track will be reconstructed, replacing the present 60-lb. A.S.C.E. rail with 7-in., 128-lb. grooved girder rail. An extension of 6,870 ft. will also be built.

A 2-mile extension is being built between San Gabriel and Temple. The first section of this line is constructed with 75-lb. C.S. revised section rail, rock ballast, redwood ties, flat tie plates and continuous joints. A second section in paved street is being constructed with the 7-in., 128-lb. grooved girder rail.

At Redondo Beach the railway is replacing 50-lb. and 60-lb. rail with 75-lb. C.S. revised rail. At Pasadena 2,799 ft. of second main track is being built and old 60-lb. rail is being replaced by 128-lb. rail. Between Redondo Beach and Del Rey approximately 3½ miles of track is being changed from 60-lb. rail to 75-lb. rail. A storage yard with a capacity for 296 cars is being built in the vicinity of Long Beach.

In Los Angeles more than 22,000 ft. of single track is being constructed as described in the first paragraph. In this work old 50-lb., 60-lb., 61½-lb., 72-lb. and 75-lb. T-rail is being replaced. Asphalt concrete pavement is being generally used in connection with this reconstruction job.

Bids Received at Detroit on $600,000 Bus Installation

Bids for furnishing 50 or more buses for the Detroit Department of Street Railways have been opened and are under consideration by the Street Railway Commission. Four companies submitted bids. They were the Fageol Motors Company, the Yellow Coach Manufacturing Company, the Standard Motor Truck Company and the Gotfredson Truck Corporation. Two of the bidders were Detroit concerns. The Detroit companies are not considered to be manufacturers of buses, according to announcement by the Street Railway Department. Their bids, although lower than those of the two others who submitted proposals, were considered as offering a truck design modified to bus use. The buses on which bids were asked are to be double-decked with six-cylinder motors and pneumatic tires.

The Fageol Motors Company, Oakland, Cal., and the Yellow Coach Manufacturing Company, Chicago, the two outside bidders, have both placed sample buses in use in Detroit for experimental purposes. It is believed that the results of the trials with the sample buses will have considerable bearing on the decision of the Street Railway Commissioners.

The bid submitted by the Fageol Motor Company was as follows: From one to 49 buses, with fully inclosed upper deck, $12,470 each; from 50 to 74, $11,371.50; from 75 to 99, $11,072.25; 100 or more, $10,773 each. Chassis only—49 or less, $7,115; 50 to 74, $6,759; 75 to 99, $6,581.38; 100 or more, $6,403.50. Delivery is to begin within 30 days after the order is received and continue at the rate of one bus a day for the first 50. An additional 50 would be delivered within 60 days.

The Yellow Coach Manufacturing Company bid was as follows: $12,400 each regardless of number; with open top, $11,360; with semi-inclosed top, $12,000. The first bus would be delivered within 90 days, the next 10 at the rate of one a day and the next 39 at the rate of two a day; others within 60 days of the announcement of the award of the contract.

The Standard Motor Truck Company submitted a bid of $9,886 each, while the Gotfredson Truck Corporation bid $10,500 each.

Metal, Coal and Material Prices

Metals—New York	Sept. 16, 1924
Copper, electrolytic, cents per lb.	13.062
Copper wire base, cents per lb.	15.875
Lead, cents per lb.	8.00
Zinc, cents per lb.	6.163
Tin, Straits, cents per lb.	47.50
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.15
Somerset mine run, Boston, net tons	2.05
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.475
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.55
Weatherproof wire base, N. Y., cents per lb.	18.25
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.04
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.12
Turpentine (bbl. lots), N. Y., per gal.	0.89

Rolling Stock

Cleveland Railway, Cleveland, Ohio, has been authorized by the City Council to purchase 100 new cars—50 motors and 50 trailers. One motor and one trailer are now being constructed in the railway's shops and the success of these two cars will determine whether or not all of the hundred are to be built by the railway company or purchased.

United Traction Company, Albany, N. Y., will purchase ten trackless trolleys, eight of which will be put in immediate operation. The new vehicles will cost $120,000.

Williamsport Passenger Railway, Williamsport, Pa., plans to purchase three buses.

Johnstown Traction Company, Johnstown, Pa., has placed in service three new cars, purchased from the G. C. Kuhlman Car Company. The cars are 47½ ft. long, or 7½ ft. longer than any other car of the company. The cars seat 52 persons. They are all steel and weigh 35,000 lb. each, equipped with all safety appliances, and cost $15,800.

Buffalo & Erie Company, Fredonia, N. Y., has placed an order with the Cincinnati Car Company for 18 modern interurban type cars for passenger service between Buffalo and Erie. The cars will seat approximately 41 persons. They are expected about Nov. 1. New cars for service on the Dunkirk-Fredonia line have also been ordered. This is the successor company to the Buffalo & Lake Erie Traction Company.

Illinois Central Railroad, Chicago, Ill., sent out specifications to car builders on Sept. 18 for the construction of 250 new multiple-unit cars. These will be operated out of Chicago in suburban service on the electrified division.

Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., has awarded contracts to the American Car & Foundry Company for the construction of four three-car articulated units with delivery promised within five months. The trains are considered as samples. Two will be equipped by the General Electric Company, and two by the Westinghouse company. The General Electric equipment will consist of type 282 motors, four motors to each three-car unit, with two motors on each end truck. The control will be the G.E. PC-15 duplex; that is, there will be separate control for each set of two motors, but the pairs will be connected in multiple-unit control. General Electric CP-30 compressors will be used on each end section. The Westinghouse motors will, like the General Electric motors, be of a special design. They have not yet been designated by number as a type. The Westinghouse control also will be of special design. It will be known as UP-2. The trucks will be made by the Pressed Steel Car Company after special designs not yet designated. Each three-car unit will have a capacity of 520 passengers with a seated load of 250. The seating capacity of the end cars will be 90 and of the center car 70.

New York, Saturday, September 27, 1924

Electric Railway Journal

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ANNUAL CONVENTION NUMBER—"MODERNIZATION"

MODERNIZE

MENTALLY AND MECHANICALLY

By Britton I. Budd

President American Electric Railway Association
President Chicago Rapid Transit Company

THE "Journal" is to be congratulated on devoting its Annual Convention Number this year to the subject of "Modernization" and on having so many representative men in the industry contribute their views on this important subject.

To me the term "modernization" is the most comprehensive in the lexicon of the electric railway industry. It means the modernizing of mental as well as physical equipment. It means a new understanding of the spirit of service, of the relationship between utility companies and the public which they serve.

Without this new understanding of the public, this spirit of willingness to provide the most and best possible service at the lowest cost commensurable with doing justice alike to those receiving and those supplying that service, we have not "modernized" as I understand the term.

Nowhere has progress been more marked in the last decade than in the field of transportation. The modern concept of transportation service is radically different from that of a few years ago. The users of transportation service today do not think in the terms of yesterday. Their ideas have been modernized by the automobile, the motor coach and other developments in the transportation field, as the radio has revolutionized their ideas on the means of communication. Have the men charged with the responsibility of supplying service grasped the meaning of the new order of things as clearly as have their customers?

We hear a great deal today about the "education of the public." If by that is meant that the public can be educated to accept the practices common in industry a few years ago, such efforts at "education" are hopeless. The wheels of progress are not going to run backward. The education must begin at the other end. The transportation executive must be educated to get the point of view of the public.

A New Day Has Dawned in Transportation

IT IS futile to speak of the "good old days" when the best transportation service was infinitely worse than the worst is today and the public was better satisfied. That is water gone over the dam. A new day has dawned and a new character of service is demanded. We are here to supply that service, and if we cannot do it to the satisfaction of our customers we will be brushed aside, as we ought to be, and other agencies will take our places. The procession will move forward and we must keep step or be trampled upon.

The underlying motive by which the public utility executive must be governed is service. To give service we must have the necessary tools at our command. That means modernization of equipment, better cars and roadbed, higher speed and greater comfort to our customers. But when all those things are provided we shall still be wanting in the most important phase of our work if we do not know our customers and treat them with understanding.

The large corporation has many advantages over the smaller one in the way of reducing the cost of production. It can operate more economically because of the volume of its output, and this economy is shared by its customers. But it has its disadvantages also. The larger it grows the farther are its executives removed from contact with the people it is in business to serve. The greater the size of the company, the greater the danger of losing sight of the human element so essential to public good will. The smaller company can more easily "personalize" itself to its customers than the larger one.

"Personalize" the Corporation

THE public attitude toward the utility company has changed greatly for the better in recent years. It will be found that this change has been brought about in proportion to the degree that the company has accepted the new concepts of service, that it has sought to cultivate good will by humanizing itself to its customers. Public relations are improved by actions more than by words. An improvement in service is more effective than a striking newspaper advertisement. The personal visit of a representative of the company to a complaining customer will do much more in the way of creating good will than the best letter that ever was written. Every complaint about service should be given immediate attention. The matter complained of may in itself be insignificant, the accumulation of small grievances breeds ill will and finally results in a big explosion.

In "personalizing" itself to its customers the public service company should have no inflexible rules. Every company must have well-defined rules for the conduct of its business, but the accommodation of the customer is of more importance than the strict observance of a company rule. If a customer makes a request for some small accommodation and is told that to comply would be "against the rules of the company" it does not create a favorable impression in the mind of that customer of the company or respect for its rules. A company cannot afford to be the slave of a rule. A slight infraction might change an unfriendly customer to a friendly one.

Service Is the First Consideration

TO attain this new understanding of the spirit of service to which I allude, educational work must be done among the employees of a company. Every one in the employ of a utility company, from the highest to the lowest, must be made to understand that service is the first consideration. When they understand that the chief rule for their guidance is the pleasing of customers, they will not give offense by saying that something is "against the rules of the company."

How can employees be brought into the proper frame of mind to give willing, unselfish service?

The first step is to familiarize them with the business affairs of the company. In large organizations there is, many times, too much isolation of the various departments. The employees in one department are familiar with what is going on in their particular circle, but frequently they know little or nothing of what the organization is doing as a whole. For instance, a company may spend thousands of dollars for advertising its service and yet its own employees may not see its advertisements unless steps are taken to call their attention to that particular activity. An effective way to call the attention of employees to advertisements is to have proofs posted in all departments, offices, stations and other places where employees are at work.

To Please, Every Employee's Job

AS with advertising so with other activities within an organization. The employees should be given every opportunity to learn the business of the company by which they are employed. Because certain work or certain practices may affect one department directly, it should not be taken for granted that employees in other departments are not interested. Too often we see a spirit of "that is no concern of mine" because it affects directly another department. Anything which affects the interests of the company is the concern of every one connected with that company.

When every employee understands that a company is in earnest in its desire to please its customers and that it relies upon him to carry out its purpose, it gives him a new interest in his work. He takes pride in his company and feels that it rests with him to uphold its reputation. He feels his responsibility and responds accordingly. He thinks of himself as an important factor in the operation of a great human enterprise. He is a part of that enterprise and proud of it.

When that spirit permeates a whole organization it cannot fail to make its influence felt by every one with whom it comes in contact. It is the foundation of good service. Public good will is the key to successful operation of a utility company, and good service is the basis of public good will.

The Manager's Part

By EDWARD DANA

General Manager Boston Elevated Railway

The manifold duties of the modern manager require him so to plan his time as not to neglect important duties. A gain will follow the intelligent use of statistics and delegation of authority. Other managerial problems are discussed.

"MODERNIZATION," defined literally, means "the act of conforming to recent or present usage." As used by electric railway managers today it signifies more than that. The mention of the word suggests to them not merely conforming to usage but helping to create usage and to raise it to a higher plane. This involves knowing what is the best practice, making the most effective use of it under local conditions, and improving it as opportunity permits and ingenuity suggests.

A great and vital industry is at the moment intrusted to the managers of today as stewards and modernizers. The problem before us is to direct and develop it, and pass it on in a manner worthy of the traditions which have been handed down to us from previous periods of modernization effort. Ours is the duty of contributing as much as our predecessors did in bringing the industry to the position which it occupies today, or to do more than this if possible.

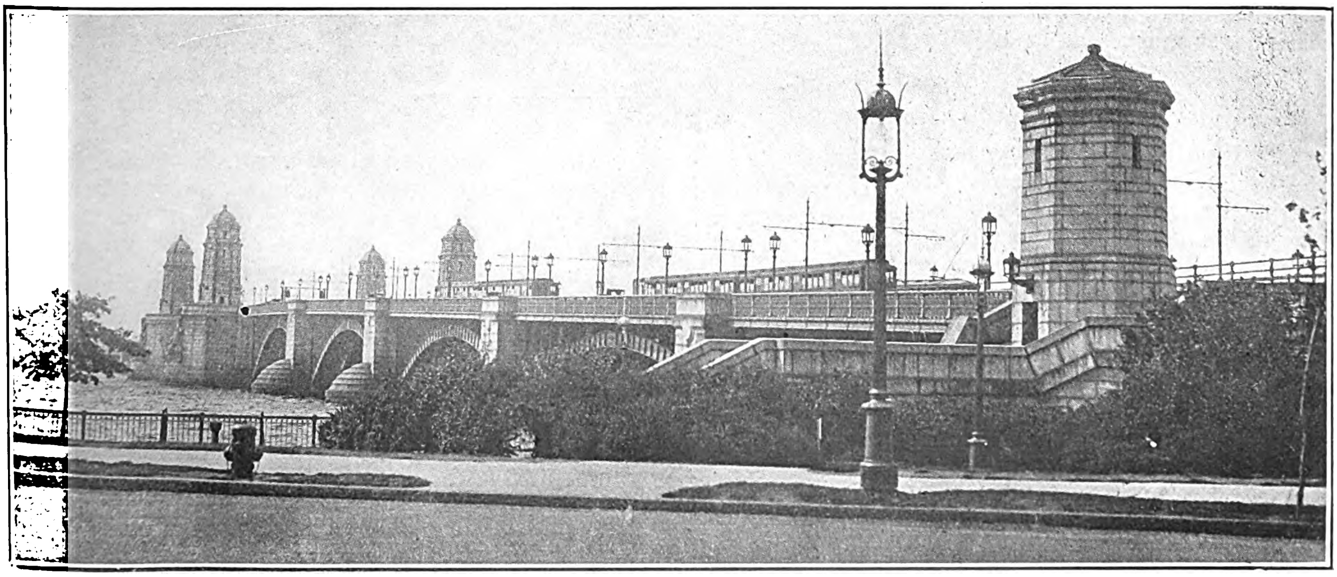
In deciding upon what is best in "recent or present usage," opinion will differ. But the differences are minimized through the operation of our national co-operative organization, the American Electric Railway Association, which acts as a balance wheel and, as one might say, integrates the work of individual managers in their modernization efforts.

As we glance back at the brief span of 40 years which marks the career of the modern electric railway, each milestone in the path of its remarkable development is seen to be a sign of timely modernization. The first electric railways were simply the horse railways electrified, potentially perfect but actually crude. One by one modernizing features were introduced, improving speed, comfort, economy, safety and general attractiveness of operation.

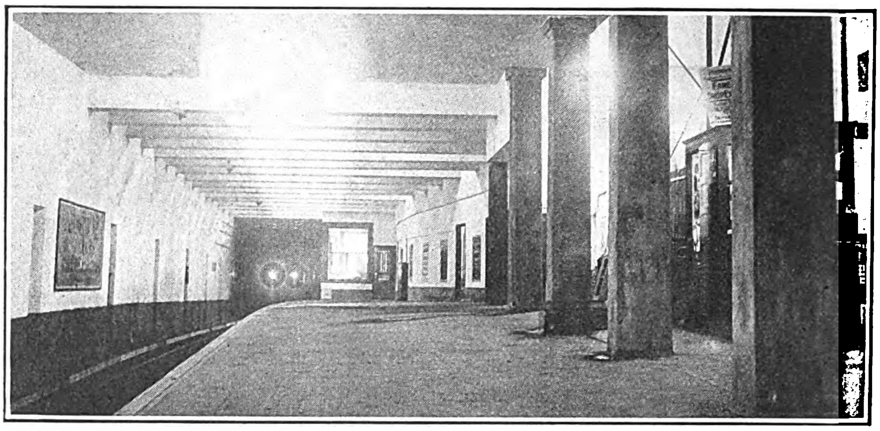
To my mind electric railway modernization can be represented by a curve like that accompanying this article, in which *a* represents the progress which is being contributed by our epoch and *b* represents that epoch. This progress, I believe, is greater than that which has been contributed in any like period before. The reason for this is that the economic chains (of which the 5-cent fare was one), which long held the industry in bondage, have been loosed, and greater freedom and opportunity is presented to those now in charge to produce results.

Various Views of Modernization

In order to discuss this subject intelligently we must ask ourselves the question: "What does the present-day manager think about modernization?" In other words, how does he orient himself amid the conflicting thought, improvements and other changed conditions of the industry existing at this time? In short, how does he judge of the realities and the needs of the time, and adjust his necessary service best to meet these needs? Right here we find widely divergent opinions.



The Cambridge Subway of the Boston Elevated Railway Crosses the Charles River on This Bridge



New Maverick Square Station of the East Boston Tunnel

One manager thinks salesmanship, as applied to selling transportation, the key to modernization. Possibly he may see other factors; perhaps he worships at that shrine alone.

To another, publicity—and still more publicity—seems an obsession, and he regards it as the acme of modernization.

A third revels in camouflaged reduced fares, ticket fares and other cleverly devised methods designed to lower the average fare and thus induce more people to ride.

Still another manager aims at safety targets, no-accident "centuries" and the like. He appreciates the human suffering as well as the financial burden involved in the accident toll being taken from our generation.

Modernization to another manager means one-man cars, or, as have followed them in Darwinian style, "no-man" substations, which exemplify the fascinating advance being made in lowering power cost.

Still another is specializing in a grandstand play of wage reduction in the effort to get a scale that is economically commensurate with the decline following the period of rising cost of living and advancing wage costs.

Again, some managers feel that municipal ownership, service at cost and the "all the cards on the table" method of improving the practical working of private operation under state regulation are the panaceas for electric railway ills.

To my mind there is virtue in all of these elements of modernization, and the viewpoint of the all-round manager should include them in their proper proportions.

After all, it is a matter of attitude. The manager must have an abiding conviction that the electric railway is a public servant, and as the nature of its service is much misunderstood he must have an enthusiastic devotion to an "under-dog" industry. As there has long ceased to be a place in the mouth of the utility manager for the words "the public be damned," so there must be no place in his heart for the thought "the public be damned."

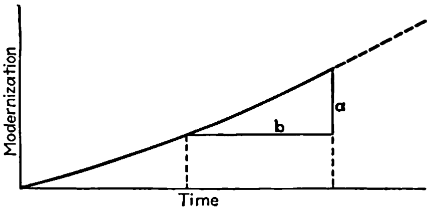
The Use of the Manager's Time

A manager can accomplish little in modernization unless his time and attention are properly distributed. A busy manager may be carried first this way, then that, unless he checks himself as to whether some phases of his work are receiving too much of his time to the neglect and detriment of others.

Roughly speaking, an electric railway executive is called upon for attention to the following:

1. Transportation problems.
2. Departmental problems.
3. Legislative matters.
4. Regulation affairs (commission).
5. Requirements of the public.
6. Requirements of the president and directors.

While the real problem of operating the railway is embodied in the planning, checking and improvement of affairs covered by items (1) and (2), if an executive were to concentrate his entire attention upon them he would shortly find himself and his railway in very serious trouble. An executive cannot solve his problems in a private experimental laboratory.



The Curve of Railway Modernization

On the other hand, while it may be gratifying to an executive to be seen much in the legislative halls, or in the offices of the public utilities commission, he can get the best results for his railway by being on the job with the Legislature or commission only when it is necessary. At such times, by earnest, forceful exposition, he can secure respectful consideration, whereas he loses prestige by constant attendance at these places.

In dividing his time among these six major claimants, the executive will find that the fifth group, the public, can easily usurp a much greater portion than that to which it has a reasonable right unless he is careful. Modernization has made it necessary for him to give any and all comers as much of his personal attention as possible. But this swing of the pendulum to great freedom of access requires careful discrimination. Properly allocated and wisely selected, the minutes given to representatives of the public oftentime will yield a golden harvest, whereas poorly planned and hasty conferences may lead to no definite benefits.

Finally, the time which the executive needs to give to his president or directors is dependent more on their attitude than on his own. Certainly if the organization is functioning properly the president or directors will call for no more sacrifice of time on the part of the operating executive than is absolutely necessary to keep them properly informed and satisfied that good results will be forthcoming. One of the most trying experiences of an executive is to have his time diverted from important major matters by directors, or others, to relatively unimportant details. But the manager must be discriminating here, for the very effort of president or directors to know more of the details of the management is in itself proof of the complete spirit of modernization which has been growing of late years.

We may assume now that the manager appreciates the importance of wise distribution of his time and energy. It seems to me that this is more important than ever before, because the trend of modernization is forcing centralized authority into his hands. This is to eliminate delay in a direct public service which profits so much by equally direct action.

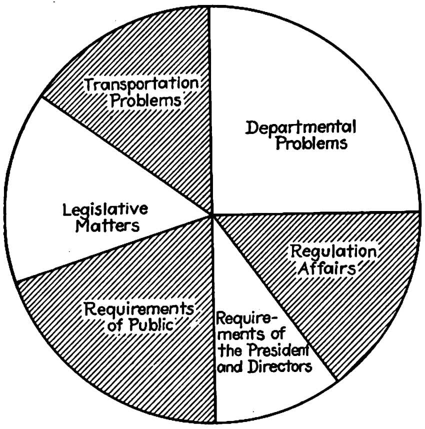
One of the factors which had much to do with creating adverse public opinion in former days was the time it took to investigate and report upon matters vitally affecting particular individuals. Modernization tends to eliminate this and secure direct prompt contact with those with whom business is being done. To this end a superfluity of departments or intermediate officials should be avoided. This adds emphasis to the managerial means of control.

The Use of Statistics

While a modern manager appreciates that to attempt to run the details of his department is to retard the progress and efficiency of his organization, nevertheless if he is to be capable of meeting trying situations, he must employ vital operating statistics to the best possible advantage. He must do this to furnish him the means of control in the shortest space of time to enable him to get results before serious damage has occurred.

To illustrate: There was a time when it was believed impossible to budget the income and expenditures of an electric railway because of the varying factors which enter. Today it is realized that once the problem has been resolutely tackled it is relatively easy to do so. The budget lifts a great burden from the shoulders of the manager because, at all times, he has a compass to indicate which way his ship is traveling.

Only a relatively few detailed statistics are necessary to keep the manager well informed as to the trends of his business and as to the efficiency of his departments. Fortified with such statistics, for instance, the manager, by his familiarity with the men on the payroll, wields a very stimulating effect upon department heads, even though his familiarity may not extend beyond the preliminary index figures.



How One Manager Divides His Time

However, the manager must be satisfied with general deductions from his data. He cannot follow out the details in all of the byways which open up to him in the mass of statistics which flow over his desk or can be made to do so.

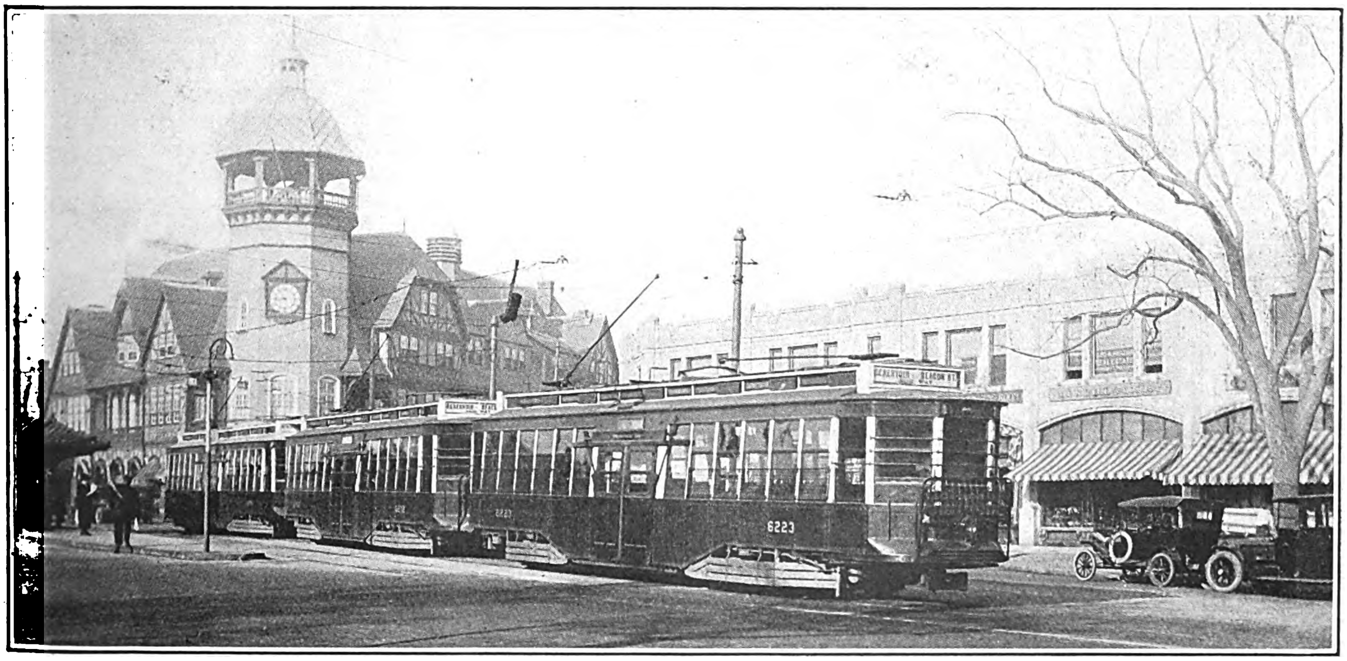
Delegating Authority

In the centralization I have referred to, I must not be understood as recommending the manager's absorption in detail. He must delegate most of the detail to others. But delegation of authority can be exercised only in proportion to the experience, competency and loyalty of subordinates.

I do not look upon the responsibilities naturally incumbent upon a department head as delegated by the management. Rather they go with the job. The manager's responsibility here is to select competent persons and to see that they get results. Their authority in their own departments should not be curtailed by interference from the management. What I mean by delegation of executive authority is the sharing with subordinates of the general manager's authority as such. He must delegate executive authority to some extent or he cannot carry his load. But if each department head is supreme in his own bailiwick, the loyal co-operative spirit of the departments will become so enmeshed with the management that such general executive responsibility as may be delegated will be assumed in such a manner that it is hardly noticed as such, and no harm can come therefrom.

The Most Pressing Problem Today

This matter of delegating authority is closely related to another one which has come up in the progress of modernization. I refer to the selection, training and education of the personnel. This is the most important task confronting the manager today. Here lies a field of pioneer work for modern managers.



A Modern Three-Car Center-Door Train on the Boston Surface Lines

While many devices have already been tried and found wanting in the effort to secure co-operation and intelligent workmanship, there are evidences on every hand that this problem is destined to receive more attention in the immediate future and along more fundamental lines.

Another Pressing Problem

Only second in importance among the large jobs of the manager of the future will be that of constantly improving methods of telling the story of the industry. Recently the New England Bureau of Public Service Information* called attention to the story of Joseph, the son of Jacob, who went down into Egypt, and through diligence and intelligence rose until he became the principal person in the state, excepting only the monarch. And then the story goes on to say: "And Pharaoh died and there arose in Egypt a new king who knew not Joseph." This was hard on Joseph's descendants. They lost favor with the ruling dynasty.

The ruling dynasty in regard to public service is the public. Through publicity, week in and week out, year in and year out, the public utility story must be told, because every day the people who know the story pass on and others come who do not know it.

Every year general counsel and boards of aldermen, improvement societies and the car riders are subject to change. Consequently it will be the ever new job, and one of the most important jobs, of the manager to tell his story to the public.

Modernization in the broad sense has brought in public utility regulation by commission. This has done the utility no harm but probably a world of good. Before commission regulation came in earnest it was relatively easy for the manager to feel like a czar, even if he did not act like one.

With full commission regulation the manager has been obliged to secure the assistance and support of the commissions in properly operating his property. He no longer considers them as obstacles, but without in any way compromising the commission staff, virtually adds it to his own staff. This is possible because the function of the commission staff is simply to get the facts and act upon them intelligently. This is what the railway needs to do, also.

With co-operation the commissions will have no need to exercise the autority with which they are clothed. If they did they could become obstacles to the proper operation of the railway.

Obstacles

Modernization is, like all progress, subject to obstruction and criticism. This need give rise to no discouragement. Enthusiasm and constant effort toward a given end, backed up with convincing information, will in the long run wear away most of the obstacles which stand in the path of modernization.

One obstacle is found in the tendency to consider modernization theoretically, without due regard to practical economics. This leads to the weathercock practice of endeavoring to see how many new wrinkles can be discovered or how many schemes can be followed. Such procedure reminds one of the ignorant sufferer who, in trying to effect a cure, purchases at different drug stores a variety of quack advertised remedies.

Certainly the modern manager should be keenly alive, through the constructive efforts of the American Electric Railway Association and the helpful work of the technical press, duly to consider the conflicting tendencies of the time. He should cull from them, after analysis, those which appear to be sound practice and which are likely to result in improvement over the practice of the past.

There still seems to be too great faith in existing practices which, while they have been satisfactory and have done no harm, might well be replaced by others which would work out ultimately to greater advantage. This faith, I regret to say, is too often due to lack of a spirit of inquiry.

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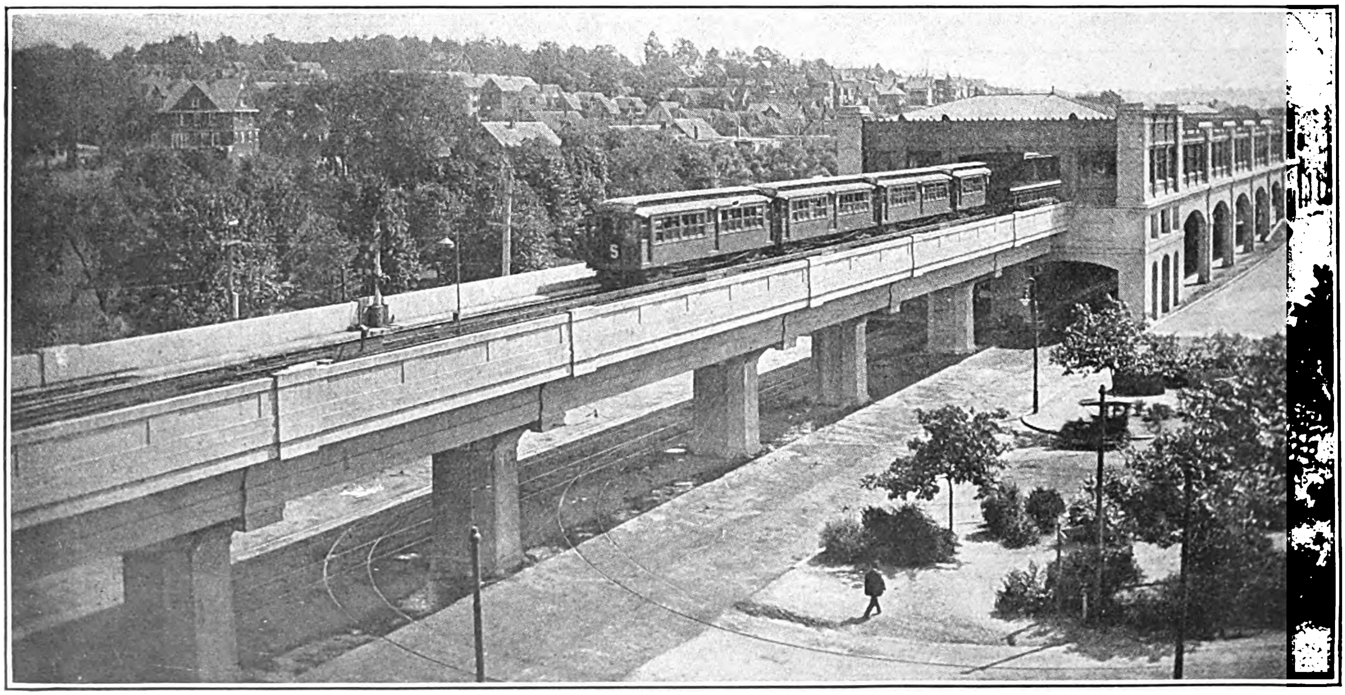
*See also address by Bruce Barton before National Electric Light Association in ELECTRIC RAILWAY JOURNAL for June 9, 1923, page 967.



Attractive Architecture Features the Forest Hills Terminal of the Washington Street Elevated

Local Transportation

By JOHN A. BEELER

Director the Beeler Organization, Public Utility Consultants, New York City

The use of modern methods in street railway transportation, such as attractive equipment, good schedules and improved fare-collection practices, reduces operating costs and stimulates travel. Many companies can be made prosperous at a relatively minor cost.

STREET cars, subway and elevated railways, buses, coaches and taxicabs are today the principal types of conveyances employed in the local transportation field. Each has its own distinct place and value. The taxi, of course, is for quick individual service at a higher rate of fare. The bus and coach provide a form of public motor service that is particularly adapted to boulevards, parkways and other thoroughfares frequently not accessible to street cars. High-class coaches, such as those employed on Fifth Avenue, New York, and on the boulevards and avenues of Chicago and Detroit, have created a new type of service and patronage which has possibilities in many localities. This does not mean the promiscuous duplication of existing service, but rather a judicious employment of the various forms so as to expand the scope of such service without waste to the full requirements of the community.

In our larger cities the problem of making the streets safe for pedestrians is practically an unexplored field and one that must be given especial attention. The location of car stops, establishment of safety zones, loading platforms, parking control and regulation of vehicular traffic are important factors affecting the facility of the movements of pedestrians as well as their safety. Steps will have to be taken in the near future to minimize sidewalk congestion in many city districts. In co-ordinating the various types of transportation the requirements and safety of the pedestrians must not be lost sight of.

The street car, next to rapid transit subway or elevated lines, is the greatest factor in handling mass transportation. In the principal cities of the country to-day the street cars are carrying between 80 and 90 per cent of the total surface passengers and constitute only about 10 per cent of the vehicles on the streets. They are by far the most economical and efficient carriers, not excepting the elevated or subway. These latter, except in connection with great population densities and tremendous volume of business, are impracticable on account of their excessive construction costs.

Table I—Reequipping, Rerouting and Rescheduling a Street Railway System Serving 1,000,000 Population

	Old Plan	Revised Plan
Annual Operations:		
Annual operating revenue..	$11,873,565	$13,107,699
Operating expenses, including taxes and renewals and retirements.........	11,718,953	9,084,667
Net before interest........	154,612	4,023,032
Investment...............	45,048,711	51,448,711
Investment per dollar of revenue................	3.80	3.92
Return on investment, per cent..................	0.34	7.82
Comparative Operating Statistics:		
Miles of track............	146.20	139.60
Cars in daily operation.....	682	532
Car-miles.................	19,106,948	16,091,362
Car-hours.................	2,778,306	1,918,238
Car-miles per car-hour.....	6.89	8.38
Revenue per mile of track..	$81,200	$94,000
Cents per car-mile:		
Operating revenue......	62.1	81.5
Operating deductions...	61.3	56.5
Net revenue	0.8	25.0
Dollars per car-hour:		
Operating revenue.....	$4.28	$6.84
Operating deductions..	4.22	4.74
Net revenue..........	0.06	2.10

Buses can be used in many a locality that cannot support a car line and to augment and feed car and coach lines. They should not, however, be permitted to parallel immediately or to duplicate established transit lines that are rendering ample and satisfactory service. Many buses are to-day opening up new territory, while others, by duplicating service, are merely making it more difficult for the existing lines to operate economically and efficiently.

To secure the best results, all services must be co-ordinated in a local plan of transportation that will best serve the community, each class performing its own peculiar function. Each type should charge what the service is worth, based upon its cost and not upon all that the traffic will bear.

Modern Street Railway Equipment

Modern equipment requirements for service on city surface lines can be brought under three types of cars:

One-man safety single truck.
One-man safety double truck.
One-man, two-man double truck.

Motor vehicular service likewise is covered in three types, coaches, buses and flivver jitneys. I will not enter into details of the various types except to say that each should be light in weight, fully equipped with all advantageous automatic and safety devices, easy steps, wide and commodious entrances and exits, comfortable cross-seats facing forward, plain and sanitary inside finish and should be well lighted, with an attractive interior. The exteriors should be bright, preferably light colored, so that they may be more readily seen. The cars must be amply motored and equipped with brakes that will provide smooth and even retardation. Rapid braking and acceleration are of prime importance.

New and attractive equipment should not only reduce maintenance costs but should stimulate travel. Recently we observed a railway operating in a densely populated territory, where general traffic and business were good, that was showing a steady loss of patronage. One reason was the unattractiveness of its rolling stock. I recall an instance of a railway that was paying out annually for maintenance and power amounts which annually would exceed charges to these items on new and modern equipment by more than 50 per cent of the first cost of the new equipment.

In analyzing a large street railway system that was badly run down it was found that 450 new modern standardized cars would meet the company's entire requirements. This called for junking of more than 600 old worn-out, inefficient cars of many types and varieties, to the great advantage of both the patrons and the company.

Think of the storage room released and the simplification of maintenance practices made possible, to say nothing of the advantages secured from the operation of attractive, comfortable and quick-acting cars on the streets. The best modern practice is toward standardization of efficient types, not only to bring about economies of operation but also to stimulate traffic.

In the matter of stops, many lines in city service could reduce the length of time consumed in making a stop approximately 5 seconds by substituting modern cars for the heavy and obsolete equipment with narrow doors, high steps and small platforms now in use. Another 3 seconds per stop could be secured by increasing the rate of acceleration and braking. This is a total of 8 seconds per stop saved, including the time lost in slowing down to the stop and in resuming free running speed. An average car will run 40,000 miles per year and make about 240,000 stops. A saving of 8 seconds per stop means a reduction in the cost of operating the car of $1,600 per year. This will pay the carrying charges, with interest at 7 per cent, on a new car costing $15,000 and leave a net saving of $550 for each car operated by the company.

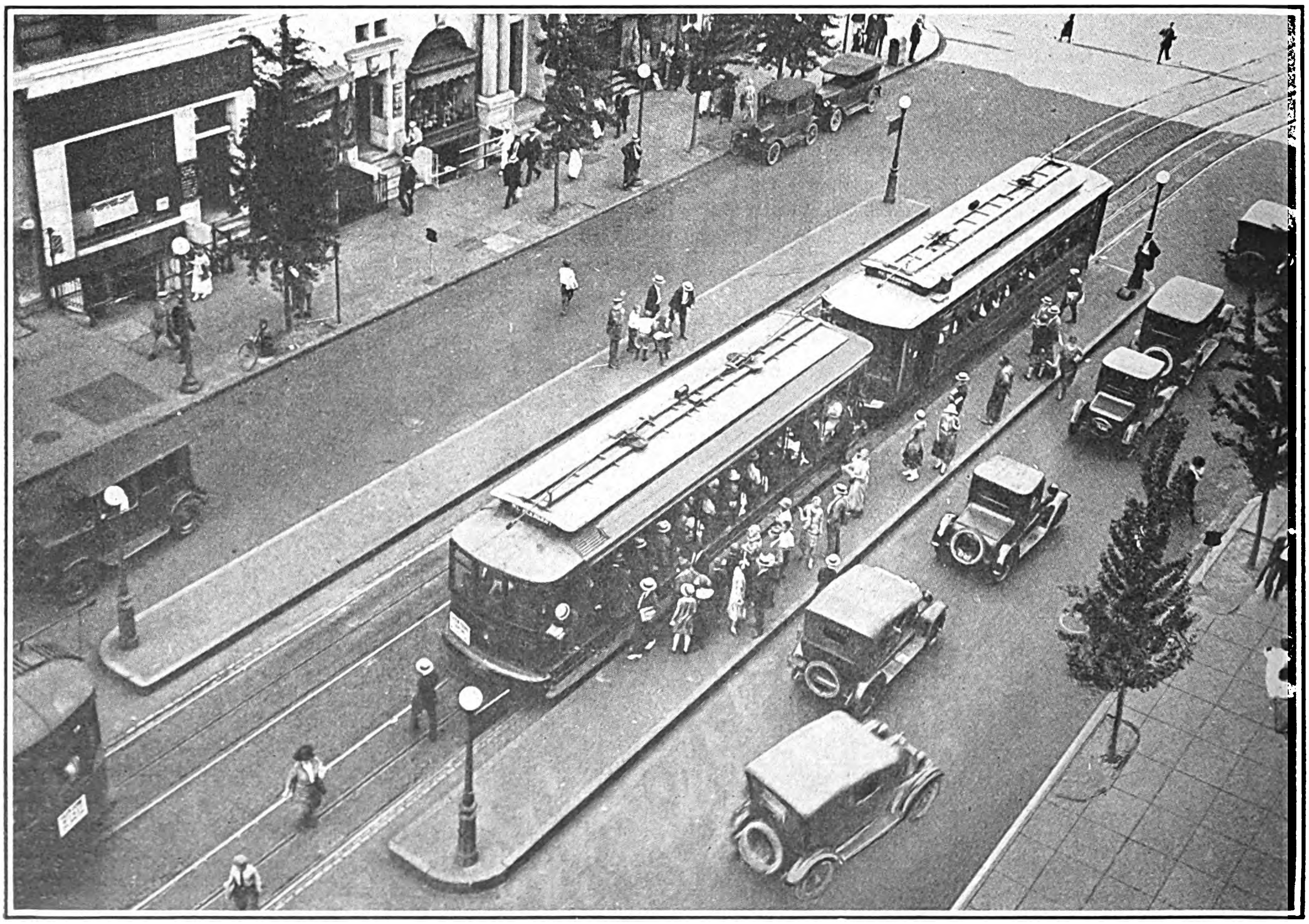
What new and suitable equipment and a general rerouting and scheduling can do to a railway system serving a population of upward of 1,000,000 is shown in the comparison of operations in Table I.

The net result expressed in dollars and cents is shown by the increase in the earnings applicable for interest from $155,000 to over $4,000,000, raising the return on the investment from less than one-half of 1 per cent to nearly 8 per cent.

The results of the almost universal swing from far-side to near-side stops a decade or more ago have demonstrated that neither plan is entirely satisfactory as a hard and fast rule. The many difficulties encountered under the far-side method confirmed this. To-day it is evident that the selective plan is preferable. Stop locations should be carefully studied and established only after considering all the factors that are involved.

Stop Locations Important

The near-side stop plan caused a general slowing up of schedules. Vehicular traffic usurped the right of way and made the cars slow up at crossings whether they were stopping for patrons or not. Where the far-side stop is in use it is known definitely that when a car appears it is going to cross the intersection. Consequently there is little excuse for an attempt on the part of the vehicle driver to beat it to the crossing. Far-side stops, except at controlled streets, tend to permit of



Permanent Loading Platforms Such as These in Fourteenth Street, Washington, Save Time for Car Riders and Speed Up the Car Service making better time by the street cars and to result in fewer accidents.

In the matter of the location of passenger stopping places, the best practice covers the following features:

Spacing should be close enough to accommodate passengers, but far enough to permit a reasonable schedule speed. An average of eight stops to the mile in the business and well built up residence sections is generally recognized as desirable for surface cars and buses.

At junctions, stops should be made before entering the joint tracks with heaviest traffic. Often much can be gained by merely shifting a stop across the street. The location of individual stops is not only important to the operation, but the correct location will benefit the patrons and diminish the accident hazard.

The advantage of eliminating unnecessary stops is threefold, for the number of stops made determines to a large extent the amount of service that can be given with the available track and equipment, the time required to reach the desired destination and the cost of the service.

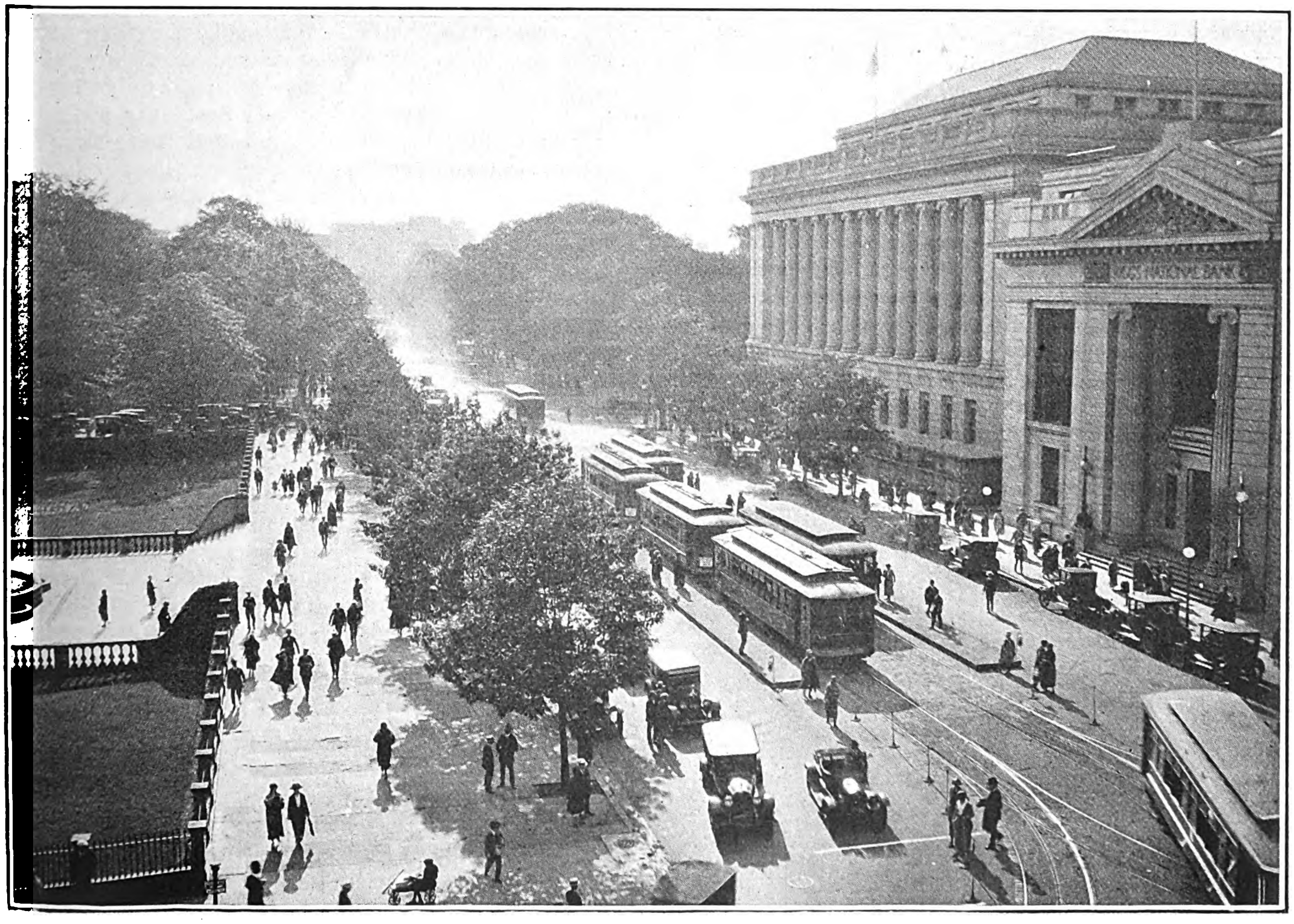
In one community of less than 200,000 people it was found possible to save an average of one stop per mile of route by respacing the stopping places. This represented a saving of $100,000 annually in the cost of operation. In New York City the saving of an average of one stop per mile by the surface cars last year would have been equivalent to $1,750,000.

Double Berthing at Important Stops Saves Delay

Double berthing of cars saves time, for it eliminates stopping more than once at a stop location. Many companies now use this principle, but oftentimes they do not follow it rigidly enough to secure its advantages. Double berthing means loading and unloading passengers by two cars at one stop location. The first car should always stop in the forward berth, and the second car approaching should pull into the second berth behind the first car without hesitancy and proceed to load and unload its passengers. It should then continue to the next regular stop location without making any further stops. This practice, if it is done correctly, enables two cars or even two sets of cars to pass through an intersection on one signal of the traffic officer and results in the minimizing of bunching and in relieving congestion to a marked extent. A result that seems almost contradictory is that with double berthing established, the need for it seems almost to disappear. It also has a direct monetary value which, though secondary, is important. In the downtown section of a city of some 400,000 population observations made indicated a saving of from $250 to $500 annually for each location thus treated.

Safety Zones and Loading Platforms

Clearly defined safety zones should be established at all heavy loading points. Or better, by far, in wide streets permanent loading platforms should be installed. This will shorten the length of passenger stop, as it has the effect of eliminating one step onto the car when boarding and alighting. It also provides a safety island where passengers will congre-



On Pennsylvania Avenue, Washington, Where Parades Are Frequent, Loading Platforms Are of Wood and Are Removable on Short Notice gate and be ready to board the car as soon as its doors open, for they know definitely where the car will stop. There should be no difficulty in locating loading platforms with a double-track car line in streets which are 60 ft. or more wide between curb lines. On streets narrower than this individual conditions enter into the desirability of using platforms. If street car loading is heavy and vehicular traffic light loading platforms would still be desirable. Platforms should be long enough to accommodate two cars, should be 5 ft. wide and 9 or 10 in. above the rail. The inner side of the platform should be about 24 in. from the outer rail. Street widths are frequently such that platforms can be employed without reducing the number of traffic lines. In other words, the platform will occupy what otherwise would be waste space in the roadway.

Observations have shown that platforms under average conditions not only permit of a more rapid flow of vehicular traffic but speed up car loading about one-fifth of a second per passenger. While the monetary saving here is secondary, it has a value. On a platform loading but a thousand passengers per day a saving of $60 annually is obtainable, which will pay a good rate of return on the cost of the platform. One from which 3,000 load daily will save $180 annually, and so on in proportion.

Coaches and buses usually stop next to the curb. Under heavy traffic conditions, such as encountered on Fifth Avenue, this is often impracticable. Under no circumstances, however, should their regular loading places be alongside of a street car safety zone or platform.

Vehicle Parking Should Be Controlled

Parking of vehicles along main thoroughfares has been and is the cause of much congestion in cities of over 100,000 population and in many of the smaller communities. Parking as now practiced frequently results in serious disadvantages to moving vehicles. There is no logical reason why the first driver to come on the street in the morning should preempt public property to his own private and personal use for the entire day or such portion of it as he may desire. Such a plan is of great detriment to the merchants and business men. Dead cars parked all around their stores drive legitimate customers away. What is wanted is a stream coming and going continually. It must be remembered that the streets are primarily for moving traffic and not for storage purposes.

Parking should not be permitted on any street carrying an important car line unless there is a roadway of at least 17 ft. between the outer rail and the curb line. Where there is an appreciable volume of vehicle and street car traffic parking should not be permitted unless there is ample room for two lines of moving vehicles between the parked car and the street car. Parking should not be allowed opposite or within 25 ft. of a car stop location or within 75 ft. of the intersection of two street lines. In all cases, unless it be an extremely wide street, cars should be parked parallel to the curb and on the right-hand side of the street in the direction in which they are headed. Parking spaces should be marked distinctly as such and the parking regulations should be strictly enforced.

Fares and Fare Collection

Given the right to do business, the cost of service is largely dependent on eight principal factors, as follows:

Efficiency of management.
Rate of wages paid.
Cost of supplies and fuel.
Taxes, including paving requirements.
Interest rate.
Speed and length of haul.
Type of equipment employed.
Volume of business.

Table II—Operating Survey of a Street Railway System Serving 175,000 Population

Annual Operations	Old Plan	Revised Plan
Operating revenue	$2,042,000	$2,107,000
Operating deductions	1,683,000	1,505,000
Net revenue	359,000	602,000
Comparative Operating Statistics:		
Miles of track operated	83.64	84.98
Cars in daily operation	174	152
Car-miles	6,525,000	6,360,000
Car-hours	719,800	655,000
Car-miles per car-hour	9.09	9.72
Revenue per mile of track	$24,400	$24,800
Cents per car-mile:		
Operating revenue	31.3	33.1
Operating deductions	25.8	23.6
Net revenue	5.5	9.5
Dollars per car-hour:		
Operating revenue	$2.84	$3.22
Operating deductions	2.34	2.30
Net revenue	0.50	0.92

These factors will fluctuate from year to year and vary considerably in different communities. I know of railways doing well on 5 cents and others losing money at 10. There can be no such thing as a universal flat rate that is applicable to all properties regardless of the foregoing factors.

Any service that is satisfactory and of permanent value to the community must be based on sound finance, and the income must be sufficient to cover the total cost of service, including a reasonable return on the investment. The average rate of street car fare to-day in this country is approximately 7 cents; coach service is 10 cents, and bus fare is about 6½ cents. Where public dissatisfaction exists very little, if any, complaint is in evidence as to the rate of fare. It is generally with reference to the quality of service rendered.

Odd cash fares take more time for change making, congest the car entrance, consume the patron's time and slow down the service. All of these things are expensive and detrimental to good service. The trend in fares is toward even money. The ideal arrangement is for a straight 5 or 10-cent cash fare, with intermediate rates obtainable through the use of tokens or tickets. The sales units should be large enough to cut down an excessive number of transactions and small enough to attract all regular patronage to buy tokens, but should be in easily handled units. Twenty-five cents makes the ideal sales unit, but there should be nothing to prevent the purchase of larger quantities when a patron so desires.

The method of fare collection should be made as easy and rapid as practicable. Hand collection has its advantages in platform payments, for then the responsibility for collecting the proper fare is fixed absolutely upon the collector. He is the official salesman for the company. This safeguards the receipts. With proper registration, which should be based upon the cash register principle, the earnings are doubly protected. Each fare should be registered under its individual classification and receipts should not be simply lumped by being rung up as so many fares, any more than a merchant would lump his daily transactions under the head of so many sales.

Prepayment areas are desirable where practicable and such automatic devices as the featherweight turnstile are most efficient under special conditions. All operators know the difficulty of checking platform fare box collection; the fare box must be continually watched and tripped. Where locked fare boxes are used, however, a registration is useless as it makes unnecessary work for the trainmen when their time could be employed to better advantage, such as watching the boxes more closely or in looking after the wants of passengers. No one will ever know how many millions of dollars have been lost during the past few years from the dropping of odd pennies in the fare box instead of the full fare.

Making Schedules to Increase Speed

With modern equipment, properly placed stops, the co-ordination of the movements of other traffic with that of the street car and reasonable vehicular traffic and parking regulations schedules can be revised to take advantage of quicker loading and unloading, faster braking and acceleration and freer movements generally through the streets.

A scientific revision of schedules should have the result that less equipment will be required to do a given amount of work, that each unit will render more car-miles of transportation per day or per hour and that first costs will be reduced, as well as interest charges and operating expenses.

It has been truly said that schedules make or break a company. Hence the tendency to-day is to give close attention to this most important department. One of my first experiences as an operator was in raising the average schedule speed of the system then in my charge from 8 to 10 miles per hour. It was made in the face of much opposition and apprehension, mostly from our own officers and employees, and required a period of more than a year to consummate fully, as many lines were involved. When finally accomplished, it was found that the railway had increased its range of usefulness, traffic had been stimulated, accidents had decreased and operations were much more effective and economical. The operating ratio had dropped from around 90 to 65, showing that by employing better schedules 25 per cent of the gross revenues had been conserved. This was sufficient to add several millions to the market value of the railway's securities.

The great demand to-day in all lines of transportation is for quicker service, increased safety and greater comfort. Cost is an important factor, but both cost and safety (I am sorry to have to include the latter) are regarded as secondary elements by many. This is illustrated daily by the huge death toll resulting from the reckless use of the motor vehicle, now so prevalent from one end of the country to the other.

Public transportation, to be financially practicable, must be safe. Quicker service is possible with safe speeds by reducing the time wasted in making unnecessary stops and in delays. Wide-awake transportation agencies are alive to the demand for time saving. Any system where the service is becoming slower is slipping and should take account of itself at once, for unless this factor is corrected quickly its days of usefulness are about over.

It is indeed difficult to overestimate the importance of many matters that appear as of minor importance. For instance, the saving in time obtainable due to raising the rate of braking and acceleration on a line from 1 to 1.5 m.p.h. per second will increase an average schedule about 12 per cent. What has been accomplished in a community of 175,000, largely by eliminating or minimizing time losses, delays and service duplications, is illustrated by the comparative figures that are shown in Table II.

It will be noted that practically the same number of car-miles are furnished under the new plan as under the old. This service, however, has been so placed that it serves more riders and serves them better by transporting them more quickly. This, combined with some general operating economies, results in an increase of net earning capacity from $359,000 to $602,000 annually.

A More Liberal Public Policy Is in Sight

The tendency generally by the authorities is in the direction of a more liberal policy toward tractions. The advent of the bus is partially responsible. The latter uses a roadbed furnished at public expense. Otherwise, few bus lines could afford to run.

It is more clearly evident to all that the trolleys must be relieved of excessive special assessments for paving and other public improvements if equity is done the car rider. There is little room for argument on this. The trend is toward equality in taxation with such items of expense minimized to both types of service in order to maintain good transportation at a reasonable cost. This is of the utmost importance to the social and commercial welfare of all live communities.

Comments on Foreign Report

AMERICAN ELECTRIC RAILWAY ASSOCIATION
Office of the President

NEW YORK, Sept. 15, 1924.

I think your committee has performed a very valuable service to the electric railway industry. It is well to know from an authoritative source just what the relative conditions pertaining to our industry are in England and France. I have no doubt that the experience which the committee gained from this trip will be of great benefit to the electric railways of this country in furnishing suggestions and ideas which will be forthcoming long after the report has been laid aside.

BRITTON I. BUDD.

STEVENS & WOOD, INC.
Engineers

NEW YORK, Sept. 23, 1924.

To illustrate how much I appreciate your report on foreign conditions it is only necessary for me to say that last night I read the issue of the JOURNAL from cover to cover.

In talking with some of the members of the committee I got the impression that they felt the trip was to a certain extent disappointing—that is, that they did not find as much of interest as they had hoped. They may be justified in this disappointment if they set their expectations too high, but to me the report is all and more than I expected and very much worth while.

The value of this report is not necessarily found only in the suggestions of the committee, but a feature of equal importance to me is the opportunity it gives, that is, the inspiration, one might say, for suggestions which are more applicable to one's own problems. To me, this report was very meaty from that standpoint, and I thank you and congratulate you.

R. P. STEVENS.

Railway Franchises

By W. H. MALTBIE

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Commission regulation has changed economic theory and the law on which a franchise rested. A modern franchise therefore should not be constructed by wholesale borrowings from older franchises but should be drafted so as to be in full harmony with present-day conditions, both legal and economic.

WITHOUT attempting an elaborate legal definition of a franchise, we may say that in the last analysis a street transportation franchise is practically a contract between a municipality or other political unit, acting as agent for the public, and a transportation agency, providing for the rendering of service by the transportation agency to the public, represented by the granting political unit.

This franchise contract, in common with all contracts:

1. Must be within the contractual powers of the respective parties.
2. Is to be construed in accordance with established legal precedent and as if it contained certain special covenants which the law assumes to have been included.
3. Must rest upon some consideration moving from the political unit to the transportation agency, usually the right to the use of the streets, exclusively or otherwise; the right to collect compensation for the service as rendered, and the power of eminent domain.
4. Must rest upon a consideration moving from the transportation agency to the political unit, usually the promise to render service, to which there are frequently added other considerations such as the payment of an easement tax, the assumption of paving burdens, and numerous other items.
5. Must show definitely the nature of the service to be performed and the conditions under which it is to be performed; or, if this is not practicable, must set forth some method by which this nature and these conditions can be definitely determined from time to time.
6. Must provide definite compensation for the service, or provisions for making this compensation definite from time to time.
7. Must provide for the ultimate termination of the contract and the adjustment of the respective liabilities of the parties in event of such termination.

While such an outline as this is relatively simple, an actual franchise, covering very complicated services to be rendered over a period of years under probably varying conditions and involving enormous expenditures of money, is necessarily complex; and the difficulties which arise in operating under such a contract lead frequently to court interpretation and adjudication. As a result, there has been in the past a marked tendency to copy from an existing franchise those provisions which have received a satisfactory court interpretation and to develop safeguards that are supposed to meet the difficulties that have arisen while operating under other forms of contract.

In consequence of all this, the franchise has now become an extremely technical and complex document made up largely of court tested sections borrowed from previous franchises, and it forms a satisfactory basis for practical operation only in those cases where it is the product of high-grade technical information, a broad knowledge of the economic field, practical common sense, and high-grade legal draftsmanship.

Many other important documents are built by this same borrowing process. State constitutions, city charters, bond mortgages, deeds, leases and similar documents have thus reached their present form and, granting one essential condition, there is perhaps no safer or better method.

This one essential condition is that the economic theory and the legal basis on which the document is to rest must be the basis underlying the document from which it is proposed to borrow. So long as testamentary law, for example, remains unchanged no good attorney attempts to be original in drawing a will.

But if the basic economic theory or the basic law which underlies a document is changed in such a way as to affect its operation, it becomes the height of folly to adopt a form or a provision without first determining whether or not it is a desirable form or provision under the changed economic conditions or changed law.

Such a change in basic economic theory and in basic law came about with the adoption of commission regulation, and with the adoption of commission regulation practically all of the then outstanding franchises became unsafe models for future draftsmen. A single illustration will make this statement evident. Prior to commission regulation the usual franchise fixed the rate of fare, and whatever the stockholders could make out of this fare over and above the cost of operation became their property. Therefore, any cash payments that could be exacted for franchises; any special taxes; any street paving, sprinkling, or cleaning burdens; any free service or other concession was a direct levy upon the stockholders, could not be passed on by them to the riding public and resulted in reducing by so much the burdens of general taxation.

With the adoption of commission regulation the fare ceases to be the fixed point, and in its place the net return becomes the fixed point about which the rate structure is constructed. It follows immediately therefore that all burdens placed on the transportation agency are at once passed on to the riding public. It is evident, we think, that it would be unwise to take any franchise written under the original theory as a model of construction under the new.

The adoption of the new system of commission regulation therefore opened the door for originality in franchise making. This new system has been in force generally throughout the United States for a relatively short period; but we have now accumulated a considerable body of law, interpreted by decisions of state and federal appellate courts, so that while much of detail is still uncertain the broad principles under which the system operates and the general economic and legal theories under which the courts will interpret and restrain commission action are fairly well established.

It is therefore entirely proper for a student of the subject to examine this question of franchises *de novo* and attempt to formulate a franchise consistent with the present economic and legal basis on which it must rest and by which it must be interpreted. If he is wise, however, he will regard the results of such a study as nothing more than a basis for discussion and criticism by others.

Comparisons of Existing Types

Let us assume, therefore, that we have been asked to act as consultants in the drafting of a new franchise for a transportation company in a modern city, in a state where transportation is under the supervision of a public service commission with broad powers, that we have but two objects in view: first, to protect the interests of both parties, second, to produce a practical working document.

Here, then, is the situation. The municipality desires mass transportation. The company is ready to furnish it. The contract is to cover the terms and conditions.

One of the first points that comes up in any service contract is the question as to whether compensation for the service shall be on a cost plus basis or for a flat price. An enormous amount of paper has already been used in printing criticisms of the cost plus basis, and it is necessary here only to state the principal objection, namely, that this form of agreement offers no incentive either to economy or to efficiency of operation.

Unsoundness of a Permanent Flat Rate

On the other hand, a permanent flat rate for service is theoretically unsound because:

1. Changing economic conditions may make it impossible to render a satisfactory service at this rate and may lead to the abandonment of the enterprise, since private capital cannot be required to continue operating under a deficit but may at any time choose the alternative of a receivership.
2. The uncertainty of the profits to be made by a transportation agency under a flat rate makes the enterprise as to its stock, and even to some extent as to its bonds, a speculative rather than an investment proposition, thereby hampering it in its financial program, increasing the cost of money, and under some conditions rendering it impossible to secure the necessary funds for subsequent expansions which must be provided for in any growing municipality.
3. The flat rate is a direct invitation to the management to carry skimping of services as far as possible without reducing net return, and has a direct tendency to prevent the transportation agency from keeping pace with the development of the art.

Entirely apart, however, from these theoretical considerations the permanent flat rate contract is beyond the contractual powers of the parties where transportation is under the control of a public service commission with broad powers.

There is perhaps also a doubt as to the power of the municipality and the transportation agency to enter into a contract for service at cost plus a fixed return upon investment, but there is relatively less danger that a commission or a court will upset a contract of this sort than there is in the case of a permanent flat rate contract.

The real choice, therefore, lies between (1) a service-at-cost franchise in which the transportation agency is allowed to collect its operating costs, taxes, depreciation, and a fixed per cent upon its invested capital, the rate of fare changing automatically in order to keep gross receipts approximately equal to the sum of these items; and (2) operation under rate schedules which the commission may correct if they become unjust, unreasonable or discriminatory, but which the commission may not reduce to the confiscatory level.

Each of these forms has its advantages and its disadvantages. The service-at-cost plus plan, as previously noted, offers no particular incentive to economy and efficiency of operation. Economy and efficiency can be promoted either, first, by seeing to it that the employees render full service, that supplies and materials are not wasted, that the plant is kept in proper repair and made to render full service; or second, by the introduction of improved machinery and the adoption of various devices, original and borrowed from other companies, by which operating costs per unit of output may be reduced and the comfort or quality of the service increased.

The first of these methods of securing economy and efficiency may be reasonably safeguarded by the creation of a supervisory board or official on the part of the municipality who shall keep a constant check on the actual operations of the company; but the full performance of this function calls for a man, or usually men, of broad experience in the transportation field whose services command a price very much in excess of the amount which a municipality is in the habit of paying. Moreover, the exercise of this authority brings the municipality too far into the management field and encourages the company to pass over to the municipal representative the responsibility for efficiency.

The second method demands a keen, active interest on the part of every member of the transportation staff. This interest must spring from within the organization and cannot be imported to it from the outside. The municipality cannot secure it unless it creates its own operating staff and thereby practically doubles the administrative expense of the enterprise.

The occasional success of an experiment of this kind is no proof of the unsoundness of the statement above, but merely an illustration of the fact that some transportation agencies will work for efficiency without the promise of financial reward, and of the further fact that love of the work and an appreciation of the importance of public service sometimes enable a municipality to obtain high-grade service for inadequate compensation.

If we are to frame a franchise, however, which is to be in force for many decades and extend throughout the life of several generations of transportation employees and municipal office holders, we must deal with human nature as it is and not as we would like to have it. Moreover, fairness demands that improvement of service, whether brought about by a man or a corporation, shall draw a greater compensation than mere performance of an allotted task, however faithfully done.

Method of Promoting Efficiency

Various methods of promoting economy and efficiency under service-at-cost franchises have been suggested from time to time. Probably the most practical one is the one by which the rate of return is increased as the service charge is decreased and conversely. In other words, the net return of the enterprise is on a sliding scale corresponding to changes in the scale of rates.

Given economic conditions generally static, this will be probably a satisfactory method of meeting the problem, but under such conditions as those of the World War it fails completely to meet the need. It assumes, of course, that increases in the operating cost of a service unit can be prevented by intelligent and efficient operation and that decreases in operating cost are the result of such efficiency and economy. But if a general change takes place in unit costs so that the actual expense of operation undergoes an advance, the charge for service must be advanced accordingly, and if the ability to secure new capital is to be maintained the net return should increase rather than decrease. On the sliding scale principle, however, such an advance in service charges would result in a decrease of rate of return and the credit of the company would be weakened at the very time when it should properly be strengthened. This difficulty might be met by introducing a new factor into the rate structure, such as the general purchasing power of the dollar or preferably the composite price index of street railway operating materials and labor. Under this modification the sliding scale of net return would not be based upon the rate scale but upon the relation of the rate scale to the price index.

The advantage of this method of regulating service charges is that the speculative element is almost entirely removed, the enterprise comes into the straight investment class with practically a public guarantee of a given return. As a result, bond capital can usually be secured at a low rate of interest, and if the contract includes interest charges as an expense rather than as a part of the return the public is immediately benefited by a reduction in the cost of service. Moreover, this method produces practically a public partnership relation with the utility, resulting in a public co-operation in the promotion of satisfactory service conditions, such as the prevention of jitney competition, the elimination of unnecessary street obstruction, and a willingness to dispense with extravagant service and unnecessarily luxurious equipment.

Rates Under Commission Regulation

Under commission regulated rates there is a stronger incentive to economy and efficiency of operation, since they result in a direct financial reward to the management in that they increase the net margin possible under the authorized rate. Moreover, the municipality is freed entirely from the necessity of exercising managerial duties and yet retains in the periodic commission investigation an opportunity of determining whether or not the service is rendered with reasonable efficiency and economy. The discretion of the commission in fixing rates covers a rather wide range between confiscatory levels on the one hand and the value of service on the other, and the far-sighted commission will seize this opportunity to force efficient operation by rewarding its presence with a high rate and punishing extravagance with a rate more nearly approximating the confiscatory level. This plan leaves, however, something more of the speculative element in the industry and therefore has a corresponding tendency to increase the cost of money and make the financing of improvements and extensions more difficult.

Theoretically, commission control should give as great stability to the income as the service-at-cost system, but commissions are not always wise and commission relief frequently lags behind necessity, so that capital with its proverbial timidity will probably ask a somewhat greater return under this system than where there is a definite municipal guarantee of a fixed return.

Moreover, while such public co-operation as reduces the cost of service ultimately reacts upon the rate just as inevitably under the commission rate system as under the service-at-cost system, the relationship is less direct and immediate, is not so clearly understood by the general public, and public co-operation is therefore apt to be less effective.

A Suggested Form of Franchise

The modern franchise may therefore reasonably adopt either one of these two theories. The writer would prefer at present a modified service-at-cost franchise, with the sliding scale of return to promote efficiency, with protection against change in the purchasing power of money and against one other contingency to be hereafter noted. The parties to such a franchise contract must be sure, however, that it is enforceable under the local laws, since otherwise either party, after operating for years under conditions less favorable than those under the commission plan, may find the contract repudiated by the other party merely because the relative advantages of the two plans are reversed. Under such a system as this, capital is sure of its return if it provides intelligent management and is increasingly rewarded as the management becomes more efficient; the municipality is freed from managerial duties; the reduction in rates through effective public co-operation is instantaneous; and the industry is safeguarded against economic changes which might result in a decrease of reward in spite of an increase in efficiency. So far as we are aware no such franchise has yet been written.

In the concluding installment of this article, to be published next week, the author will outline the provisions which should be included in a franchise of the kind just mentioned.

Rolling Stock

By J. C. THIRLWALL
Railway Engineering Department, General Electric Company

Smaller wheels have reduced car weights. The single-truck car has certain advantages. Relative merits of center doors and end doors are discussed. Lighter cars are being used on rapid transit lines. Trend toward luxury is noticeable on interurbans. Some railways are making the seats more comfortable.

MARK TWAIN once observed that "It takes a difference of opinion to make horse racing profitable." He might have added that individuals who are interested in horse racing sometimes find their opinions extremely unprofitable. The same enthusiastic difference of opinion as to the respective merits and demerits of various car and equipment designs is found in the electric railway industry. Moreover, an ever greater profit or loss may follow when money is spent to put these ideas into practice. For an impartial observer to pick out from the great variety of designs those which represent the best thought along the lines of modern practice is a difficult task. Nevertheless, there are certain fundamentals upon which the operating and designing engineers are almost unanimously agreed, and which are reflected in a majority of the cars recently purchased.

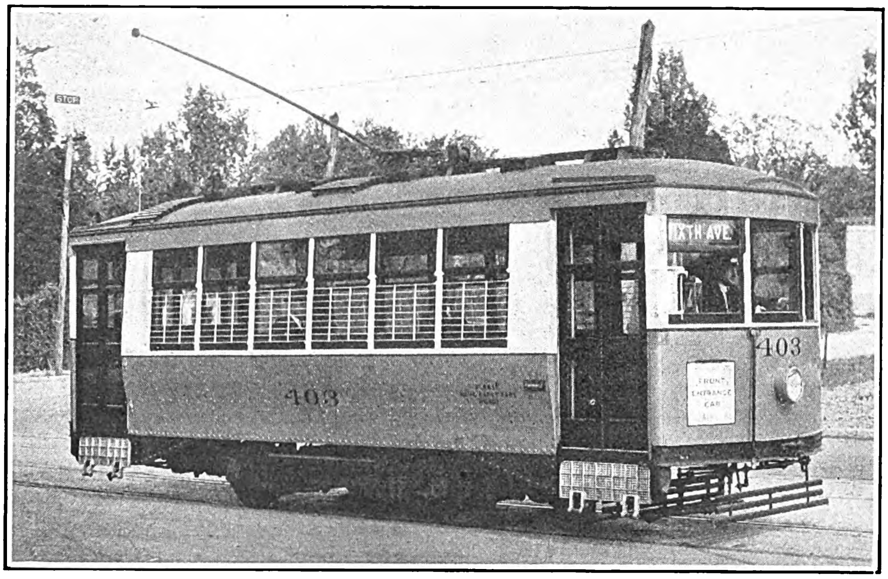
For city cars the high wheel truck has been discarded, with very few exceptions, in favor of the 26-in., 27-in. or 28-in. type, permitting either a reduction in step heights, the elimination of the drop platform, or both. The New Orleans Public Service, Inc., was the only large urban company that purchased 33-in. wheel equipments during the past year, while the most recent cars in Philadelphia, Chicago, Brooklyn, Detroit, Boston, Pittsburgh, Cincinnati, Los Angeles, Cleveland, St. Louis, Atlanta and many other cities use low wheel trucks.

Even in the interurban field there was a decided movement in this direction and the majority of such companies buying new passenger cars specified wheels of 26 in. or 27 in. diameter. This was mainly among the moderate speed roads however, the high-speed lines preferring to keep platform heights the same as on their existing equipments. But several complete installations were made of low wheel cars on roads that have free running speeds of more than 45 m.p.h., and which may, therefore, be considered well above the moderate speed class.

The reasons for this trend are numerous, and all of them in accord with sound engineering principles. The primary desire was to facilitate passenger movement by a reduction in the height between the ground and the floor of the car. In most instances this takes the form of eliminating the step from the platform into the body of the car. This saves time for the passenger and reduces the number of falling accidents. It also makes possible a stronger and lighter body construction, by permitting the extension of the longitudinal sills to the bumper and cutting down the overhung weight of heavily reinforced platform knees. The weight thus saved in the body of a double-end car amounts to about 500 lb.

But it is in the trucks and motors that the biggest saving in weight is obtained. For a city car, two trucks with 6-ft. wheelbase and 33-in. wheels weigh from 13,000 lb. to 14,000 lb. Even the more modern type, designed for small motors and using a 4-ft. 10-in. wheelbase with 33-in. wheels, weighs about 12,000 lb. per pair of trucks. The same

Greater Comfort for Passengers in Single-Truck Safety Cars Has Been Secured by the Use of Plush Seats by the Knoxville Power & Light Company



A Rear-Exit Door on a Single-Truck One-Man Car Relieves Congestion at the Front End

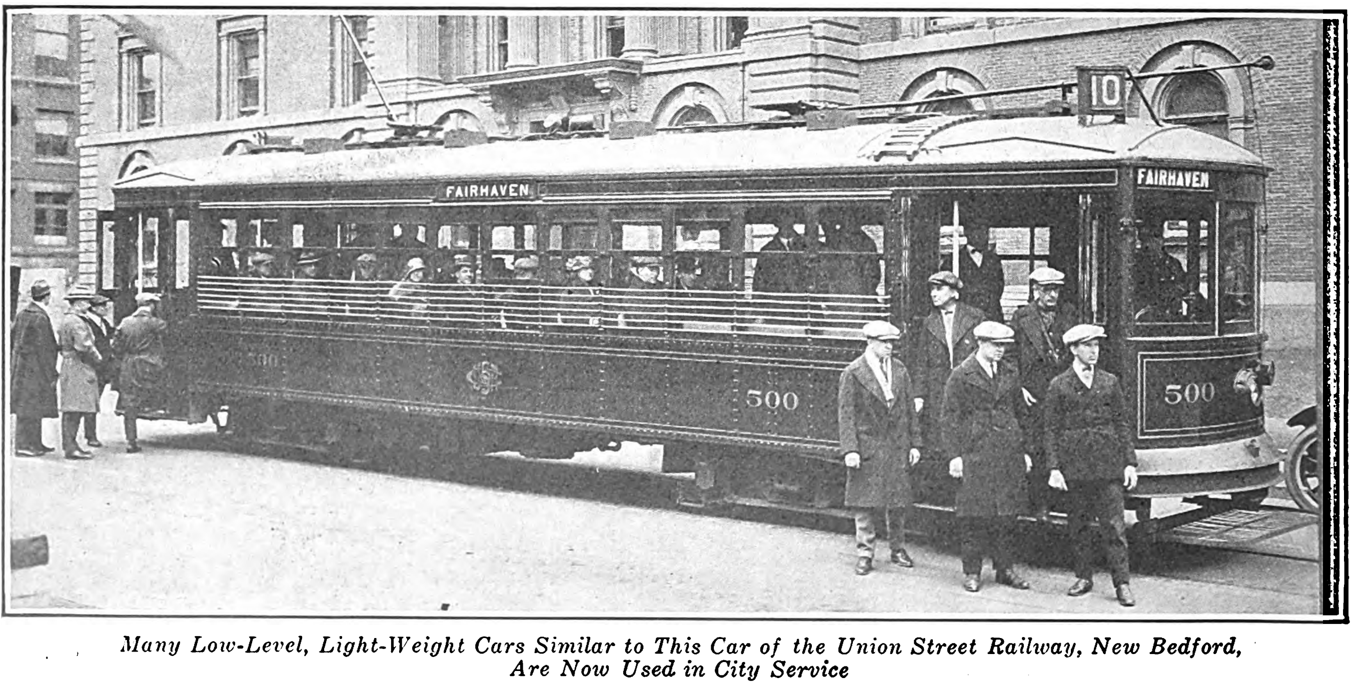
design with 26-in. wheels and a 4-ft. 6-in. wheelbase, suitable for use with 25-hp. motors, weighs about 10,000 lb. per pair. Many trucks now in service weigh even less than that. In other words, smaller wheels require a lighter truck frame, and the wheels themselves weigh materially less, the combined savings amounting to from 1,000 lb. to 1,500 lb. per truck for city cars and 2,000 lb. or more per truck for cars in interurban service.

The modern high-speed motor, built for use on the low wheel truck, accomplishes further weight reduction. Four 35-hp. machines with a working capacity practically equivalent to that of four of the old GE-80 or Westinghouse 101 type save between 5,000 lb. and 6,000 lb. per car. In the first place there is a saving of approximately 400 lb. per motor for the low wheel type as compared with the high wheel type which requires a longer gear center and heavier frame. Moreover, the weight reductions in the body and truck combined frequently permit the use of 25-hp. motors, thus effecting a further reduction of about 1,600 lb. per car. Additional savings are made in the weight of the truck frame.

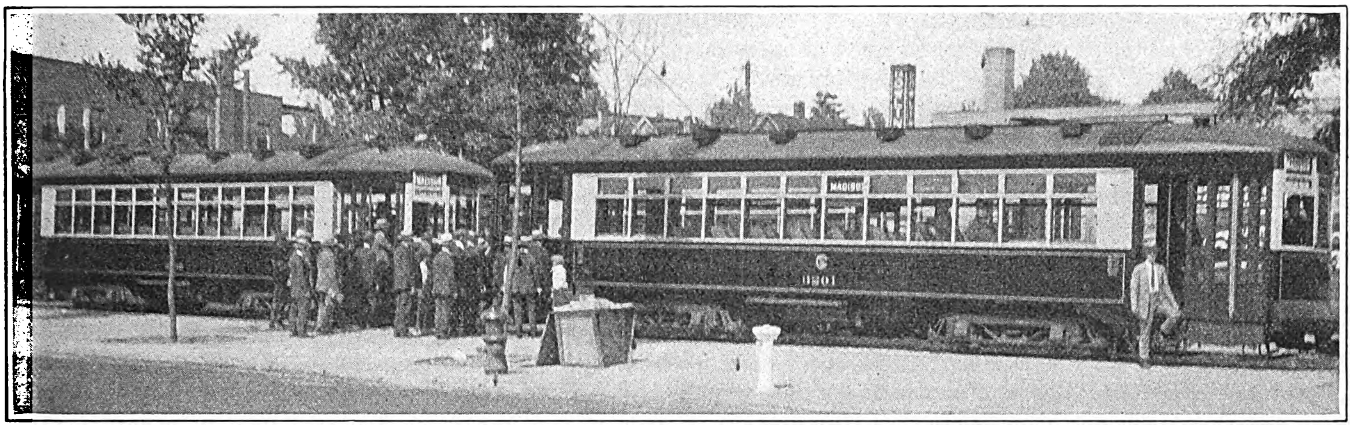
The combined results are seen in the 48 to 50-passenger cars used in city service by many New England railways. They are equipped with four 25-hp. motors on 26-in. or 27-in. wheels, and weigh from 28,000 lb. to 32,000 lb. as compared to 43,000 lb. to 52,000 lb. for the older types of similar capacity that are now being retired. Even lighter cars of the same general type have been put into service by the Stone & Webster properties in the South, and by a number of moderate speed interurban roads in the Middle West.

For city service in Detroit, St. Louis, Cincinnati, Atlanta and Providence and on a considerable number of moderate speed interurban roads 35-hp. motors were selected together with 26-in. or 27-in. wheels for cars seating 48 to 54 passengers, and weighing from 32,000 lb. to 37,000 lb. In Philadelphia and Chicago the latest cars using two 60-hp. motors and 28-in. wheels weigh from 35,000 lb. to 38,000 lb. All of these show very material reductions in weight per seat from the older types used on the same properties. The biggest part of the saving is unquestionably due to the low wheel equipment.

The economies in operation resulting from this weight saving are material. In the first place, the cars and equipment can be purchased at a lower price, thus reducing fixed charges for interest and depreciation. The reduction in energy consumption is almost directly proportional to the weight, thus reducing both the annual power bill and investment in power house, substation and line. The maintenance of equipment and maintenance of track costs



Many Low-Level, Light-Weight Cars Similar to This Car of the Union Street Railway, New Bedford, Are Now Used in City Service



The Latest Multiple-Unit Cars of the Chicago Surface Lines Are Equipped with Automatic Exit Doors at Both Ends

are both favorably affected, and there exists good evidence that the life of track is largely governed by the ton-miles moved over it.

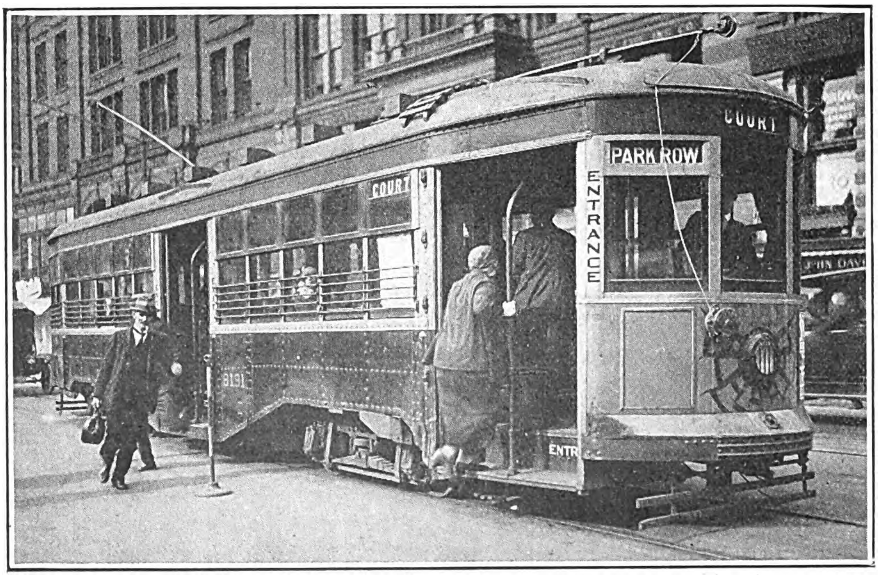
The actual annual economies effected will vary on different properties, being largely governed by the annual mileage per car, by the cost of power generation, etc. But it is interesting to note that the engineers of the Boston Elevated Railway, after several years of careful study of this problem, have decided that under their conditions the economies due to weight saved in their new cars amount to $219 per ton per year, or about 11 cents per pound. Their analysis of this subject was presented in the ELECTRIC RAILWAY JOURNAL for July 26, 1924. But in their analysis, they omit entirely the item of fixed charges on the investment in the cars themselves. Cars today cost approximately $800 per ton, including all equipment. Interest, depreciation, taxes and insurance usually amount to between 13 and 15 per cent, so that the annual fixed charges on a 20-ton car will be from $2,080 to $2,400, and for a 16-ton car between $1,664 and $1,920, a saving of between $416 and $480 per year, or more than $100 per ton. It appears, therefore, that a complete analysis would show on any road total savings of close to $300 per ton annually.

Single-Truck Cars Have Advantages

In the matter of wheel diameter and weight reduction there is almost a universal agreement, at least so far as urban operation is concerned. There is another trend, nearly as distinct, to which a number of able operators take vigorous exception. This trend is illustrated by the practical elimination of the single-truck safety car from recent purchases, even by properties for which it is in many respects better suited than the heavier and more expensive double-truck type. In the case of the larger cities, where headways on all lines are reasonably short, or where rush-hour loads are tremendously in excess of normal, the superior riding qualities and greater average capacity of the double-truck design probably offset the advantage of shorter headways. But in many of the smaller communities, any given investment in modern single-truck cars will pay a greater return than if the same amount of money were put into larger double-truck vehicles. This is based on the universal experience that where headways are 10 minutes or longer, any shortening produces a material increase in riding. In only a few cities, except those of the first class, did normal headways of less than 10 minutes prevail prior to the adoption of the safety car, and this condition still exists on many routes in too many communities. In others, notable among these being the Stone & Webster properties, enough safety cars were purchased to provide all-day headways short enough really to attract traffic. After that modern, light-weight double-truck cars, with their advantages in rush-hour service, were a logical purchase.

But for a railway in a city of 30,000 to 100,000 population, with normal headways of 15 to 20 minutes, which are still all too common, to purchase 10 double-truck cars at a cost of $125,000 in preference to 15 single-truck cars at $95,000, and to continue to operate on the old headways instead of cutting them to 10 or 15 minutes, appears to be an error in judgment because the operating cost would be lower and the service would be better with the small cars.

It must be admitted that the so-called standard 28-ft. safety car is not a comfortable vehicle in which



The Double-End, Center-Exit Cars of the Brooklyn City Railroad Are Unique to ride and that it is in most instances extremely noisy. Nevertheless, railway after railway, on line after line, found that more people rode on three of these cars on a 7-minute headway than had been riding on two double-truck cars on a 10-minute headway. The objection that the car as originally built does not meet today's standard of comfort is a valid one, and is some justification for the use of the double-truck type. But a number of operators have taken the small car and made its comfort comparable to that of the ordinary double-truck design, by introducing heavily upholstered seats of greater width and spaced to give more knee room, and with a wider aisle, and by adding a rear exit door to minimize the crowding at the forward end.

Single-truck cars with such changes have been put into service in Lexington, Ky.; Knoxville, Tenn.; Columbia, N. C.; Zanesville, Ohio, and other cities. Their owners are enthusiastic about their performance, and in particular about the increased gross earnings that have followed their installation.

As to the suitability of the 30-passenger single-truck car for many routes in even the largest cities, C. E. Morgan, vice-president and general manager Brooklyn City Railroad, states emphatically that on the routes in Brooklyn over which his railway operates more than 180 Birney cars he would not substitute double-truck cars if they were available, unless riding should increase to such an extent that headways would have to be much shorter than at present. Furthermore, he believes that an attempt to operate larger cars on longer headways on these routes would be vigorously criticised by the patrons of the company.

Double Platform Versus Side Doors

The location of entrances and exits is a subject on which there is a decided difference of opinion. Opposing views are reflected in the more recent cars purchased. The majority of railways, including all in New England and nearly all in the South and on the Pacific Coast, appear to prefer the double platform car. Brooklyn, Detroit, Philadelphia, Pittsburgh, Cleveland, and Birmingham, on the other hand, have purchased side-door cars. In the case of Birmingham, it was purely a local cause, the need of providing separate entrance and exits for whites and negroes, that dictated the choice. A double door was located about one-third of the way from the rear of a single-end car, the negroes occupying the space to the rear and the whites the forward portion of the car. With the conductor stationed at this door, the arrangement permits positive segregation of the two races. Obviously, one-man operation of this car is not feasible. These cars were described in ELECTRIC RAILWAY JOURNAL for July 12, 1924.

In most of the other cities mentioned the intent was to speed up the loading of the passengers, particularly at heavy terminals, by utilizing the forward half of the car as a loading platform, entrance being at the forward end and fares being collected as the passengers pass the conductor, who is stationed adjacent to the center side door. These cars follow the general design of the Peter Witt type originally used in Cleveland.

In Cleveland, Detroit and Philadelphia the cars of this general design are single end, having but two doors, the one for loading at the front and the middle door for exit. Breaking into the side frame increases the weight approximately 1,500 lb. on the single-end car, in order to secure equivalent structural strength, and naturally the trucks, motors and accessories have to be heavier, so that the equipped cars average 3,000 lb. to 4,000 lb. heavier than a double platform car of the same dimensions. Single-end cars, moreover, do not readily lend themselves to turn-back service, and of course cannot be used on lines which do not have loops. Despite these obvious disadvantages, the managements in the cities mentioned believe the speed in picking up extremely heavy loads more than compensates for the higher operating cost.

To put center doors on both sides of a double-end car adds several thousand pounds more to its weight, but the Brooklyn management, having in mind the capacity loads picked up at the Manhattan terminals with cars on very short headways, decided in favor of such a design and pronounces them highly satisfactory for these conditions. It is admitted, however, that the weight is excessive compared to the recent cars of other properties, and studies are now being conducted to determine how the weight can be reduced safely. Changes planned seem to hold out interesting possibilities. In the rearrangement of cables and in platform or vestibule design, these changes are revolutionary, but they are not yet far enough advanced for discussion.

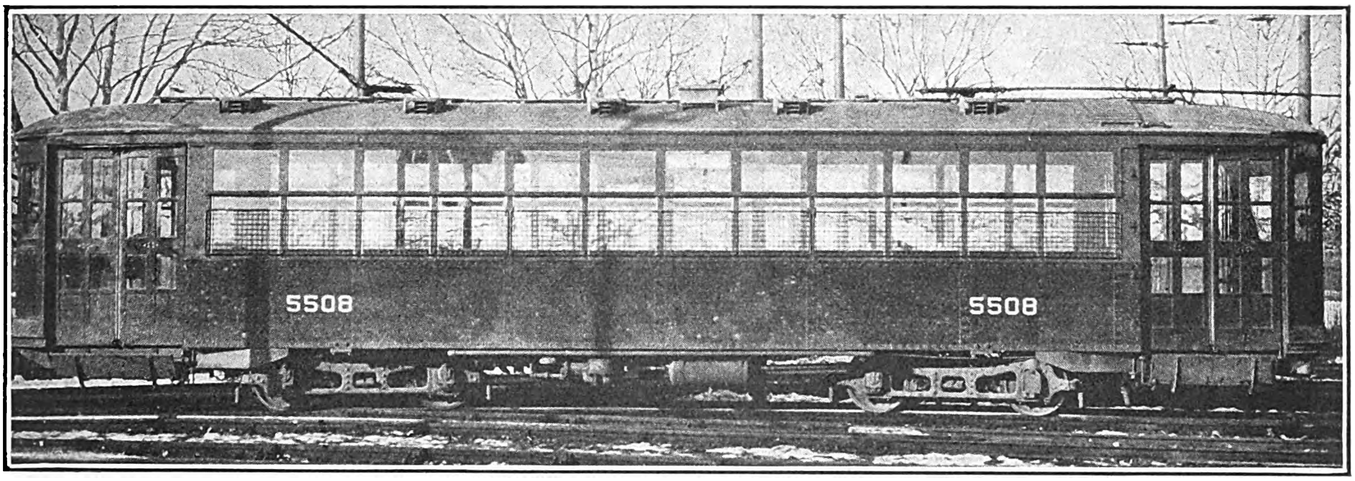
Another advantage possessed by center-exit cars is that with nearside stops front entrance involves less walking for the average passenger who waits near the curb line than if he must enter at the rear 40 to 50 ft. further from the street corner. In Brooklyn, this has been found to reduce the average time per stop materially.

In Philadelphia, the P. R. T. Co. has put in service a large number of single-end cars of this design. But the extra cost, weight and complications involved in a double-end center-exit car led the Philadelphia management to install end doors only on the cars it purchased for routes without loop terminals. There are many heavy loading points, particularly at rapid transit terminals, but some of the heaviest loads are from prepayment areas, and the collection problem is therefore not so acute as in Brooklyn.

The heaviest loading points on the surface lines of the Boston Elevated Railway are in the tunnels and rapid transit terminals, which are prepayment areas, and outside of these points there seldom is a load at any one stop that cannot be accommodated on the platform. Moreover, the construction of the rapid transit terminals necessitated the use of double-end cars. The solution, therefore, was the end entrance and exit double platform type, and an unusually light car was designed, its weight being approximately 31,000 lb. It is believed by the maneagment in Boston that the unbroken aisle and floor of these new cars gives to the passengers a more pleasing effect of spaciousness than the two compartment effect of their older center-entrance cars, with a well and fare box breaking the floor line in the middle of the body.

There is no question but that the side-exit two-man car can pick up heavy terminal loads in a shorter time than can a prepayment platform car. In some places this advantage is worth paying for, but for average conditions, even in most of the larger cities, it is the writer's belief that the lighter weight end-door design is more economical and efficient.

Some novelties in design have been introduced, notably the Minneapolis two-car permanently coupled train, with the truck frame inside the wheels, and using band brakes and an 8-motor controller. This is an extremly light-weight unit, and good reports have been received of its performance in service. But like the articulated three-car train in Detroit, another light-weight large capacity unit, the data available do not permit passing judgment as to its suitability under general conditions.



The End-Entrance Car, Such as This One of the Boston Elevated Railway, Is Preferred by Many Operators

Nearly all recently built city cars are being arranged for one-man operation if desired, even those in the largest cities. Philadelphia and Boston are using extensively their latest and largest capacity cars with a single operator. When so operated, the side door or the rear door normally remains closed. However, in Boston, at rapid transit terminals, both front and rear doors are thrown open to facilitate the discharge of passengers, and both are again opened as the car stops at the loading platform. The same system prevails at some of the connection points between surface and elevated lines in Philadelphia. On cars going toward the elevated, fares are collected as the passenger boards the car; going from the elevated, the passengers pay as they leave, and en route only the forward door is opened while operating with one man. But at the heavy interchange point both doors are opened for quick unloading and reloading.

It is with strictly one-man cars that the greatest difference of opinion prevails as to entrance and arrangement. The standard single-truck Birney car uses a single front platform door for exit and entrance. Some operators have felt that a double door at the front was necessary, even at the expense of a longer overhang of the platform and poorer riding qualities. Modern double-truck one-man cars are nearly all equipped with the double door to permit simultaneous ingress and egress. On the Chicago Surface Lines H. H. Adams has worked out an arrangement by which the outgoing passenger opens and closes the exit door automatically. In these Chicago cars the exit door is on the front platform, but in Washington, D. C., the automatic treadle recently has been applied to the rear door, passengers leaving at that end if they so desire. The Dayton City Railway has for several years successfully operated double-truck one-man cars with a rear exit controlled by the motorman. More recently Lexington and Knoxville have bought single-truck de luxe one-man cars using rear exits. Similar cars are to be used in Zanesville.

In all these cases rear exits were provided to relieve the congestion that always exists at the front end on heavy trips where the exit is alongside the entrance. They seem to serve their purpose admirably. No accidents are reported and practically no attempts to board the car through the rear door.

Even in the rapid transit field there are evidences of a trend toward the reduction of weight so marked on surface lines. Boston has recently built for use in the East Boston tunnel trains of two, four and six cars that are revolutionary in this respect. The individual car dimensions and seating arrangement conform closely to those of the elevated cars, but by taking advantage of low wheels and modern design their weight is approximately 44,000 lb. per car as compared to 76,000 lb., a reduction of about 40 per cent. These cars were described in the Aug. 23, 1924, issue of the ELECTRIC RAILWAY JOURNAL. The Brooklyn-Manhattan Transit Corporation is experimenting with three-body articulated units for subway service, to secure a reduction in weight and simplification of apparatus and wiring, and apparently some gratifying results in both directions have been secured.

In the interurban field, two distinct trends have been apparent. The first and most pronounced has been in the direction of economy and the second toward greater comfort. Railways operating long, high-speed lines such as the Chicago, North Shore & Milwaukee Railroad, the Interstate Public Service Company and the Pacific Electric Railway have devoted most of their efforts to giving de luxe service, the last word in speed and comfort, almost without regard to first cost or operating expense.

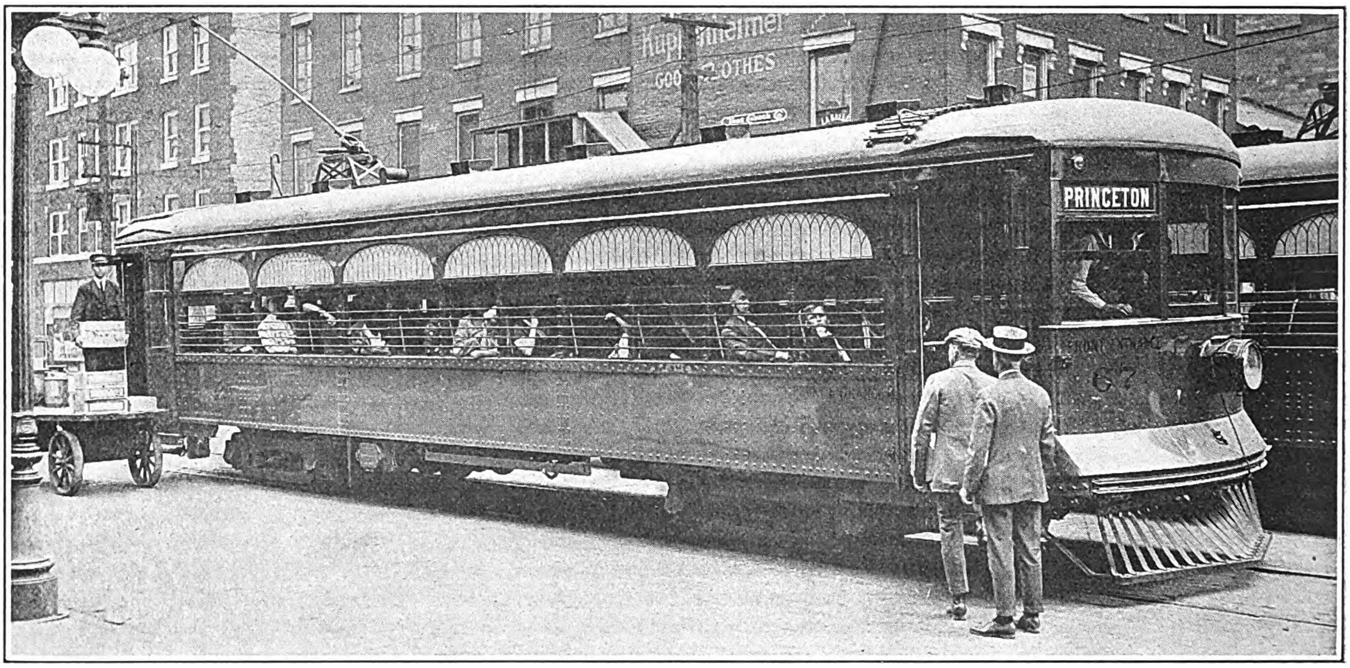
But the vast majority of interuban companies purchasing new cars today have been confronted with so great a reduction in earning power that they have been compelled to seek reduced operating costs as the first consideration. On these roads more revolutionary changes have been made than can be shown even in the urban field. Cars weighing from 70,000 lb. to 80,000 lb. have been replaced by ones weighing from 26,000 to 34,000 lb., as was done by the Kentucky Traction & Terminal Company, the Western Ohio Railway, the Cleveland, Southwestern & Columbus Railway, and several others in the Central states. These new cars, operating on the same schedule speeds as the older type, show enormous reductions in energy consumption and in track and equipment maintenance. Their riding qualities at moderately high speeds, about 40 m.p.h., are superior to the cars they have displaced. Many of these roads report a material increase in passenger receipts since placing the new cars in service and all report a decided improvement in net earnings.

In all fields there has been a persistent and successful attempt to reduce both investment and operating charges by eliminating useless weight; to encourage riding by making the cars attractive in appearance and in seating arrangement, and facilitating ingress and egress of passengers. Splendid results have been obtained.

Almost all operators are agreed concerning the stimulating effect of short headways and fast schedules on the riding habit. Nearly all will agree that comfort is highly desirable as an inducement to riding. Double-truck cars, particularly those with the modern low-wheel truck designed for easy riding, ride well at either high or low speeds and attract favorable comment from passengers. The majority of modern cars use cross-seats in so far as practicable. Car riders certainly prefer them. But, with very few exceptions, these seats are the most uncomfortable things to sit on that the passenger encounters during the day. They are usually narrow and almost uniformly hard. The fact that the duration of the ride is comparatively short hardly reconciles the passenger to an uncomfortable seat. This phase of car design has not been given the attention it deserves.

Automobiles, even the cheaper varieties, have upholstery that gives real comfort to their users. On interurban cars the seat is wider, with spring cushions and soft back, and usually has an arm rest. But the short rider in city street cars has been denied this attractive feature. However, a few installations of upholstered seats have recently been made at Lexington, at Knoxville and at Columbia, S. C. At all three places, single-truck cars were preferred by the operators as being best suited to their traffic conditions, but heavily upholstered cushioned seats were used, of greater width and with more knee room than on the standard safety car. Headways were improved only slightly, but riding increased very materially, due mainly, the operators believe, to the comfort and luxurious appearance of the cars.

Another question to which little attention has been given by American designers is that of noise. A steel body with a bow roof makes an excellent drum, and noises coming up from the truck echo and reecho inside. Something can be done by means of headlinings, double floors and inside sheathing to reduce the sound vibrations. A number of railways have made good progress in this direction. The Twin City Rapid Transit Company has experimented extensively with means to damp wheel vibrations by wooden blocks on the web and by the use of band brakes. The English and the French have gone still further by reducing unsprung weight to a minimum, and have developed rail cars with automotive type drive, suspending the motors on the body instead of the axle. They claim that this not only reduces the noise but makes a better installation. This holds out some interesting possibilities. With a worm drive, for instance, gear noises would completely disappear; a greater gear reduction could be secured, permitting higher armature speeds and smaller and lighter motors, and the bodies could be brought still closer to the ground, again reducing step heights. There is no apparent reason why 22-in. or even 20-in. wheels could not be used. Such a development may seem at the moment a too radical departure from established practice, but after all, that is often the way of progress.



This Interurban Car of the Illinois Traction System Shows the Modern Trend Toward Light-Weight Construction for Operation at Moderate Speeds

Bus Operation

By CHARLES E. THOMPSON

Assistant to the President Chicago, North Shore & Milwaukee Railroad

A field of usefulness exists for the bus, although it will not supplant the electric railway. By co-ordinating its operation with existing facilities, transportation service can be improved. Immediate profits should not be expected. Bus rates must be higher than rail rates. Special trips are good advertising.

HISTORY has a habit of repeating itself. A quarter of a century ago the electric railway was the popular craze. Today it is the motor vehicle. To visualize properly the relative positions now occupied by the bus and the railway it is necessary to go back in one's mind to the early days of the industry.

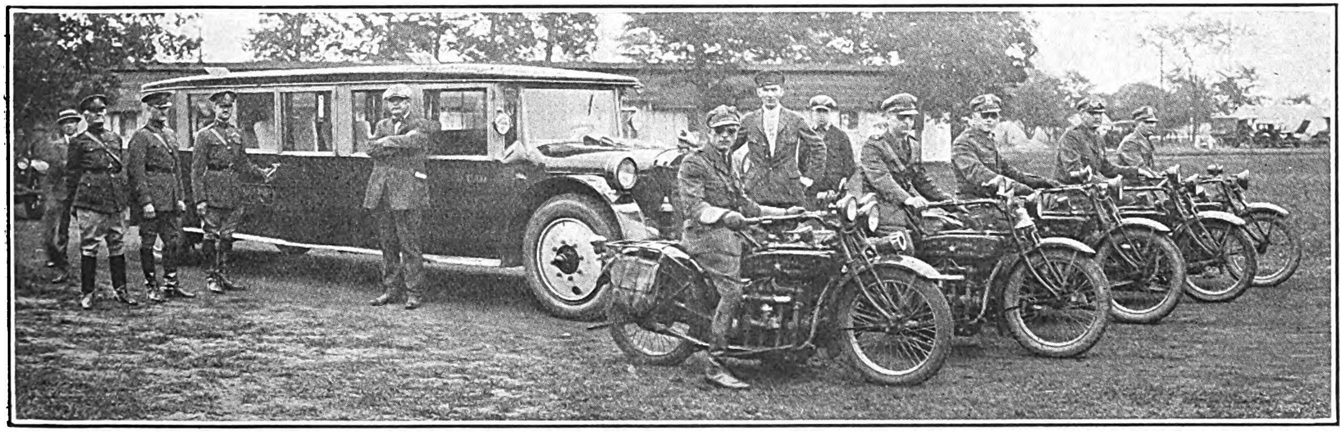
At that time there was a strong popular demand for urban, suburban and interurban electric transportation. Steam railroads looked with disfavor on the new mode of transport, much as some electric railway operators today look on the automobile and the motor coach. The talk then was of the "electric age" and enthusiasts predicted the end of the steam railroad. While the enthusiasm lasted many electric lines were projected into territory where sound business judgment might have foreseen that they would prove unprofitable. Some of these lines have been abandoned in the last few years, partly due to the advent and competition of the automobile, but largely due to the lack of foresight of their promoters.

Did the electric railway prove a serious competitor of the steam railroad after its novelty wore off? Was there any real cause for alarm on the part of the steam railroads? Experience has shown that there was not. The electric railway was able to operate more economically than the steam road and consequently to establish lower rates of fare. Undoubtedly, some short-haul business was taken from the steam roads, but it was business that was largely unprofitable. It was not the lower fare of the electric lines that established their popularity with the public so much as it was their ability to render a service that the steam roads were incapable of giving, and they prospered accordingly. They operated on shorter headways, they opened up territory inaccessible to the steam railroads, they stimulated the riding habit because of the greater convenience afforded and they eventually became valuable allies of the larger carriers.

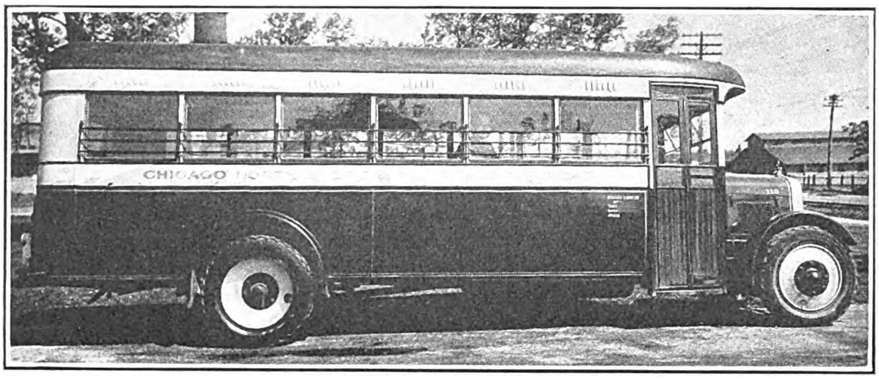
With the advent of the motor vehicle a few years ago, railways fell somewhat into disrepute and many operators became greatly alarmed when they saw the automobile, the jitney and the motor truck cut into their revenues. But the popularity of the automobile and the motor coach was inevitable. The public always likes something new. The automobile was not only new, it was also convenient and it supplied a new kind of service. The public demands service and the use of the gasoline-driven vehicle has grown in favor.

The situation was somewhat disheartening to the electric railway operator. He saw earnings steadily falling off while operating expenses were mounting higher and higher. In many cases he attributed his troubles solely to the rubber craze and looked upon the motor vehicle as a menace which should be fought. He failed to recognize the motor vehicle as a factor in transportation which might be turned to the advantage of the electric railway.

In the early experience of the electric railway and the opposition of the steam railroads there is a lesson that can be applied to the present situation. The rubber craze of today



General Pershing en Route from Evanston to Rockford via Bus of the North Shore Line



Pay-as-You-Enter Type Bus Used in City Service

is much like the electric craze of twenty-five or thirty years ago. Ultimately the outcome will be the same. Where there is a real need for electric railways they are in favor today. They have gone through the storm and the stress of war and post-war periods and are giving more service and carrying more passengers than at any other time in their history. Where there is no real need for them and where the service they performed can be rendered more economically by the bus they are being forced to the wall.

What is the lesson to be drawn? It is that the motor vehicle has its place in the transportation field and that its place must be recognized by the electric railway. Instead of being looked upon as an undesirable competitor, it must be regarded as a valuable ally and its use adapted to meet the peculiar needs of the communities to be served.

When the place of the motor vehicle is better understood it will be fitted into its proper niche in our scheme of transportation, always keeping uppermost in mind the thought of service to the public. Local transportation is a natural monopoly and should be treated as such. The operators of electric railways who have made transportation their life work are the men best qualified to operate bus service. If the goal to be attained is the greatest measure of service that can be given at the lowest possible cost, it follows that all local transportation agencies should be under a unified management, each agency performing the service for which it is best fitted.

If the experience of the last few years proves anything it proves that no other known transportation agency can take the place of the electric railway. Those who talk of the electric railway being obsolete do not know much about the transportation business. They are in the class with those who saw the electric railway supplant the steam railroad thirty years ago. In many of our large cities automobile congestion has grown to be the most serious of all civic problems and in the same cities the electric railways are carrying more passengers than ever before. It is absurd to talk of the bus supplanting the electric railway.

But it is equally absurd to say that the rubber craze will soon run its course. The automobile and the bus are here to stay. It is true that in many of our large cities automobile congestion has grown to such an extent that it has forced thousands back to the trolley as being much more economical of time and money, but that is not an argument against the bus. On the contrary, it is an argument in favor of unification and co-ordination of all transportation agencies.

In the smaller cities it may be that the bus can take the place of the electric railway. In such cases probably it will be found that the electric line has been subjected to unusual burdens in the way of taxes, street paving, etc., and that the traffic does not warrant the rebuilding of tracks and renewal of equipment to give the public the character of service it demands. In other cases it may be found that the bus can be used in conjunction with existing electric lines in serving outlying sections where the population is not sufficient to support the railway investment.

In the larger cities the bus can be used to provide crosstown service and as feeders to the electric lines in outlying sections. Usually the streetcar lines radiate from a central business district in such a way that a person wishing to travel from one outlying section to another outlying section must go by a circuitous route through the business district. Where good cross-town service is supplied the time required to make such a trip is materially reduced. In cases where such traffic will not support a rail line it may be sufficient to support a bus line. The bus can be used to advantage to augment rush hour service and because of its mobility it can be operated on boulevards where there are no railway lines. In large cities there are residential sections in which railway lines are not desired and the motor coach offers a convenient mode of transportation to the residents in such localities.

The bus has the greatest field of usefulness in cities of more than 250,000 population. Local transportation in these cities may consist of only street railways, or it may include surface, subway and elevated lines, but in all cases the bus can be used to advantage to supplement such service. It can be used on cross-town or feeder lines in outlying sections, as a temporary extension to an existing line until the territory is developed sufficiently to support a railway line or in boulevard service for those who live at some distance from existing facilities. It can be used to supply an express service for long-distance riders while the railway furnishes the local transportation. This would improve the service for the long-distance rider and make more seats available in the rush hours for the short-haul passenger.

It is evident, however, that in order to utilize the bus to the fullest possible extent its operation must be controlled by the electric railway. It must be made an adjunct to existing railways and all surface, subway and elevated lines be unified so that competition and needless duplication of service can be eliminated. Operating expenses can then be reduced and the public given the benefit of a properly co-ordinated service at a minimum cost.

The North Shore Line, for example, has not been troubled with jitney or bus competition. When the jitney appeared as a possible competitor to the street car in the city of Waukegan one-man safety cars were installed, headways reduced and service greatly improved. The jitney was unable to offer any serious competition and in a few weeks it died a natural death.

Six motor coach lines have been established during the past two years by this company in order that its territory might be adequately provided with transportation and new territory made tributary to the railroad. Of the six interurban bus lines now being operated, three are strictly feeder lines serving territory not previously served. These lines operate from Kenosha, Wis., to Lake Geneva, Wis., 32.5 miles; from Waukegan, Ill., to Antioch, Ill., 20 miles, and from Waukegan, Ill., to McHenry, Ill., 25 miles. The others are parallel to the railroad and are in a measure at least in competition with the rail service, although in each case they are to some extent feeders to the railroad. These lines run from Kenosha, Wis., to Waukegan, Ill., 19 miles; from Waukegan, Ill., to Highland Park, Ill., 14 miles, and from Highland Park, Ill., to Wilmette, Ill., 14 miles.

In addition to the interurban lines the company operates urban bus service in the city of Waukegan, covering parts of the city not adequately served by street car lines. It is planned soon to operate other lines, both urban and interurban.

Our bus service to date has not been profitable from a strictly operating standpoint, but immediate financial returns should not be expected. It takes time to put any kind of business on a profitable basis. Those of our lines which have been in operation for about two years are now self-supporting. The others are showing good increases in traffic and will, no doubt, at least pay operating expenses within a reasonable time.

In the early days of electric railroading very little attention was paid to the cost of operation. It was assumed that railways could be operated more cheaply than steam roads, and therefore rates of fare were established on a basis much lower than those in effect on the steam railroads. Experience proved, however, that the assumption was not correct and the fares on electric interurban railways are now almost on a par with those charged by the steam roads. We should profit by the experience of the past. If we do we will know what it actually costs to operate a motor vehicle and what rates of fare will produce sufficient revenue to pay the cost of operation, provide for the replacement of the equipment at the end of its service life and provide a fair return upon the investment.

It is difficult to give operating statistics that will be of value without a lengthy discussion of details. However, it may be profitable to give a summary of operating costs based on actual experience and certain assumptions which may be modified to conform to conditions on other properties. For a bus in interurban service with seating capacity of 25 to 30, equipped with six 36-in. x 6-in. pneumatic tires, costing $8,000, and run 50,000 miles per annum by operators receiving 60 cents per hour, the cost will be approximately as shown in the table.

Touring Party on a Seven-Day Bus Trip Through the "Land o' Lakes"

Items:		Cost per Bus-Mile
Way and structures:		
Maintenance, garage and station buildings...		$.006
Equipment:		
Inspection, repairs, painting and miscellaneous garage expenses...	$0.053	
Tire renewals...	.019	
Depreciation...	.032	
		.104
Power:		
Gasoline...	.026	
Battery repairs and renewals...	.003	
		.029
Conducting transportation:		
Superintendence...	.005	
Wages of operators...	.059	
Lubrication...	.004	
Washing and cleaning...	.006	
Heating, lighting and miscellaneous station and garage expenses...	.018	
		.092
Traffic:		
Advertising and solicitation...		.007
General and miscellaneous:		
Salaries of officers, clerks and general office expenses...	.008	
Injuries and damages...	.003	
Taxes and insurance...	.038	
Other general...	.002	.051
Total operating expenses...		$0.289
Return on investment in equipment, garage buildings and tools and station buildings and equipment...		.021
		$0.310

From these figures it is plain that under the conditions outlined a revenue of 31 cents per mile is necessary to pay operating expenses and a fair return upon the investment. What rate of fare will produce that revenue? That depends entirely upon the population and other local conditions surrounding the operation. Our experience indicates that bus rates should be higher than rail rates, particularly on those lines extending into territory where the population is not large. On such lines we are charging 4 cents per mile for cash fares, 3.6 cents per mile for one-way tickets, 3 cents per mile for 25-ride tickets and 2 cents for 50-ride individual monthly tickets. On the Kenosha-Waukegan line, which is competitive with our rail line, we charge the same rate and tickets are good either on the trains or the buses. This line is handling in excess of 400,000 passengers per annum, and a large portion is new business, created by the service. On all our lines the minimum fare is 10 cents.

To my mind the most important reason for bus operation by electric railways is the matter of public relations. There are, no doubt, many cases in which it might be argued that the railway company would lose as much from its motor operation as it would from the competition of an independent operator. While this may be so, there is much to be gained by furnishing all the transportation needed in the community. Public good will is an intangible asset, but there is no other factor which so vitally affects the income account and the balance sheet of a public utility corporation. An electric railway can well afford to add something to its investment and even stand a substantial loss in bus operation if by so doing it can show the public a desire to serve.

In addition to the regular service operated on schedule over definite routes, we have found many other uses for the motor coach. We handle many special parties for lodges, Sunday schools, clubs, etc., whose members wish to have a picnic or attend a meeting at some point not served directly by rail lines. Real estate firms charter our motor coaches to show their salesmen the properties they have for sale and also arrange special service for prospective purchasers. We operate tours to points of interest in the Wisconsin "Land o' Lakes," some one-day tours, others of seven days or less, the rate including transportation, meals, hotel accommodations and entertainment features. An accompanying illustration shows one such party on a seven-day tour. Trips for special parties have been made also to Washington, D. C.; New York, Boston and other Eastern points. The luxurious coaches which are used for these tours attract a great deal of attention and are an excellent medium for advertising our railroad.

Among our fleet of forty-odd cars are two "parlor car" buses, which are used for special occasions. Recently General Pershing desired to go from the home of General Dawes in Evanston to Camp Grant, near Rockford. The most direct route is via highway. A North Shore "parlor car" made the trip of 102 miles in three hours. After inspection of the camp General Pershing and his party were taken to Aurora, where they boarded their train for the West. Before his departure the general declared, "That was the finest trip I've ever taken in a motor car."

Like the many interurban railways which never should have been built and never had a chance of financial success, many motor bus routes have been, and will continue to be, established in territory where there is no possible chance of financial success. In some cases actual experience will have to determine whether or not a line can be made to pay. In others a survey in advance will indicate whether or not the line should be established. The first essential to successful bus operation is a paved highway; the second is sufficient population to support the service. One test that may be applied is to calculate the traffic from the population of the smaller terminus and of the intermediate territory, assuming that this population will provide fifteen rides per capita per annum. If that number will support the proposed service, the line will probably be successful.

The industry can do much to modernize local transportation by using the motor coach to supplement rail service. We should not wait until forced by competition to enter the field of automobile transportation.

We should know the local transportation needs and supply those needs by the best possible methods whether that be by electric cars, motor coaches or airplane.

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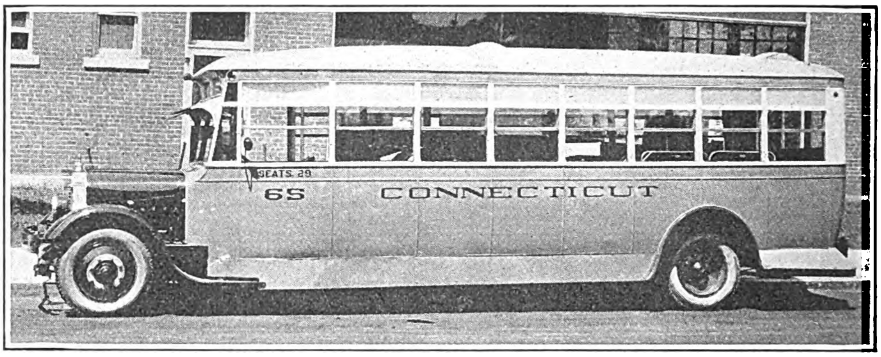
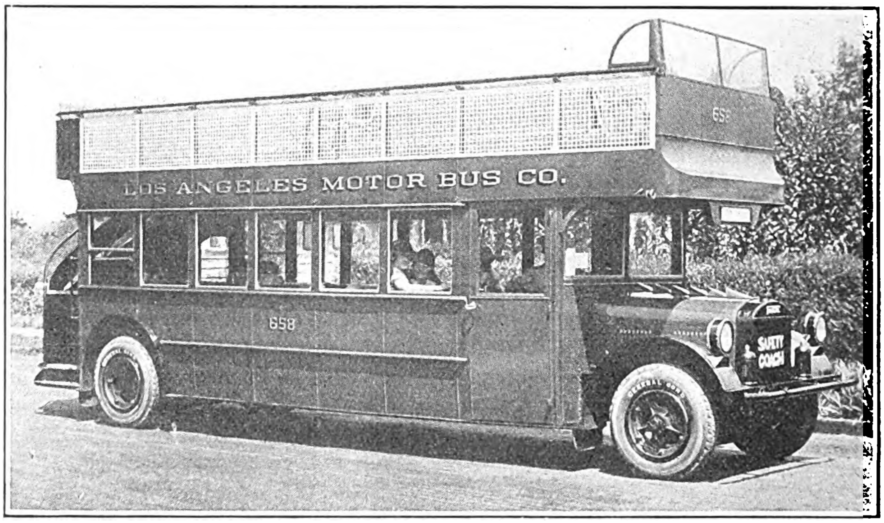
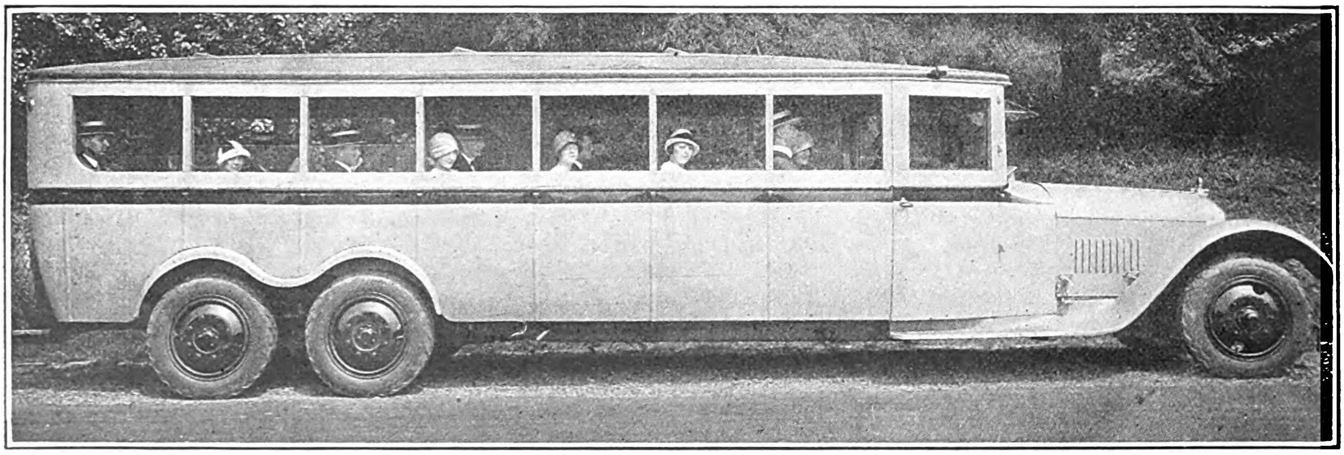
Three of the Newest Developments in Bus Design



This Model Vehicle Has a Wheelbase of 230½ In. and Provides Seats for 29 Passengers



In the Large Cities Double-Deck Buses Have a Wide Field of Usefulness



The Six-Wheel Coach Is One of the Recent Developments in Bus Transportation

Line Construction

By H. M. GOULD

Assistant General Manager Department of Street Railways, City of Detroit

Abnormal wear on trolley wire at suspension ears and failure of strain and line insulators and malleable fittings are among weaknesses of present suspension. Scientific study should be made to correct these defects. A.E.R.E.A. standard fittings should be used wherever possible. Much trouble with the overhead can be eliminated by using more ears in its erection.

WITH continually increasing competition from gasoline-propelled vehicles, together with high operating expenses, the street railway engineer must scrutinize his maintenance costs very carefully in order to maintain his equipment in the most efficient and economical condition. As the overhead equipment constitutes one of the major items of maintenance, it can well be investigated to determine its weaknesses and what should be done to remedy its defects.

Probably the greatest fault of the present-day overhead trolley construction is the abnormal wear of the trolley wire under the suspension ears. Every electric railway engineer is familiar with this effect and each one has some opinion as to the cause. However, while numerous disconnected experiments are being carried on by various railways in an attempt to alleviate this condition, up to the present time no scientific study has been made of this matter to determine accurately the action which causes this abnormal wear and what changes should be made in the overhead fittings to secure permanent relief from the trouble. The particular problem in this case is to determine the mechanics of the operation that takes place at the ear. The rotating wheel moves ahead and pushes upward against the trolley wire, which in turn is being forced down due to its weight. Thus the ear forms an obstruction to the forward motion of the trolley wheel. Numerous types of ears and hangers have been tried out, but none of them seems to have given universal satisfaction.

There are other weaknesses in the present overhead suspension. One is the use of wood strain insulators, which are unable to withstand the shocks caused by dewired trolley poles, with the result that the overhead is torn down. Another difficulty is that the usual malleable iron fittings will not stand shocks without breaking.

To overcome some of these weaknesses the Department of Street Railways has been experimenting with spring hangers, several types of ears, and the use of porcelain strain insulators. These devices make it possible so to install the overhead that even if an insulator should become broken the span or guy wires are interlocked in such a manner that it is impossible for the overhead to be torn down due to failure of the insulator.

The trend of present-day line material design is toward that which has better wearing qualities, is lighter in weight but with the required strength, and which will stand without failure the strains and shocks of railway service. Among the conspicuous examples of this trend is the use of drop forged steel fittings in place of malleable iron, the use of porcelain strain insulators to replace wood strains and the elimination of bronze frogs and crossings. The value of straight-line hangers is questionable. The dielectric strength of the insulation is not uniform, and its character is such that in many cases it softens sufficiently under ordinary summer air temperatures to release the stud bolts holding the ears.

There is no reason why a simple device such as a flat piece of steel cannot be used for holding up the trolley wire when a sufficient number of porcelain strain insulators are inserted in the span wires. The Department of Street Railways is at the present time trying out this scheme on a line which is equipped for test purposes with practically all the well known kinds of line fittings.

Drop-Forged Fittings Are Lighter and Stronger

Drop-forged line material fittings have been found much superior to malleable iron fittings in that they can be made very much lighter in weight and still have the same strength. They will not break under shock. When they are produced in reasonably large quantities they can be manufactured much cheaper than malleable fittings and in general they have a much better appearance.

At the present time there are too many different types of frogs, crossings and section insulators, so that every railway must carry a large stock of this class of material both in the storerooms and on the line trucks. In consequence the members of a line crew usually will find that on some particular job they do not have the proper piece of material with them. Then they must send the truck back to the storeroom, with resulting loss of time of the workmen and oftentimes a serious delay to service if it happens to be an emergency case. This procedure is similar to the old "plumber's trick."

The Department of Street Railways has assisted in the development of the Slaymaker universal frog, which, while rather crude at the present time, has been giving satisfactory service. When this device is fully developed it will tend to solve the problem of providing frogs for more than one angle in a single fitting. This is also true of the Slaymaker universal crossing which is now being developed.

Although catenary overhead has a promising future for interurban service, it is unlikely that it will be used to any great extent in city construction. This is because it requires heavier supporting structures and side guys where poles are used. There also is a considerable amount of overhead wire. With the municipal authorities constantly ordering overhead wires placed underground, it is doubtful if the installation of catenary construction would be considered favorably by them.

Keep Overhead Inconspicuous

In this matter it behooves the railway engineer to use every means to keep the overhead as inconspicuous as possible in order to minimize complaints from the public. This is one of the reasons why the Department of Street Railways paints all poles, crossarms and galvanized material, such as crossarm braces, before installation, so as to make them as inconspicuous as possible.

At the present time the wood pole is commonly accepted as being the most economical supporting structure, but with the growing scarcity of suitable timber it soon will be replaced by concrete poles, which even now have many advantages. They are uniform in dimensions and can be made of pleasing appearance and in any desired color. When these poles are properly designed and manufactured they have all the advantages of strength of steel poles, and with the added factor that the maintenance should be negligible.

The use of building attachments in the congested districts reduces maintenance costs to a minimum, and improves appearance of the street.

There is no need for using larger than No. 00 trolley wire for city service since the trolley wire should be considered only as a part of the collecting device and not depended upon as a feeder to carry for considerable distances the large currents demanded in such service. The use of alloy wire in the heavy traffic districts has proved to be very economical. However, recent experiments made by the Department of Street Railways with copper trolley wire lead to the belief that this wire can be made so as to compare favorably as to wear with the alloy wires.

The standardization of material and equipment which has been the salvation of many other lines of business seems to have been disregarded by the electric railway industry. This is borne out by the general disregard of the American Electric Railway Engineering Association specifications by both manufacturers and railway men. The new A.E.R.E.A. Manual just out should help to correct this condition, but only if every one concerned has a copy and uses it at every possible opportunity. When specifications are drawn up by the various companies for railway material, references should be made to the corresponding specification in the manual. For example, this has been done by the Department of Street Railways in a new specification just issued for cedar ties. The paragraph covering this reads as follows: "Reference is made to the American Electric Railway Engineering Association specification No. W 113-23 as given in the Engineering Manual, issue of 1924, pages 863 and 864."

Use Greater Care in Erection

It has been found that a great deal of the trouble with overhead equipment can be eliminated by using more care in its erection. The use of a dynamometer in stringing trolley wire and span wire makes guesswork unnecessary and also eliminates the possibility of exceeding the elastic limit of the wire and thereby producing an excessive sag. This is not only unsightly but crystallization results, finally causing breaks at the points of suspension. There is no reason why a lineman should consider himself superior to a dynamometer in determining the proper stress in the trolley wire or better than a plumb line in obtaining the proper alignment of the wire.

By paying more attention to the proper guying and anchoring of trolley wire there is less danger of the wire being torn down. This trouble is not only costly but causes unwarranted delays. There is also less wear on the trolley wire with correct guying, because it is less likely to get out of alignment.

For city work the medium sized wheel with the graphite bushing gives the best efficiency. The use of a small wheel means a high rotating speed with the result that the wheel has a tendency to slide, rather than to turn. On the other hand using a big wheel means added weight on the trolley pole. This necessitates increased pole tension, and results in greater damage when trolleys are dewired. The use of graphite bushings provides suitable lubrication during the life of the trolley wheel and overcomes the defects caused by the neglect of periodic lubrication where wheels of the oiling type are used.

Relative Wear of Contact Devices a Problem

A detailed investigation should be made of the operation of trolley shoes both on high and on low-speed sections, and also on sections where wheels and shoes are both operated. This is desirable in order to determine the relative wear on the trolley wire with the different types of contact devices. Up to the present time too many opinions have been offered in this matter without enough actual tests to substantiate them. This was very forcibly brought to the attention of the Department of Street Railways during the arbitration proceedings with the Detroit United Lines in the matter of interurban rental, when the city attempted to fix an amount to cover damage caused by the Detroit United Lines operating interurban cars equipped with shoes over the city tracks. It was found that no reliable information was available on this matter. Consequently it was necessary for the Department of Street Railways to make tests consisting of micrometer readings on the trolley wire and also wipings made by means of a clean cloth which was applied to the trolley wire at various places. The amount of copper dust remaining on the cloth served as an indication of the relative wear caused by shoes, wheels and both shoes and wheels operating on the same section.

The entrance of the trackless trolley into the transportation field has not introduced any new known problems in the construction of overhead or equipment. However, there immediately arises the question of the cost of operation of the trackless trolley as compared with that of gasoline-propelled vehicles. Unfortunately, figures which are available are largely guesswork. They may be so interpreted as to appear favorable or unfavorable to the trackless trolley depending upon the whim of the individual who is analyzing them. The remedy for this is the adoption of a uniform system of accounts for bus operation by the company which contemplates the operation of a trackless trolley system.

Power Facilities

By CHARLES H. JONES

Electrical Engineer Chicago Rapid Transit Company

The power requirements of the electric railway now form a comparatively small part of the total demand in the average community. This favors the purchase of power from the central station, but the correct power contract is important to protect the railway. Outstanding developments in power distribution are the automatic substation and supervisory control.

WITH the extensive use of electricity for industrial work that has taken place during recent years, combined with economies by the railways generally in the use of power, the railway load in the average community is now only a small part of the total. This is quite a contrast with the early days of the electric railway, when the power required by it was a large proportion of the total used in the community. As few power companies were able to supply this demand the railways were forced to undertake generation for themselves. Today power companies have grown to such a size that they are able to handle any business offered to them. The accompanying diagram shows the total output of power companies in a large industrial area where they also supply all power for railway purposes. It indicates that the industrial power business is growing a great deal faster than the railway load.

Increased use of electricity in all lines of industry has greatly diversified the load, with improved load factors at the generating plants. This greater use of the equipment spreads the investment charges over a greater kilowatt-hour output and reduces the cost.

As a result of the rapid growth of the power business, numerous improvements have been made in generating, transforming and distributing equipment, making possible a reduction in the cost of energy despite increases in the cost of labor and materials. To take advantage of all the improvements being made in apparatus, it frequently is necessary for a generating company to purchase additional equipment of the latest and most efficient type. This can be utilized to the best advantage in base load plants, retiring the less efficient equipment to peak-load service only.

With the development of high-tension transmission it has become possible to tie together large power plants located adjacent to centers of population and industry, permitting a better use of plant capacity. Reliability is thereby increased and new business can be taken on that could not be carried economically at the lower transmission voltages. This has resulted in large efficient generating stations at points where the density of the local load would not justify their erection. All of these factors have kept the cost of power down to a minimum, making it desirable for every user in a community to patronize the company which specializes in production and distribution of energy rather than to make it a side line to his own business.

Railway Power Plant a Side Line

The cost of energy is the second largest item of operating expense on a railway system. Any saving that can be made will materially affect the welfare of the property. In order to see clearly why a railway cannot avail itself of central station economies in its own plant, it is necessary to analyze the power requirements. The railway load factor depends on the class of business handled, being about 35 per cent on a property having a heavy rush-hour service, and running as high as 55 per cent where there is little service above the average at any time of day. On interurban lines where freight is handled at night there is a possibility of raising the load factor somewhat above 55 per cent. Since this is the only railway load there is no way of improving the plant load factor for a railway generating station and thereby reducing the cost of energy. The annual increment of increase in load depends on the increase in service on the line. As a general thing, these increments will amount to only about 5 per cent. Increase in the amount of equipment in the plant will be slow, making it impossible to take advantage of more efficient machines as soon as they are put on the market by the manufacturer.

Due to the rapidity of improvement in equipment, obsolesence rather than wear has been the determining factor in discarding apparatus, thus requiring a high rate of depreciation to provide for replacement. In general this has been lost sight of by railway companies, and replacement funds are not available to provide the more efficient equipment.

The size of units in a plant must be kept down to the point where a minimum of spare capacity will be tied up to provide a reserve against the breakdown of a unit in the station. As higher efficiency is obtained in the large units, it is impracticable for the average railway to use the most efficient machines.

The operation of a power house is a side line to the railway business and generally the management is loath to make the necessary appropriations for scientific operation of the plant. The total payroll rather than the cost per kilowatt-hour is looked upon as the measure of energy cost and, since the plant is comparatively small, it is not feasible to hire the specialized talent required for the best operation. Frequently one man must do all the general supervision and engineering, and in these times no one individual can hope to master all the details of best operation of a power system.

Wherever a power plant is operated by the railway, it is a source of considerable worry to the executive. Its operation is foreign to his regular line of business. In times of stress, when all of his energy should be given to transportation problems, his mind will be troubled by power worries. New capital is continually required for the productive end of the transportation business, and usually more is needed than can be obtained. If there is a shortage of available money the power house expenditures usually are deferred until the time comes when they must be made in order to continue operation. This practice results in a further reduction in the efficiency of the plant. When the financing of these requirements can be passed on to a company whose prime business is furnishing power, just so much more capital is rendered available for the primary end of the railway business.

The Effect of New Developments

Within the past few years considerable improvement has been made in rotary converters, with resulting reduction in size and increased commutating capacity. Developments in design have brought the 60-cycle rotary converter to the point where general use can be made of it for railway work. This has been a big step toward encouraging the railways to buy power, as the large developments in the general power field have been made at a frequency of 60 cycles. Hence, in order for the railway to enjoy the reduction in cost, the 60-cycle frequency has had to be adopted, unless the power company was maintaining a 25-cycle system.

From the foregoing, it is apparent that in considering a new undertaking there is no good reason why a railway should go into the power generating business. Even where a company is operating a modern power house the substitution of purchased power is well worth investigating, as under such conditions a favorable contract with the power company is possible on the basis that economy of operation can be improved in conjunction with the general power business, when the plant is handled by specialized talent.

Appreciation of Problem Leads to Satisfactory Contract

Power companies and railways are both public utilities, and as such must give service as demanded. In this respect the two are on common ground, and therefore, the railway is in a position entirely different from that of the average industrial customer of the power company, and must be considered from a different point of view when a contract is framed. In negotiating a power contract a number of things must be taken into consideration by both parties if the best results are to be obtained. The power company should study the railway company's problem and understand its requirements in rendering service to the traveling public, especially under adverse and unlooked for conditions. The railway should realize that the power company is not an unfailing source of supply or an unlimited reservoir of power.

While the railway load may be very sizable, the rate must be such that the power company will make a reasonable profit on the business. The period to be covered by the contract should be made as long as possible. If provisions are made for a variation in price of coal and labor, for readjustment of basic rates when conditions warrant, and for a lower rate to the railway when any other consumer in the same class is given a rate reduction, terms of less than 10 years should not be considered. The contract also should provide for automatic lengthening of the period in case additional power demands are made during the latter years of the term.

The method of determining maximum demand is important, as it will affect vitally the cost of energy to the railway company. An incentive should be offered to maintain it as low as possible, so that this will keep down to a minimum the power company's investment for the service. The general method has been to use the average of several one-hour peaks on consecutive days, but there seems to be a tendency to change to the average of several one-hour peaks on scattered days. This latter practice is unfair to the railway. Conditions beyond the railway's control occasionally cause excessive individual hour loads. When the power company has the capacity available the railway should not be penalized by being prevented from readjusting its service on the following day to compensate for the abnormally high hour. Occasionally there is a desire on the part of the power company to base the maximum demand on periods of less than one hour. This puts a heavy burden on the railway and discourages the buying of power as the momentary peaks are largely governed by conditions of street traffic and congestion.

Synchronous converters inherently have good power factor when the supply voltage is reasonably well regulated and when they are properly operated. This condition is favorable to the power company and it should be considered in the negotiations. Since high-tension lines are rarely provided with automatic regulation, and it is an unwarranted expense, the contract should not carry any penalty for failure to maintain a specific power factor unless at the same time it compensates the railway for giving a better power factor than that guaranteed in the contract.

Providing for Increases in Load

Provision should be made in the contract so that the increments of load increase to carry additional service will be provided for by the power company. This should be done without requiring the railway to make written requests for such increases, if these are made on available sources of supply. These increases will probably never amount to more than 10 per cent, although 20 per cent increases should be handled without previous official notice. When new points of supply are required, written application should be made a sufficient time in advance of the actual need to give the power company opportunity to make the necessary additions to its system to care for the changes.

Demands once established by written application should stand during the life of the contract. Provision should be made so that the demands established by the natural increments of load increases could be dropped after carrying them for one year, the amount of decrease not to be greater than 10 per cent of the previous year's demand. The railway will run into unlooked-for loads due to things beyond its control.

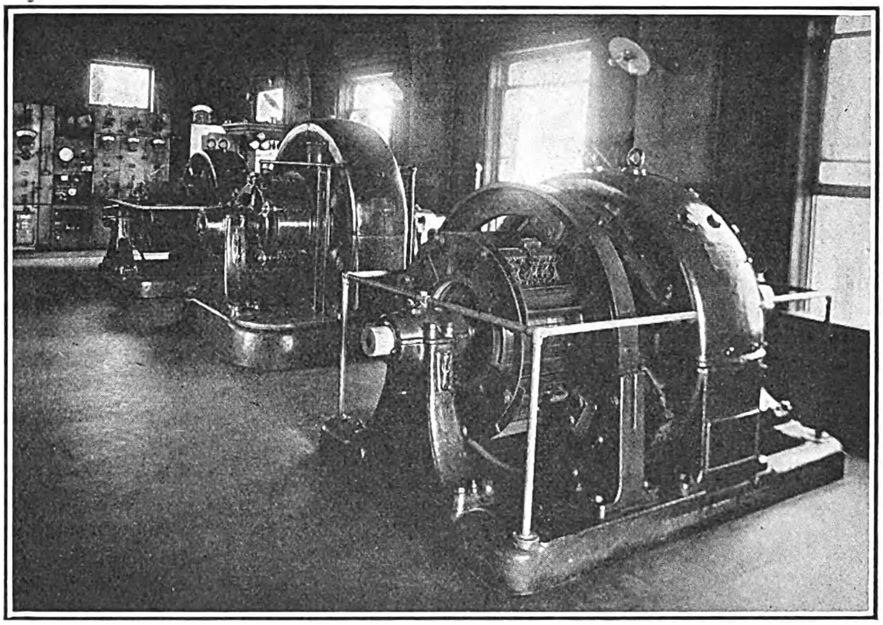
such as extremely cold weather for a few days in the winter. Some provision should be made for supplying these abnormal peak demands by utilizing some of the reserve capacity which the power company must of necessity have on its system. If this capacity is available, power should be furnished without any obligation on the part of the power company to supply this additional demand. The railway should pay for these peaks on some emergency basis, and should not be penalized on its demand for a year or more. Such an arrangement will be mutually beneficial to the power and railway companies and will encourage the railway to give additional load to the power company. The substitution of electric heat for coal heating, while desirable, is sometimes almost prohibitive on account of peak loads produced by it on a few cold days in the winter.

The railway load probably will be large compared with those of most of the power company's customers. The basic rates for demand and energy will have to be the same as those given to large industrial customers. Provision, however, should be made for reducing these as the demand and energy use go up, particularly as the railway load will be diversified from the general industrial load. Furthermore, the railway business is very stable and is not subject to the general industrial fluctuations. While its revenue may fall off in times of depression, its car mileage cannot be cut in proportion to the reduction in riding when business conditions are poor.

Conversion—by Railway or by Power Company

The railway system requires electrical energy in a form not used in general industrial work. For this reason the basic costs will have to be referred to that of alternating current. Whether the power company or the railway does the converting to direct current is an open question that may be handled either way, and there is much to be said on both sides of the question. If this service is to be performed by the power company it should be covered by an agreement supplemental to the general power contract. Conversion for city lines and for interurbans presents different problems, and each will be discussed.

In a city the power company must maintain high-tension distribution lines for its own substations. Hence the high-tension cable system for railway substations should belong to the power company. It would be an economic mistake to build a duplicate system, thereby losing the advantage of the diversity which results from interconnection. The maintenance of a high-tension cable system is a highly specialized job, and the power company, with its technical organization, is in a better position to do the work than is a transportation company.



Development of Rotary Converters in the Past Twenty Years Is Indicated by the Three Machines in This Station

This shows the tendency toward smaller, more compact units. In the background is a 500-kw. unit 10 years old, while in the foreground is a modern 1,000-kw. unit. The machine in the center is a 300-kw. machine 20 years old.

On interurban systems the transmission line connecting substations will probably be on the railway right-of-way. This line is likely to be isolated from the main power transmission system and of little use to the power company. In this case it will be better to have the railway own its transmission line, with provisions for joint use should it become desirable.

Substation ownership is an open question in city work, even more so than before the days of automatic stations, for then some saving in operation could be effected by combining the railway and lighting stations. With the use of automatic equipment on both railway and light systems there is little choice today. With power company ownership the railway is relieved of financing the station, and there may be some saving in operation due to absorbing the cost of the general supervision by the power company's organization at little or no additional expense. On the other hand, the railway will have to pay the power company some profit for the service. The power company will generally insist upon a more elaborate building than the railway actually needs as the former uses its substations to some extent for advertising purposes.

The substation question is closely related to that of distribution, especially with the advent of automatic equipment. This makes it difficult to incorporate in a contract a provision for the installation of additional substations without opportunity for considerable controversy and difference of opinion as to the necessity for them. The railway which wants them does not have to finance them, if they are to be owned by the power company. In view of the above I believe that it is more satisfactory to have the railway company own the substations for railway use exclusively. In case something is to be gained by joint substations the railway should provide the equipment and the power company the building. The power company should operate the station with a division of expense between the two companies.

On interurban systems the substations will serve only the railway and can be operated and maintained more advantageously by it than by the power company, for in this case they are closely related to the distribution system. Therefore, they should be owned by the railway.

The distribution system, which comprises the contact conductor and such parallel feeders as are required to carry the load, usually is attached to the poles supporting the overhead system. This is the portion of the power system on which the most alterations and additions are made to carry the load and suit modifications of service. During times of storm it is most liable to get in trouble. This part of the power system should always be owned and operated by the railway. At the present time it does not seem possible to turn this over to the power company with the hope of any reduction in cost.

Automatic Substation Modernizes Conversion

The outstanding improvement in the railway power field for years has been the development of the automatic substation. This has done much toward making it possible to raise the over-all efficiency of the power distribution system without prohibitive cost.

Prior to the development of the automatic substation, the practice was to install as great a capacity as possible in one substation to reduce the operating expense, even though it required considerable feeder copper. The economic balance between fixed charges and feeder losses governed the size of feeders installed, but in special cases it was necessary to discard this balance in order to obtain a suitable operating voltage. With the development of the automatic station the heavy operating charge was eliminated. This makes it possible to consider the installation of more substations, reducing the feeder copper and also the losses. Thus a new economic balance in the distribution system is created. This calls for an entirely new engineering analysis of the whole subject of distribution. The more efficient distribution of power made possible should not be overlooked.

On an interurban system the economies to be gained from automatic substations is apparent. The load density per mile of track is low, due to the class of service rendered. The factor determining the size of the distribution system is voltage drop rather than load. Stations are of small capacity with a correspondingly heavy operating charge per kilowatt-hour output. As a means of keeping the operating cost as low as possible the tendency always has been to minimize the number of substations. Frequently this has resulted in operating with a lower line voltage than was desirable. The automatic control equipment reduces operating expenses considerably, and by relocating some of the existing converter equipment along the line, considerable saving can be made in line losses. At the same time the average line voltage is improved. On heavy interurban systems the application of automatic stations has made operation on a 600-volt basis economical long after it would have been necessary to go to a higher voltage with manually operated stations.

On city systems the layout for automatic stations calls for considerable engineering study. There are many factors involved which vary with the localities, so that a general statement cannot be made. For a property already in operation, it will be more difficult to justify their use, in view of the retirement of property and rearrangement of the distribution system necessary if maximum economies are to be realized. Factors not directly involved in the economic distribution problem, but which are of considerable importance and require consideration, are the simplification of the electrolysis problem and reduction of the human element in substation operation. Where extensions are being made, or where complete rejuvenation of the distribution system is contemplated, the problem is simplified. A more efficient distribution system can be laid out with automatics and at a cost materially lower than is possible with a manual system, providing all possible savings are made in the installation and no greater degree of reliability is demanded of the automatic system than that given by the manual system.

Factors that Should Be Considered

As a number of solutions can be arrived at in any specific case, many trials must be made and analyzed before the best decision can be given. A number of variable quantities must be considered and a relative weighted importance placed on them for analysis. Many distribution engineers have been considering this problem for some time and developing new thoughts. Considerable of this work has been crystallized in reports of committees of the American Electric Railway Engineering Association. These should be studied by any one contemplating the installation of automatic stations. They represent the diversified views of engineers who have studied the subject on their own properties and have arrived at as near a general solution as is possible at this time.

Supervisory Control a Forward Step

The use of automatic substations has produced a new problem—that of exercising some degree of supervisory control over them. Pioneer work along these lines is still in progress. This consists of placing in the hands of a dispatcher, facilities for opening and closing feeder and other switches in the stations and a means of keeping him informed at all times of the operating conditions. The need may be real or imaginary, but it appears that with extensive investment in automatic equipment some additional investment is warranted to give a continuous check on its performance. Where a supervisory control system is installed the operator feels safer in increasing the time between inspections than without it. The operating saving thus made will carry at least a portion of the investment in supervisory control. Extensive city installations of automatic equipment have been made both with and without supervisory control, and in a few years it may be possible to draw definite conclusions as to the extent to which supervisory control is justified, if at all.

The present systems of supervisory control with answer-back features require three wires between the station and the control point, but a number of stations can be tapped onto the control wires. Where it is possible to lease these wires from the telephone company, as in a city, the problem of their maintenance is simple and the reliability is good.

On an interurban system it is generally necessary to attach the control wires to the overhead supporting structures along the right-of-way. Here the questions of maintenance and reliability are serious, for during storms, when the control is most needed, considerable line trouble is likely, especially with small wires. There is room for considerable improvement in the way of developing a supervisory control system that will operate over a smaller number of wires.

Revised Sectionalizing with Automatic Substations

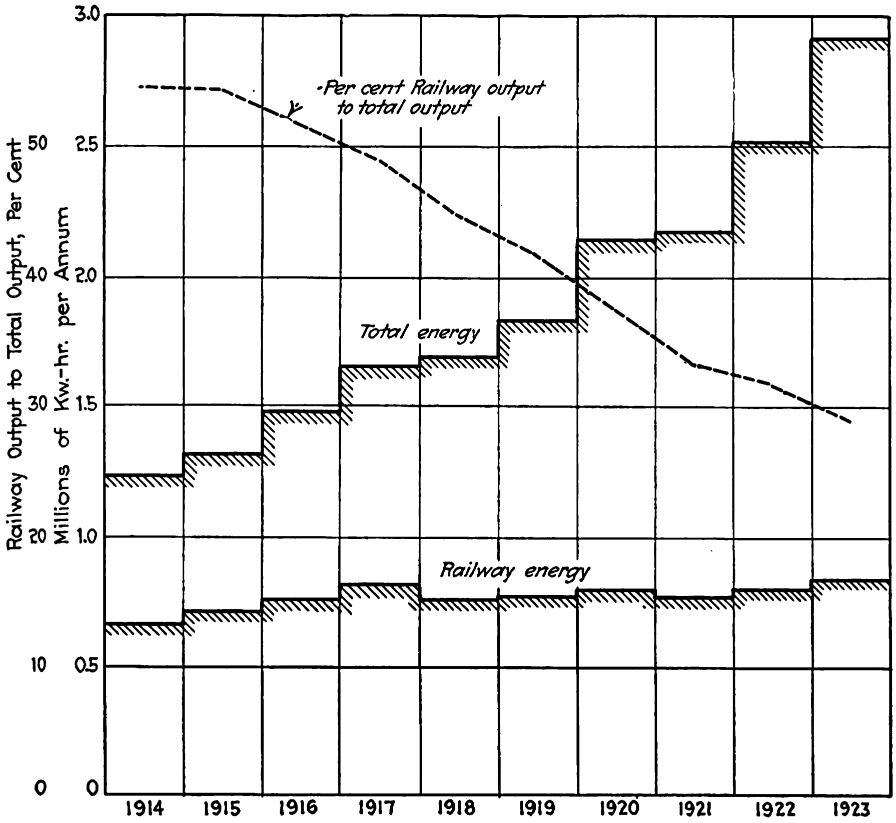
With automatic substations on city distribution systems it has been necessary to readjust the sectionalization due to the greater number of stations and the corresponding reduction in their size. It has been necessary to put more tie sections between stations so that with a station down during the non-rush hours on account of light load, or during the rush hour due to trouble, the load in that section can be carried by the adjacent stations. With large manual stations, feeders were laid out for supply from one point only at all times, resulting in a limited number of tie sections to adjacent stations. Under these circumstances traffic conditions and ability to operate certain routes in preference to others had considerable to do with sectionalization. The load on each individual feeder had little to do with determining its length as the station had sufficient capacity to handle the load. A limited number of automatic sectionalizing switches connected the extreme ends of feeder systems together to take advantage of diversity of load and to make the best use of the distribution copper used.

From a purely economic viewpoint it would be desirable to tie all the feeder system into a solid network and simply to tap into this at each substation. This is not practicable as there are too many chances of grounds which would cause considerable damage in times of trouble. With an exposed contact system which for various reasons must be killed from time to time, sectionalization must be provided in the substations. Such a system can be approached more nearly where there are several small substations than where there are a few large substations. The development of automatic sectionalizing contacts which can be placed at various points throughout the distribution system has been of considerable use to railway companies. If used judiciously these can make a considerable saving in distribution system losses.

Modernization and the Engineer

Modernization in its broadest sense simply means perfection in operating details, elimination of waste in every form and applying to the system every modern improvement which is made, not only for railway work, but for every form of industry.

There are a great many improvements both in labor-saving devices and in methods which were brought out due to keen competition in the industrial world which forced concerns to take advantage of every short cut in order to exist. This incentive to strive for improvements is not so apparant in the railway field as it is in the industrial world, but it is coming to the front. There is a limit to which the fare can be raised. With costs of materials and labor continuing to rise the profits in the railway business must be made through improved methods which lower the cost of operation. This opens up a vast field for the electrical engineer, who has practical knowledge of the details of the work to analyze his problem and apply to his system improved methods. It will require considerable educational work to develop men who can handle this phase of the business. This can be done by starting them on layout work for all new equipment that is to be put in, so they will know the details of the installation. This will cause them to look for new methods and to analyze the present methods with a view toward developing new ways of carrying out the project.



Curve Showing Relative Growth of Power and Railway Business in an Industrial Center. Improvements in Railway Operation Have Kept Railway Load Down, While Industrial Power Use Has Increased

The distribution end of the railway system has practically stood still for many years, and methods of doing work have not kept up to the pace set by the industrial world. It is going to require considerable study on every system in order to accomplish something in this field. The size of the engineering force will have to be increased. Although it may be difficult to point to definite savings made, especially if comparative data on the cost of doing a certain job for years past are not available, the cost of the additional engineering help can be justified.

Electric Railway Financing

By H. M. ADDINSELL
Harris, Forbes & Company, New York

The position of the electric railways has improved greatly in the past three years, but the public has not yet fully reacted to the change. The issues of the present year show a marked advance in the ability of electric railways to obtain capital. Customer-ownership plans have had beneficial results in improving public relations, but should be undertaken with care.

AT THE Electric Railway Association convention in the fall of 1921 I had the opportunity of discussing the general question of the market for street railway securities. The immediate conditions in the industry made the question particularly interesting at that time. The turning point had definitely come after the long continued difficulties of the war period. The intolerable pressure of constantly rising operating costs against revenues limited by a fixed 5-cent fare had been doubly relieved. In most of the important cities outside of Greater New York the 5-cent fare was already a thing of the past. Costs of materials, and to a lesser degree of labor, had furthermore shown substantial decreases from the peak of 1920.

While irresponsible jitney competition was still a serious problem in many localities, it was becoming more and more apparent that a choice of one of the two forms of service would have to be made and that the jitneys were far from being capable of handling the entire local transportation in congested centers. A few large communities had had the opportunity of proving by experience what the jitney could do unaided. In each case a comparatively brief period of suspended service was sufficient to furnish convincing evidence of the essential nature of electric railway transportation and to effect a decided change for the better in the attitude of the public toward the railway company. By 1921 well informed opinion had come into almost unanimous agreement with the finding of the Federal Electric Railways Commission that the street railway was "the most nearly adequate, reliable and satisfactory system available for transporting the maximum number of people through the streets of our cities with the least interference with the use of those streets for other purposes of public ways."

Substantial Improvement Since 1921

Statistics, articles and editorials published in these pages have evidenced the further substantial improvement of the electric railway industry since the fall of 1921. Under the sound influence of common sense and common justice, the idea of the fixed 5-cent fare continues to give way before the more equitable idea of payment for the services of the street cars in line with present-day costs and conditions. The benefits which have accrued to the companies in the form of lower material and labor costs have been supplemented by active work on the part of managements in developing more efficient types of equipment and more economical methods of operation, all of which have found a gratifying reflection in the form of increased net earnings.

The extent of the menace of gasoline competition is now more clearly defined and by that very fact seems less generally serious. Several years of experience have made it possible to estimate more accurately the real value of the bus as a feeder and in supplementary service and have emphasized its inability, at least in its present form, to compete successfully with the electric car on rails as a medium for handling mass transportation. The traffic problems created by the excessive use of the private automobile in congested centers are rapidly becoming so intolerable as to preclude a much further increase in this type of urban transportation.

In 1921 the opinion of the investing public, as evidenced by the market levels for electric railway securities, was far from having recovered from the memory of the earlier and less favorable conditions and any discussion of new street railway financing was at that time necessarily confined to a purely theoretical basis. The further improvement in the prosperity of the electric railway industry since 1921 has had its effect on the security market. As is indicated by the chart shown herewith, the prices for street railway bonds since the low point of 1920 have improved more rapidly than can be accounted for entirely by the changed conditions in the money market. Furthermore, it is no longer necessary to confine the discussion of street railway financing to an entirely theoretical basis. Several substantial issues of bonds have been floated during the past two or three years in behalf of companies doing an exclusively street railway business.

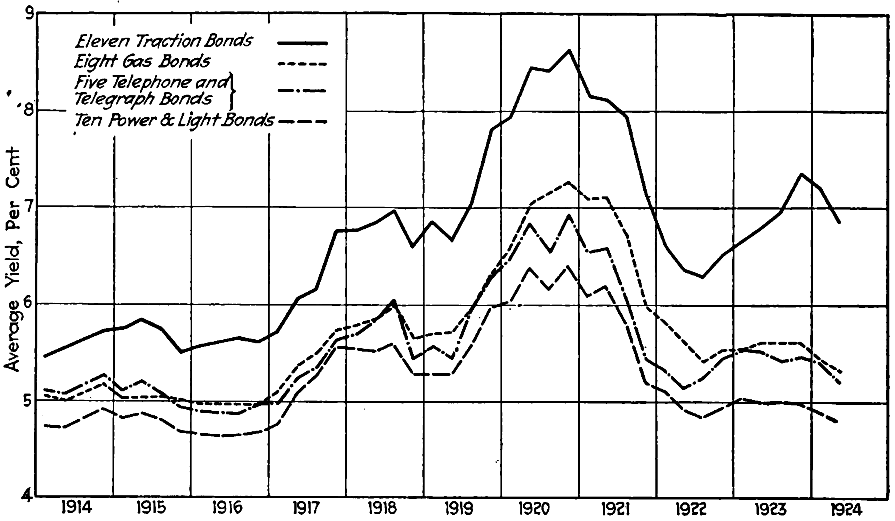
Nevertheless, the change in the rather hostile attitude of the investing public toward electric railway securities since 1921 has been one of degree rather than of kind. Referring again to the chart, it will be seen that on the bonds of the power and light, telephone and gas utilities, the investing public is demanding a yield not much higher than pre-war levels. On street railway bonds they are, however, demanding a yield substantially above what was acceptable in 1914. Before the war it was not uncommon to find an investor who refused to buy anything except electric railway securities. Although the war has been over six years now, still it is not uncommon for a bond salesman to have difficulty in persuading a customer to purchase the bonds of a company just because it happens to do a street railway business in addition to its gas and electric business, no matter how sound and profitable the railway department may be.

The new bond issues by street railway companies referred to above have formed a very small proportion of the total issues of utility securities. In the weekly lists of new financing published by the New York *Times*, for example, only 19 such issues are listed between Jan. 1, 1922, and Sept. 1, 1924. These issues total less than $71,000,000 as compared with an aggregate of public utility bond financing in the same lists somewhat in excess of two billion dollars. Additional money for street railway purposes was, of course, raised by companies doing a mixed utility business, but in practically all cases this was accomplished by placing special emphasis on the non-railway features of the security offered.

Prejudice Against Railway Securities Lessening

I should dislike to create the impression that I am over-pessimistic regarding the future of the street railways in this country, but any discussion of electric railway financing today must take cognizance of the fact that there is and has been for some years a strong prejudice in the minds of investors against street railway securities. I think I am safe in saying that this condition is showing some improvement. This conclusion is borne out by an analysis of the 19 street railway issues mentioned above. Most of the issues in 1922, and all of the issues in 1923, represented purely temporary financing. Half of the issues for those years (representing over 30 per cent of the total bonds) were in the form of equipment trust certificates, which have come to be regarded as affording about as comprehensive protection to the security holder as any instrument yet devised. So far this year, however, all but one of the issues have taken the form of long term bonds which will constitute a part of the permanent capital structure of the borrowing companies. Furthermore, the total principal amount of the issues offered during the eight months to Sept. 1, 1924, exceeded the aggregate principal amount for the two preceding years.

The handicap which the electric railways suffer in competing for funds in the general market, however, continues apparent. Most of the borrowers were companies which operate in the larger centers and which were able to present exceptionally good records of recent performance. Many of them had recourse to the expedient of a sinking fund or other special bit of "scenery" to give their issues added attraction and all had to pay rates of interest substantially higher than would have been necessary on issues by comparable companies in other lines of industry.



Average Yield to the Investor of 34 Representative Electric Railway, Light and Power, Telephone and Telegraph and Gas Bonds, 1914-1924

Work of the Investment Banker

All this has an important bearing on the discussion as to what an investment banker can do in the way of raising funds for an electric railway company. No matter how safe an issue may be intrinsically, no investment banker can afford to handle it unless it also will be salable. One of the first conclusions that must be drawn from the history of recent street railway financing is that only the obligations of the companies operating in the larger cities are, under present-day conditions, generally salable in the open market. While there will, of course, be exceptions to any rule, it is probably safe to say that companies serving communities of less than 100,000 to 150,000 population will have to develop local channels of finance.

Political considerations have been the direct or contributory cause of the past difficulties of so many street railway companies that an acceptable franchise and good public relations will be important considerations in the discussion of new street railway financing. In particular, the fixed 5-cent fare contract has been such a notorious stumbling block that some specific recognition of the right of the company to rates sufficient to enable it to earn a fair return on the capital invested and provision for machinery to adjust the fares to produce such a return are extremely desirable if not essential features in the franchise. Such "service-at-cost" agreements have fully demonstrated their worth over considerable periods of years in both Cleveland and Montreal and are now becoming quite general.

Another point which investors and investment bankers will today look for in a franchise is some provision assuring the company protection against irresponsible competition in any form. A franchise granting the company exclusive right to do the local *transportation* business rather than the street railway business alone is of course the ideal answer to this question. This is really the most logical arrangement, for the company would then be in a position to give a co-ordinated service using electric cars on rails, electric buses, automobiles or any other vehicles that would be the best suited for the particular problem at hand.

While a well-drawn franchise is an excellent protection against

NEW BOND FINANCING BY COMPANIES IN THE UNITED STATES DOING AN EXCLUSIVE STREET RAILWAY BUSINESS, JAN. 1, 1922, THROUGH AUG. 31, 1924.
(From the New York *Times*' Weekly Lists of New Financing.)

Year	Short-Term Securities	Long-Term Secured Bonds	Equipment Trust Certificates	Total
1922	$ 4,600,000	$ 9,000,000	$ 2,875,000	$16,475,000
1923	8,700,000	....	6,577,000	15,277,000
1924 through 8/31	9,000,000	29,750,000	....	38,750,000
Grand total	$22,300,000	$38,750,000	$ 9,452,000	$70,502,000

political attacks, the best defense of all is public good will. So much has been written about the various steps a company may take to achieve this end that it is unnecessary to go into detail here in this connection. The importance of attractive service, direct advertising, the cultivation of a spirit of courtesy and diplomacy on the part of employees were, for instance, emphasized in almost all the papers presented by various electric railways for the Charles A. Coffin medal competition last year.

Customer Ownership to Gain Good Will

Customer-ownership compaigns constitute another important means by which a company can gain the good will and sympathetic attention of its public. This means is particularly interesting to the investment banker because of its secondary significance as a method of raising the equity money which will go toward increasing the security behind a bond issue. The transportation company in a thriving community will have to expand its facilities from time to time to keep up with the growth in population. Such expansion requires new capital, a certain portion of which may come from the sale of new bonds. The prudent investment banker before handling those bonds will want to be sure that the company is in a position to raise the balance of the cost of the project. Customer-ownership campaigns constitute an important field for the distribution of the junior securities, through the sale of which such equity money is preferably raised. A note of warning should be sounded, however, in this connection. Care should be taken that these securities represent real values and should be protected by ample earnings. The sales price, moreover, should be in line with the general market for such securities. Otherwise, a reaction will inevitably set in which will be disastrous to the future development of this important and desirable means of supplementary financing.

Of course the fundamental requirement of a sound capitalization structure for a street railway or any other company is a conservative ratio of bonded debt to total property value. Here again it is impossible to lay down any definite rule, as the percentage of bonds will vary with individual conditions. A study was recently made in my office of the ratio between the bonded debt and the valuation for rate purposes established for the properties of various power and light utilities.

AVERAGE YIELDS ON 34 PUBLIC UTILITY BONDS, 1914-1924.

Year and Month	Eleven Traction Bonds	Ten Power and Light Bonds	Five Telephone and Telegraph Bonds	Eight Gas Bonds
1914				
March	5.45	4.74	5.11	5.06
June	5.54	4.72	5.08	5.00
September	....	....	....	....
December	5.72	4.92	5.27	5.18
1915				
March	5.75	4.82	5.10	5.03
June	5.83	4.87	5.20	5.03
September	5.75	4.81	5.08	5.04
December	5.52	4.68	4.94	5.00
1916				
March	5.55	4.65	4.89	4.97
June	5.60	4.64	4.88	4.96
September	5.64	4.65	4.86	4.96
December	5.60	4.67	4.94	4.95
1917				
March	5.70	4.75	4.96	5.09
June	6.05	5.08	5.23	5.37
September	6.14	5.25	5.34	5.50
December	6.75	5.56	5.62	5.73
1918				
March	6.74	5.54	5.68	5.77
June	6.83	5.51	5.81	5.84
September	6.95	5.59	6.04	5.98
December	6.58	5.28	5.43	5.65
1919				
March	6.84	5.27	5.56	5.67
June	6.65	5.26	5.44	5.70
September	7.04	5.57	5.95	5.93
December	7.80	5.76	6.28	6.31
1920				
March	7.91	6.03	6.46	6.57
June	8.44	6.37	6.83	7.03
September	8.40	6.14	6.53	7.13
December	8.62	6.38	6.91	7.25
1921				
March	8.13	6.07	6.53	7.07
June	8.09	6.17	6.57	7.09
September	7.92	5.78	6.03	6.71
December	7.14	5.17	5.43	5.97
1922				
March	6.59	5.09	5.31	5.81
June	6.34	4.91	5.12	5.61
September	6.28	4.82	5.22	5.39
December	6.50	4.92	5.43	5.51
1923				
March	6.64	5.02	5.51	5.53
June	6.77	4.96	5.50	5.59
September	6.94	4.98	5.40	5.59
December	7.34	4.96	5.43	5.58
1924				
March	7.18	4.87	5.38	5.43
June	6.83	4.77	5.17	5.30
September	....	....	....	....
December	....	....	....	....

In most cases the bonds represented between 60 per cent and 70 per cent of the rate base. In general I would say that to be salable a street railway bond should be set up on an even more conservative basis. The same consideration would suggest the importance of unusually conservative escrow provisions, the gradual amortization of a portion of the original issue through sinking funds and a clause in the mortgage assuring adequate provision for maintenance and depreciation. Much objection in the past has been raised to the method of requiring a fixed proportion of gross earnings or property value to be set aside for these latter purposes each year. Several recent power and light mortgages have carried a requirement that responsible engineers certify annually to the trustee that the provision made during the previous year for maintenance and depreciation has in their opinion been adequate or that a definite additional amount should be set up.

Companies Must Offset Past by the Present

The requirements outlined above may seem too rigorous, but the facts must be faced as they stand today. The investing public fared so badly in 1919 and 1920 that it has conceived a strong prejudice against traction securities. Companies which enjoy a monopoly of the mass transportation business in important communities under conditions permitting adequate "wages" to the capital invested, which have built up a feeling of good will among their patrons and whose financial houses are in order can under present conditions find—and for that matter have found—a market for their senior securities. The prevailing high interest return demanded reflects a feeling by investors based on memories of the past rather than on intelligent consideration of present conditions and future prospects.

It is up to the street railways to offset the past by the present. The problem of the modern executive is to sell street railway service to both rider and investor. Full use must be made of active advertising and educational work as a supplement to more attractive equipment and better service. The excellent work the industry has done along these lines has met with an encouraging response and the future seems to hold promise of further improvement.

Track Construction

By CHESTER F. GAILOR

Consulting Engineer, New York City

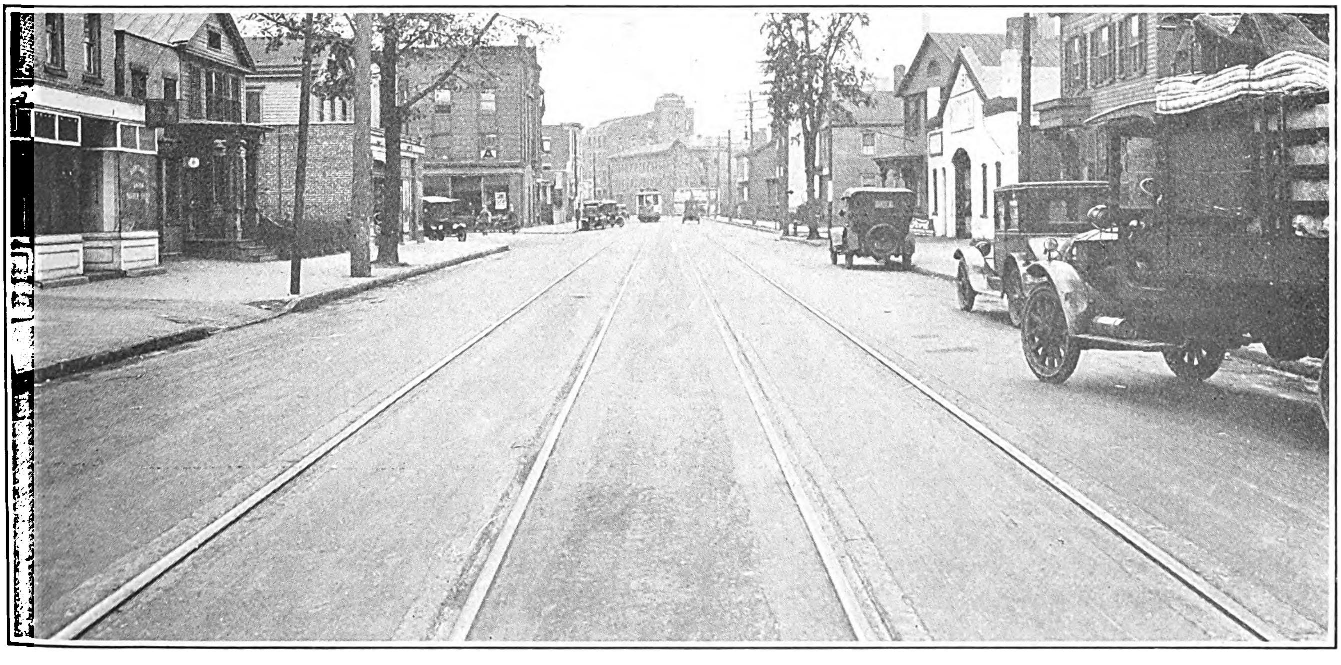
Structure should be designed for a limited life. Use of T-rail in paved streets is increasing. Important advantages result from the adoption of a standard track structure. The use of more metal and properly designed plates would improve the quality of the average welded joint.

DESIGN of a modern track structure depends primarily upon whether the way engineer favors flexible or rigid construction. The foundation, the ties and the paving are influenced by this consideration. The height and weight of rail and the type of joint, on the contrary, depend more on other factors. There exists a wide difference of opinion concerning the relative merits of different designs of track structure and concerning the individual members which compose it. In these respects it is difficult to discern any very clearly defined tendencies at the present time.

Engineering opinion today is perhaps somewhat in favor of a flexible track structure. Among the important railways now building flexible track are the Boston Elevated, the Brooklyn City Railroad, Public Service Railway of New Jersey, United Railways & Electric Company of Baltimore, Philadelphia Rapid Transit, and Pacific Electric Railway. It is thought by some way engineers that flexible track is less noisy than rigid track, that there is less tendency for the rail to corrugate and that repairs are cheaper than when it is necessary to break up a monolithic mass of concrete. On the other hand, such companies as the Cleveland Railway, the Department of Street Railways, City of Detroit, the Kansas City Railways and the Union Traction Company of Indiana favor an absolutely rigid construction.

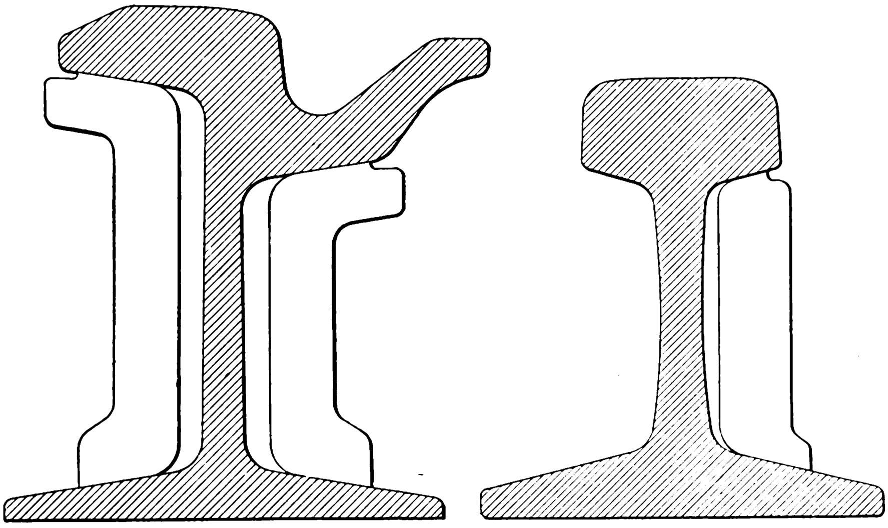
In building modern track, the methods followed and the materials employed differ in various localities, but the object is always the same, namely, to build a structure having the longest possible life for a reasonable cost. The opinion is widely held at the present time that it is both unnecessary and unwise to build track to last indefinitely. Experience shows that it is almost always necessary, for one reason or another, to tear up track at the end of 10 or 15 years and it is therefore a waste of money to design the structure for a 20-year life. If the foundation remains sound during the life of two sets of rails it has served its purpose. One type of construction which has been used by an important system with good results is outlined below as representing the flexible track school of thought:

After the excavation has been made, the subsoil is first thoroughly compressed by means of a steam roller. A layer of coarse ballast is then placed and this also is thoroughly rolled. The best quality of



A Concrete Paving Strip Along the Rail Is Being Tried by the Connecticut Company wood ties which have been given a preservative treatment are used. Unless the ties are sawn, a flat seat is cut for the rail. The rail is 7-in. grooved girder, A.E.R.E.A. standard section in 60-ft. lengths. The track is surfaced with 1-in. gravel or stone ballast carefully tamped. Joints are welded.

Special care is used to secure a waterproof paving, particularly along the rail. Track drains are installed at frequent intervals. Sub-grade drainage also is used where the nature of the subsoil requires it. Granite block pavement on a concrete foundation is employed on heavily congested streets and around special work. Asphalt or some other bituminous pavement on a concrete base is used in the residential sections of the city. In such localities granite blocks are used as liners along the rail.



Joint Plates Recently Designed to Permit the Use of Welds ½ In. to ⅝ In. Thick

Variations in carrying out the details of the flexible type of construction are many. To secure resiliency it is customary to use rock, slag or cinders for the foundation. In New Orleans, however, where the ground is very soft, the practice is first to place a concrete slab as a foundation for the ballast. Going to the other extreme some railways where the soil is extremely firm have laid their ties directly on the ground. It may be doubted, however, if this is in line with the best modern thought. Most way engineers appear to favor rock ballast foundation, thoroughly compressed, as a base upon which to build a resilient track structure.

Wood ties are generally used in the construction of flexible track, but steel ties have been used on a ballast foundation in a few places and have given good results. When buying wood ties to be buried for years out of sight under the pavement of the street, it is important to secure material of the best quality. Moreover, experience shows that it is well worth while to treat these ties with some chemical preservative in order to prolong their life. It is a fallacy to think that a cheap tie cut from a poor grade of timber, not given a preservative treatment, will reduce track construction cost. A tie once laid in a paved street is difficult to get at and cannot be replaced except at great cost. Yet, if it deteriorates and is allowed to remain in place, it will eventually cause the ruination of the track structure. For that reason only the best should be used.

A growing tendency to use T-rail instead of grooved girder rail in paved streets is plainly discernible. The most popular rail sections are the 6-in. 100-lb. T and the 7-in. 91-lb., 93-lb. and 100-lb. T-rail. The companies which continue to favor the grooved girder rail in numerous instances have adopted the A.E.R.E.A. standard 7-in. 122-lb. section. During the year 1923, for example, six of the more prominent railways in the United States definitely adopted this as standard construction. An exception to this rule, however, is the Pacific Electric Railway, which uses a 7-in. 128-lb. grooved girder section. An example of the construction of this company is shown in an accompanying illustration.

When T-rail is used instead of grooved girder rail, it becomes necessary, of course, to provide a flangeway. This has been accomplished by different means in various cities, depending on the kind of paving used. The method has been adopted in some places where block pavement is used of placing the ends of the blocks under the head of the rail and crowning the pavement between the rails sufficiently to bring the surface up even with the top of the railhead. An objection to this practice, however, is that the inevitable movement of the rail is likely either to loosen or to break the blocks.

Other railways have used nose blocks with entire success. Such blocks, however, are slightly more expensive than plain blocks. In a number of Southern cities wood nose blocks are used. These may be cut at the mill or cut more roughly on the job. With granite block a satisfactory solution of the problem has been found by keeping the headers about 2 in. away from the rail and partially filling in the gap with either concrete or some mastic filler. Where concrete pavement is used it is customary to make a flangeway in the concrete by means of wood or steel templates laid along the rail.

When grooved girder rail is employed, the majority of engineers appear to favor the use of granite blocks for paving along the rail. These are placed parallel to the rail and covered with a mastic or cement filler. Such paving is waterproof and allows a slight movement of the rail without injury to the structure.

A novel form of paving along the rail has been installed by the Connecticut Company in some of its more recent track construction jobs. Strips of concrete have been laid alongside the rails, between them and the pavement. The concrete strip is integral with the rail and separated from the pavement of the rest of the street by a mastic filler. The appearance of such a piece of construction work is shown in an accompanying illustration.

The character of track construction, particularly that of the paving, has an important bearing on the noise of operation. Experience indicates that a rigid structure is usually somewhat more noisy than a flexible one. How important this consideration is each engineer must decide for himself. To a great extent, however, this drawback may be avoided by the use of an asphaltic pavement. On the other hand, it is

Modern Open-Track Construction on the Lines of the Boston Elevated Railway

possible to create a very noisy track structure by combining a flexible design and a type of pavement that acts as a sounding board. Many way engineers advocate an asphaltic pavement with concrete base for streets where the traffic is light, and a granite block pavement with some sort of a mastic coating on the top for streets where the vehicular traffic is heavy.

Modern Practice in Joint Welding

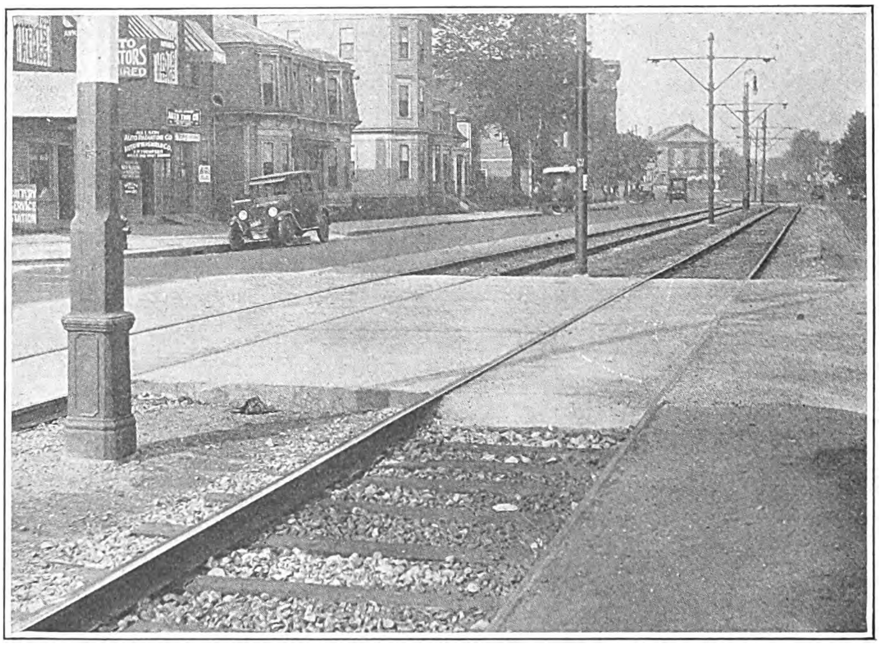
Regardless of all controversies about rigid and flexible track, way engineers today are almost unanimously in favor of welding rail joints. Seam welds, butt welds and thermit welds are widely used and give very satisfactory results when properly installed. Local conditions, among which must be included the possibility of taking track out of service during welding, will largely determine the type of joint.

So-called seam-welded rail joints, to which a name that is a misnomer has unfortunately been given, are now being installed by at least 10 distinctly different processes. Among these are the carbon arc and the metallic arc methods. The former has been followed for approximately 10 years in track welding, but seldom has been used for purposes other than bonding.

Little study has been given by way engineers to the metallic method of joint welding, compared to the amount that has been given to the carbon arc process. Often the only instructions given to the track welders have been to weld the joints with rods, wire, or any available scrap and to make the best job possible. No attention has been paid to the condition or character of the plates or rail sections. An arc weld, no matter how it is done, in the eyes of too many railway officials is a sure cure for all joint troubles.

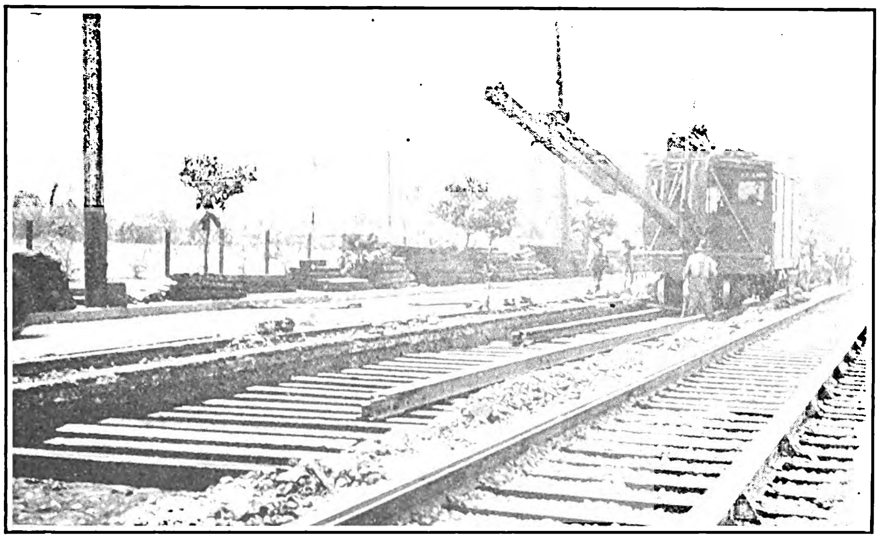
There are certain general principles involved in either process of arc welding which, if ignored, will cause failure in a remarkably short time. The greatest deficiency in arc-welded rail joints being installed today results from the fact that only one-half to one-quarter of the required amount of welding metal is applied, and most of this metal is not located where it will be of the greatest value. A large majority of the seam welds are only $\frac{1}{8}$ in. to $\frac{3}{16}$ in. thick at the point of contact between the rail and plate. Obviously, this metal being soft and coarse grained, it is not capable of withstanding the strain which occurs to all such points. Experience shows that seams $\frac{1}{2}$ in. to $\frac{5}{8}$ in. thick should be used and no attempt should be made to install a thinner weld. The unsuitability of seam welds $\frac{1}{8}$ to $\frac{1}{4}$ in. thick can easily be demonstrated by allowing a number of cars to pass over such welds where the rail metal above the welds is thin, say $\frac{1}{4}$ in. thick, thus bringing the full load directly on the welds. Only a few passes of cars will be needed to fracture such welds, showing plainly that the weld metal is being subjected to stresses far in excess of those it is capable of withstanding.

Carbon arc welding is being rapidly developed by several way engineers, among whom are H. M. Steward, superintendent of maintenance Boston Elevated Railway; E. M. T. Ryder, way engineer Third Avenue Railway, and W. W. Wysor, chief engineer United Railways & Electric Company, Baltimore. This method requires much more heat in welding than does the metallic method and consequently requires larger and more complicated apparatus, thus increasing the difficulty of the operation. Many engineers have recently modified their carbon arc method of joint welding by using the so-called "hand-feed" process which was developed several years ago in Montreal under the direction of W. F. Graves. This process resembles closely the usual gas-welding operation and is intended to give the operator an opportunity to apply the exact amount of metal required



A Street Intersection and Passenger Platform Alongside the Reserved Strip on Brighton Avenue, Boston and better to control the location of the weld as the application progresses. It is unquestionably a distinct improvement over the old method where the rod was laid in place and then fused with the carbon arc, allowing no opportunity of supplying extra metal or controlling the operation with certainty.

Gouging or nicking of the rails at the ends of the seams with the carbon arc unquestionably presents a most difficult problem. Metallic arc welding is generally preferred where worn rail joints are to be welded; in fact, it is very difficult to weld successfully old rails and plates with the carbon arc process, due to the uncontrollable action of the arc at the worn spots where the best welds are necessary.



Flexible Track Construction of the Pacific Electric Railway in Pasadena, Using 7-In. 128-*Lb. Grooved Girder Rail*

While the tests now under way at the U. S. Bureau of Standards are by no means conclusive, they have already proved that no arc-welded joints yet tested possess sufficient strength in the seams, with one possible exception, and that the type, character, and size of the joint plates must be given immediate attention. It seems quite logical to assume that the joint plate should be thickest and strongest at the center where the greatest stresses occur, likewise the best and heaviest arc welds should be so located.

A type of joint plate that will enable the welder to apply welds ½ in. to ⅝ in. thick should be used. Recent designs that answer this purpose satisfactorily are shown in the accompanying sketches. Plates for use with T-rail and others for grooved girder rail are shown. The use of proper plates and soft, pure steel rods which will produce a tough, close-grained weld will unquestionably eliminate many of the uncertainties now prevalent in the making of arc-welded rail joints.

Where it is possible to keep track out of service during the progress of welding operations, butt-welded joints and thermit joints have proved to be very satisfactory. The operations of making these joints have been standardized to a greater extent than is the case with seam-welded joints, and more uniform results have followed the installation.

Interesting work is being done in the design of open track construction in a number of cities, among which Baltimore and Boston are prominent. This type of structure can, of course, be used only where the railway operates on private right-of-way or in a reserved strip. In Boston, from 4 in. to 6 in. of crushed stone is used below the ties. Tie spacing is 2 ft. 1⅞ in. Rails are of 85-lb. A. S. C. E. section in 60-ft. lengths. At street intersections, passenger landing platforms 105 ft. long have been built of crushed stone and hot tarvia with a dry sand finish. The space between the tracks is filled with loam and seeded. This type of construction is shown in two accompanying illustrations.

Advantages of Adopting a Standard Track Design

The most important factor in all track and pavement construction is the care and attention given to the original execution of the work. It is particularly helpful for a railway to adopt a standard type of track structure and to utilize this design wherever possible. Of course there will always be places where special consideration must govern the construction. In general, however, there can be no doubt but that it pays to adopt and install a standard design. The minor savings which might be accompanied by using a little cheaper material here and there are negligible beside the savings which can be accomplished by reduction in the number of sizes which it is necessary to carry in stock.

Moreover, the adoption of a standard will facilitate the work of the roadmaster and his men. Workmen who are building the same kind of track day after day and month after month become much more proficient than those who install one design today and a different design tomorrow. The fact that cars of lighter weight operate on some lines does not justify the use of lighter track construction. Similarly, the fact that at the present time the headways are longer on some lines than on others does not justify the company in installing a lighter design track structure. Where there are great differences in operating conditions on a single property, as for example a railway which operates both city and interurban lines, it will be necessary to adopt more than one standard. Generally speaking, however, the advantages of adopting a single standard track structure outweigh the occasional drawbacks resulting from its use.

In spite of the general need to practice every possible economy in the face of rising labor cost, many railways lack the proper equipment to do efficient track construction work. The industry suffers much on account of such conditions and the individual companies suffer even more. Electric railways today are facing keen competition and it is foolhardy to disregard efficiency and neglect methods that are widely recognized as being economical. Morover, the public always admires up-to-date methods and equipment, while it is quick to condemn and ridicule obsolete operation. A reasonable amount of satisfactory work can be required of a workman only when he is fully equipped with the proper tools. The modern idea in track construction is to provide the workmen with all the necessary equipment and give them full instructions concerning its use.

Freight Service

By T. H. STOFFEL

Railway Department, Westinghouse Electric & Manufacturing Company

Traffic has tripled in ten years. Standardization of rolling stock permits of interline movements. Motor trucks are valuable adjuncts. More refrigerator cars are needed to handle perishable freight. Future prospects are bright.

BEFORE the war a few interurban electric railways were hauling a certain amount of freight, but it is during the last four years that the greatest development has come. Much progress has been made in providing larger and more modern terminals, standardizing rolling stock to permit interline movements without transfer and establishing joint rates.

For comparison, data are presented covering the years 1912 and 1923. The figures for 1912 are taken from U. S. Census Bureau reports, and those for 1923 are conservatively estimated from the last available reports:

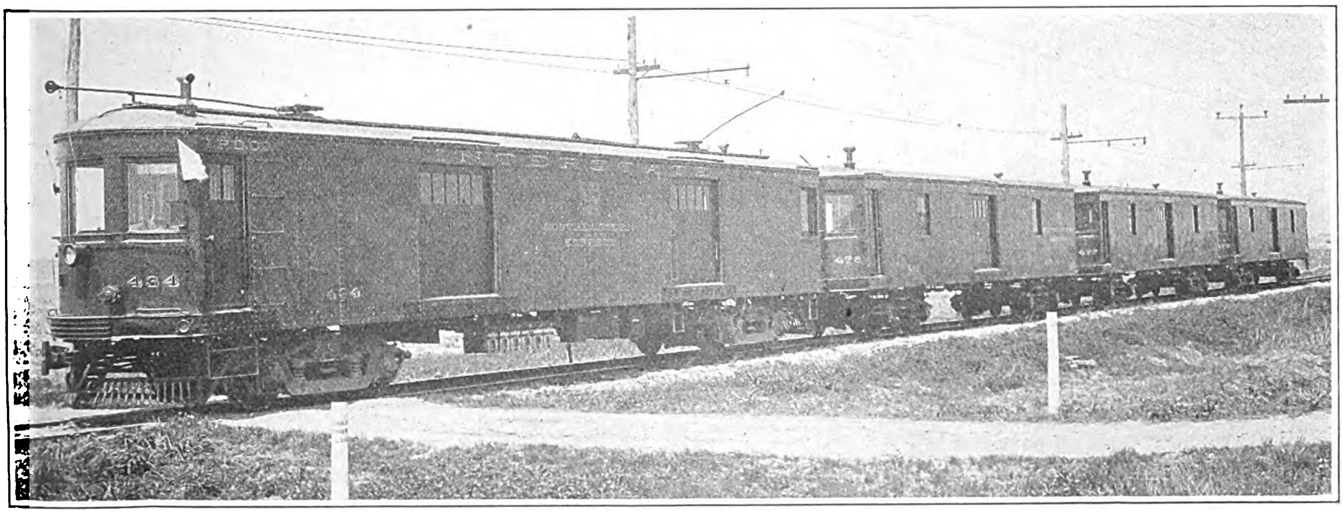
	1912	1923
Gross freight revenue	$14,577,203.00	$53,000,000.00
Freight car miles operated.........	35,749,917	87,250,000
Freight and express cars in service, including motor cars.	7,794	15,180
Electric locomotives employed.........	277	520
Total ton-miles handled..........	(not available)	1,250,000,000

Net profits obtained vary from 15 per cent to 35 per cent, depending on the amount and kind of tonnage hauled, but it is estimated that a fair average for all interurban lines handling freight will approximate 20 per cent. Such net profit is equal to about 35 per cent on the investment in freight facilities and equipment. These figures are based on the assumption that revenue from freight operation pays its full proportion of the cost of maintenance of roadway, track, equipment, power, superintendence and general overhead, as well as all costs directly chargeable to that service.

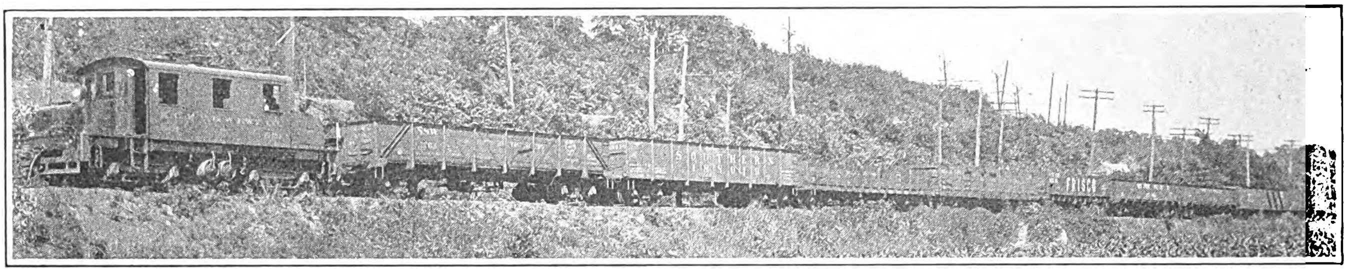
Such figures indicate conclusively that the handling of freight by electric interurban railways is not only practicable and profitable, but that the service is highly appreciated by the shipping public. It is also apparent that these lines have a definite place in the transportation scheme of the country, and tests have shown that they are able to render a service which cannot be provided by any other means. It has been found that invariably when additional facilities or equipment are provided, there is an almost automatic and proportionate increase in the tonnage handled.

Considering the small beginning, many electric interurban lines have made marked progress in the past few years in the way of improving service to meet the demands of the public, providing larger and more modern stations, augmenting motive power and rolling stock and standardizing the latter to permit of free interline movement. Joint through rates and service have been established, with the result that in the Central States especially shipments of both carload and less than carload lots are moved expeditiously on through waybills to destinations up to and exceeding 400 miles. Trains of from 7 to 15 or more cars, hauled by locomotives, are not uncommon in this part of the country.

The construction and putting into operation during the past year of the new million dollar Union Freight Terminal at Indianapolis is probably the most notable recent illustration of the progress being made by electric lines in developing freight business and denotes the tendency to provide modern and economical



Fast Fruit and Express Train with All-Steel Equipment, Operated by Interstate Public Service Company

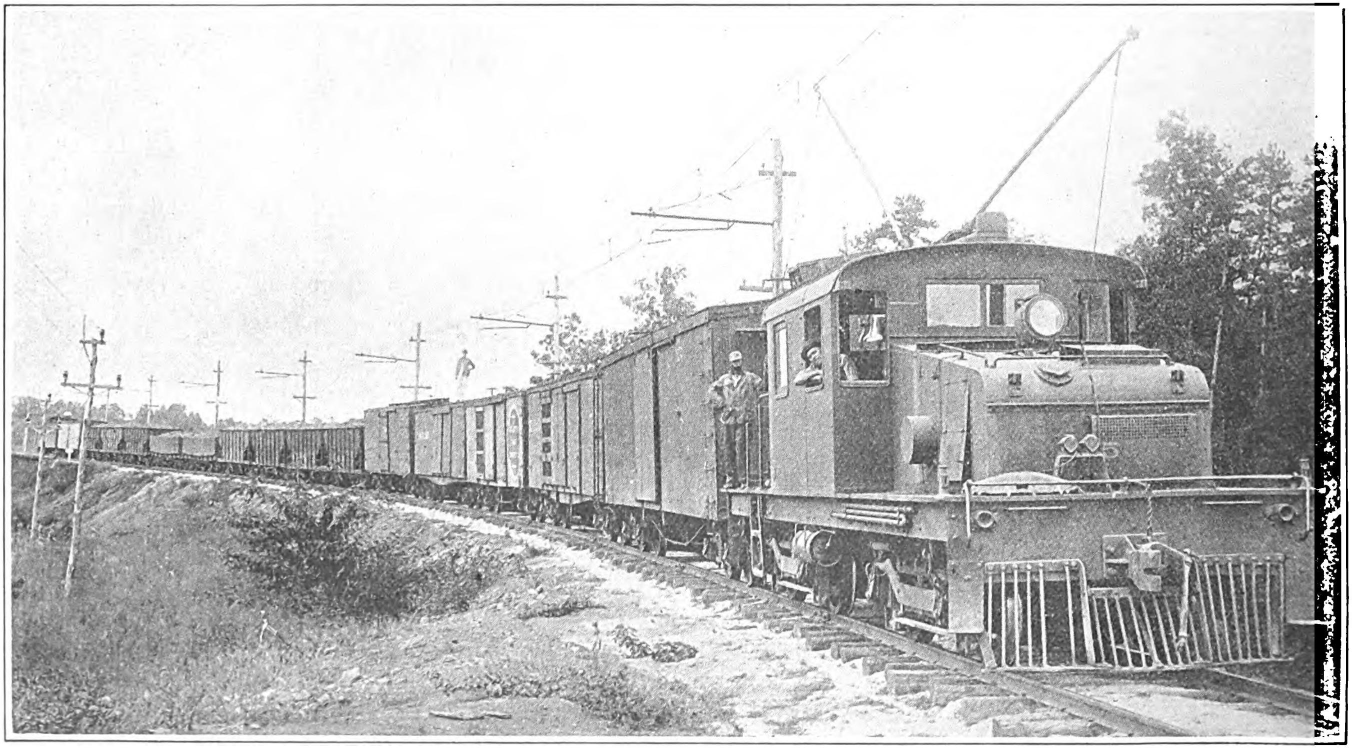


A Mixed Freight Train Drawn by a 50-Ton Baldwin-Westinghouse Locomotive on the Kansas City, Kaw Valley & Western Railway

facilities. This terminal is used jointly by the four interurban systems centering at Indianapolis, with twelve radiating lines. The combined length of the two present freight warehouses is approximately 1,300 ft., with platform track capacity for more than 60 cars at a single setting; separate well-lighted modern offices, including record rooms and up-to-date sanitary arrangements, are provided for each line. In addition, the terminal has team track capacity for 30 cars at one setting and ample track space for car storage. Ground is available also for increasing both warehouse and track capacity when necessary. It is understood that similar improvements are planned at other important interurban centers such as Cleveland, Toledo, etc.

While the basis of charges for freight handling varies in different sections of the country, as a general rule rates in force are no higher than those in effect via competing steam lines; in fact, in many states the public utility commissions designate maximum rates which may be charged for intrastate movement, and these are invariably the same as apply for steam roads. Experience has proved that freight business can be developed to the fullest extent only when transportation rates are competitive, and therefore the majority of electric lines have adopted not only the same rates, but also the same classifications, rules and regulations pertaining to them as those promulgated by the steam lines. An advantage in adopting the steam road rate basis is that it makes it possible to undertake joint traffic movements with the latter without in any way disturbing the rate structure. A number of electric lines have recently successfully negotiated through traffic arrangements with steam carriers, to the benefit of both.

Much has been said and written regarding the competition of the gas-driven motor truck in freight transportation. Investigation usually develops that this competition is not serious nor lasting, except where a jobber or shipper employs his own vehicle to deliver goods to his customer's place of business to meet commercial competition, and invariably this is done at greater expense than if done by rail. As a matter of fact, extremely short-haul business, up to 20 or 25 miles, is not generally considered profitable for any rail line, either electric or steam, due to low rates and the fact that terminal expense per ton is the same regardless of destination. It is also generally conceded that the motor truck can handle freight for such distances, not only more expeditiously, but more economically, and at the same time make delivery at the con-



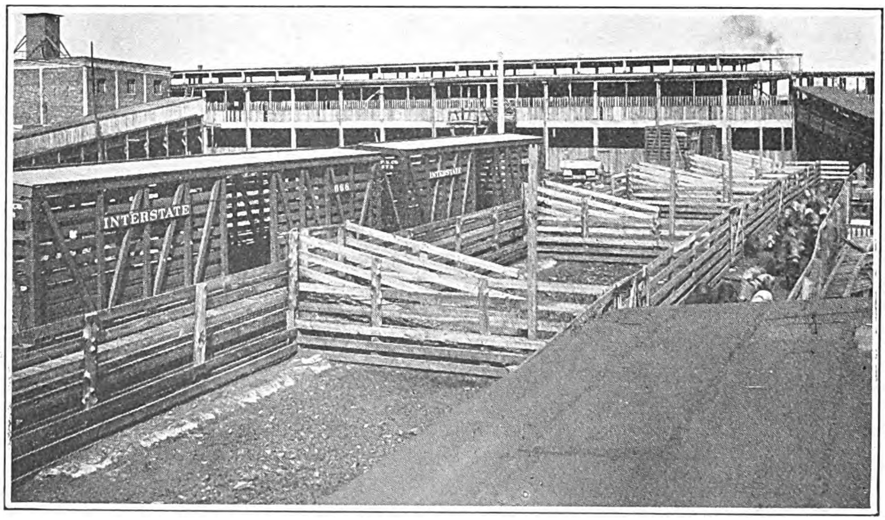
Freight Hauling in the South. The Piedmont & Northern Railway Operates More than 150 Freight Cars on 200 Miles of Track signee's place of business, and at an expense to the shipper only slightly more than if consignments were taken to a rail station for forwarding.

There is a possibility that in time rail transportation lines, both steam and electric, will find it necessary to provide pick up and delivery service, at a charge to the shipper or consignee over and above existing station to station rates, but at present the shipping public generally apparently does not desire such service. Practically all important shippers must have conveyances for other work in connection with their business, and these can be used also to move goods to and from freight houses. They do not take kindly, therefore, to the idea of paying an outsider an extra amount for this service.

The principal advantage to the railway company of such service would be the possibility of relieving congestion at terminal warehouses, or postponement of the necessity to enlarge stations. Whenever it becomes necessary for rail lines to establish so called pick-up and delivery service, it is believed that for reasons of economy and efficiency the work should be delegated to a single responsible agency in each locality, to operate from electric as well as steam stations.

Undoubtedly the motor truck has a definite and important place in the transportation of freight, and can be made a valuable adjunct to electric railways. Many possibilities exist for their use as feeders for rail lines, operating between rail head stations and rural districts, or in localities where time of transit could thus be shortened. Such service is already provided by the Detroit United Railway, the Interstate Public Service Company, and others, and has proved an important means of increasing revenue.

It is believed that electric railways could also profitably employ motor trucks in handling shipments, both carload and less, between rail head stations and substations located in jobbing or manufacturing districts of larger cities, which cannot be reached by rails. Such service has been established by the Chicago, North Shore & Milwaukee Railroad and is proving successful. Electric railways could profitably employ motor trucks to render service similar to that of the steam lines, where cars are placed on private sidings of jobbers or manufacturers to be loaded with miscellaneous consignments for various destinations on the line, and when loaded are switched to freight stations and shipments distributed into various line cars for forwarding to destination. The cost of the switching is assumed by the railway company when the aggregate weight of the consignments in the car is 5,000 lb. or 6,000 lb. or more. This relieves the shipper of hauling to freight stations, and permits the railway to make transfer during off-peak periods in the warehouse. Undoubtedly much tonnage could be secured by electric lines by employing trucks to bring the consignments to their freight stations, and by assuming the cost of the service where the aggregate tonnage from a single shipper in a single day amounted to 6,000 lb. or more.



In the Central States Hauling Livestock Has Proved to Be a Profitable Business for the Electric Interurbans

Much thought and consideration has been given recently to the type, capacity and size of freight car most suitable for electric railways on which the standard steam road type cannot be used. Conclusions reached have usually been based on local conditions. It is believed, however, that where lines are doing an extensive through interline business, the most practicable trail box car for general purposes is one of 60,000 lb. capacity and 40 or 42 ft. long, inside measurement, equipped with radial draft rigging and automatic air brakes. The capacity of such a car is approximately 2,200 cu.ft., and this size lends itself most readily to loading of the average shipment. At the same time this car is not too long to negotiate easily the sharp curves in city streets when moved in long trains.

The use of containers of various sizes, which could be loaded on flat cars and thus take the place of box cars, has been advocated for use by rail lines in the handling of merchandise shipments. Several electric railways, notably the Detroit United Lines and the Cincinnati, Aurora & Lawrenceburg Railway, have experimented with them. The advantages claimed for the container system include the forwarding under seal direct from shipper to consignee, thereby economizing in station platform labor and reducing claims for pilferage and damage; lessening chances for shipments to go astray, and relieving congestion at freight stations. In actual practice, however, it was found that available tonnage for a single destination or consignee was often either considerably less than the capacity of a container, or exceeded the capacity of one, making the use of a part of another necessary, in order that the entire consignment might go forward at the same time. This resulted in considerable reduction in the cubical carrying capacity of the car, and at times it was necessary to use two cars for tonnage which could ordinarily be handled in a single box car. Furthermore, the container did not lend itself readily to the loading of the general run of merchandise, and when long or heavy articles, such as iron bars, shafting machinery, etc., were offered, a regular box car had to be used. In addition, the considerable weight of the containers themselves was non-revenue producing, and the disadvantages of the system more than offset the advantages.

One class of available tonnage,

which electric lines could handle most satisfactorily, but which has received very little attention by operators, consists of perishable commodities, such as fresh meats, packing house products, fruits, vegetables, butter, eggs, etc., requiring refrigeration. In some districts long hauls of 200 or 300 miles could be secured if proper equipment were available to handle the business. Practically every interurban railway could profitably operate a daily peddler car or two for perishables. High rates are received for transporting this class of freight and the business is very desirable from a revenue standpoint, but undoubtedly the first cost of providing refrigerator cars and the necessary icing stations has retarded development of this business.

Experience shows that the iced and ventilated car is the only reliable method of protecting perishable commodities in transit. A plan of providing refrigeration without the use of ice, and which may prove to be of vast importance to the industry, is being worked out by the Northern Ohio Traction & Light Company. This line has many calls for refrigerator service, and in an endeavor to supply this want has decided to construct a car along refrigerator lines so far as insulation is concerned, but installing in place of the ice bunkers an electrically operated refrigerator plant, similar to that on the market for use in houses. Cooling pipes will extend along the roof and sides of the car, and vents will be provided near the floor for the exit of warm air. Power to drive the motor will be taken from the trolley, and the car can be kept at an even temperature when standing at stations or en route. If this car proves successful it will mean much to the electric railways of the country. A few roads are successfully moving a considerable tonnage of fresh fruits and vegetables in ordinary cars, where the run can be made in a few hours and delivery effected immediately, but the scope of such operation is extremely limited.

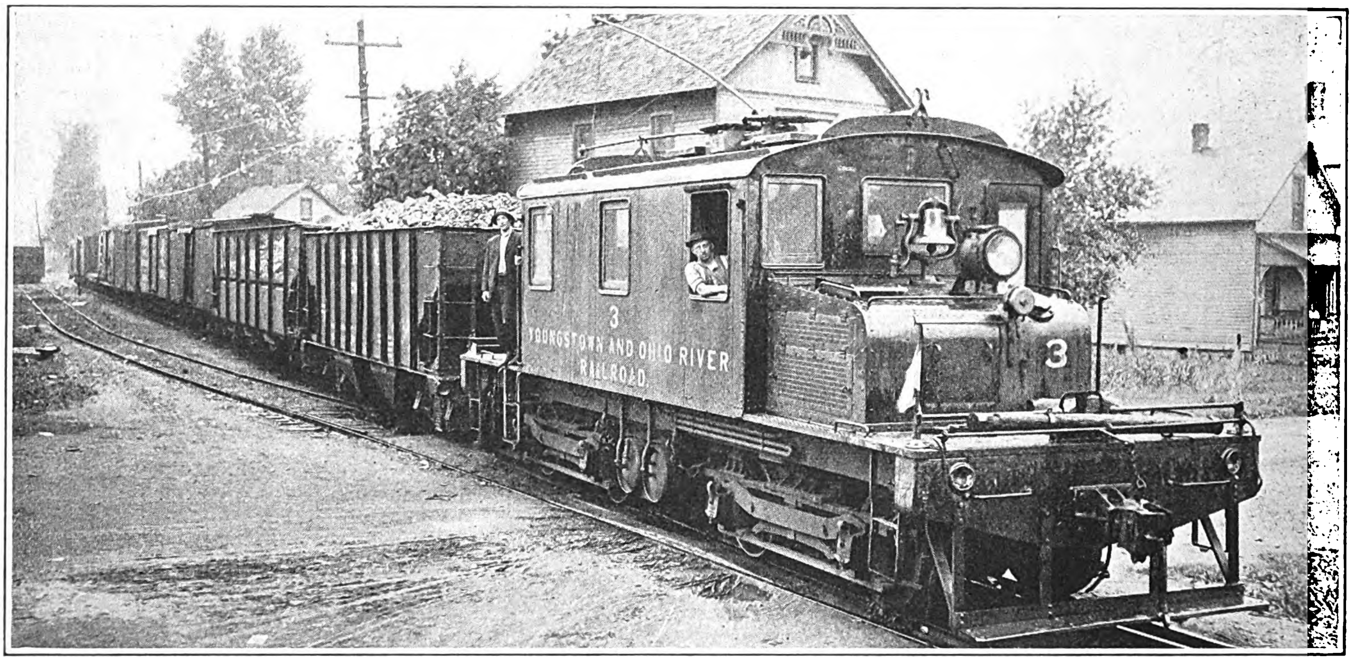
Notwithstanding the progress which has been made by some interurban lines in developing freight business and modernizing methods and facilities to produce economies in operation as well as better service for the public, there are still many opportunities open. Freight stations and terminals should be easily accessible to drays, with sufficient openings to permit prompt loading and unloading and avoid delaying shippers' vehicles. Driveways of ample size to prevent congestion should be provided and team tracks for loading and unloading directly between cars and drays.

Rolling stock should be adequate to take care of all tonnage offered. It should be completely standardized especially in respect to outside dimensions, wheel treads and flanges, draft rigging and air-brake equipment. This will permit free interchange with connecting lines.

It is well to follow a definite program of improvement, including such items as building of tracks on private right-of-way around congested centers and towns, to eliminate sharp curves and to overcome municipal objections to the operation of freight trains in the city streets. This will make possible ultimately the operation of standard steam railroad rolling stock. Meeting and passing tracks should be extended to permit the operation of longer trains and to reduce delays. Hauling more cars per train will effect important reductions in operating expense.

Railways should study the possibility of securing return loads and reducing non-revenue car-miles. Joint through rates and traffic arrangements with connecting lines should be negotiated. The use of the motor truck as a feeder in either urban or rural service is worthy of careful consideration. It may sometimes be possible to secure the location of industrial establishments along the electric railway line.

An efficient traffic department with a competent head should be organized. He should have full authority and responsibility, and the co-operation of the transportation department should be accorded him. Co-operation with agricultural organizations, farm granges, livestock associations, and the like, will help them to secure better markets for their products and at the same time will increase the revenue of the railway.



On the Youngstown & Ohio River Railroad the Freight Business Is More Important than the Passenger Traffic

Equipment Maintenance

By FRANK M. BRINCKERHOFF
Consulting Engineer, New York, N. Y.

A modern shop may be small but should be provided with the last word in labor-saving equipment to keep cars on the road. Some of the important considerations for expediting inspection and overhaul work discussed. Proper areas of floor space, use of lye tanks, provision for paint spraying and spray washing, adequate materials handling and dipping and baking equipment among practical features of shop design treated.

THAT cars are too valuable to be held in shops for long periods of time should be the governing principle on which the design of a modern electric railway repair shop is based. The modern shop may be small but equipped with every known practical device for making repairs quickly and returning cars to service speedily. It should be virtually empty as far as cars are concerned, for they should be kept on the road, where they can earn money. The number of spare cars should also be kept low, but the number of spare parts for the equipment should be large enough to insure prompt replacement. The real function of the repair shop is to keep the cars in service. One car costs $15,000 or more. To keep this investment working as nearly full time as possible justifies quite an investment in spare parts and shop equipment. Also, it is strongly advisable to have more spare parts and fewer spare cars. If this policy makes it possible to provide a given service, say with 10 spare cars instead of 15, the saving is obvious both in the investment in cars and in the investment in shop buildings.

The first thing to be decided by railway officials who are confronted with the problem of constructing a new shop is that of location. Shop arrangement will necessarily be affected by the amount of land and its location. In most cities satisfactory sites are quite limited. It is desirable to locate a shop so as to reduce non-revenue mileage and to obtain a steam road connection if possible. The shop should also be readily accessible in order that labor can be obtained and retained at average wages. In analyzing labor conditions on a number of railway properties, it appears that some find it necessary to pay above the average prices for labor due to the inconvenient location of the shops. They also find it very difficult to keep their men for extended periods. This is quite a disadvantage and it materially affects the quality of the maintenance work.

In deciding on the size of a site, it is desirable to select one having sufficient area to provide for outside storage and to permit of enlarging the building to take care of future growth. There are many classes of material, such as wheels, iron castings, lumber, scrap and the like, which can be conveniently stored outside, and this is better than to have them occupying valuable space under a roof. It is also common practice to make use of the shop yards for storing track material, so it is necessary to have a plot of ground considerably larger than that required by the shop building.

A study of existing layouts on a considerable number of representative properties shows that the relation of the total shop area to the number of cars maintained runs fairly uniform. Figures for 10 railways are given in Table I, and the average square feet per car floor area for these 10 railways is 207. In this analysis no attempt has been made to consider the variation in space needed by different length cars. A very exhaustive study of

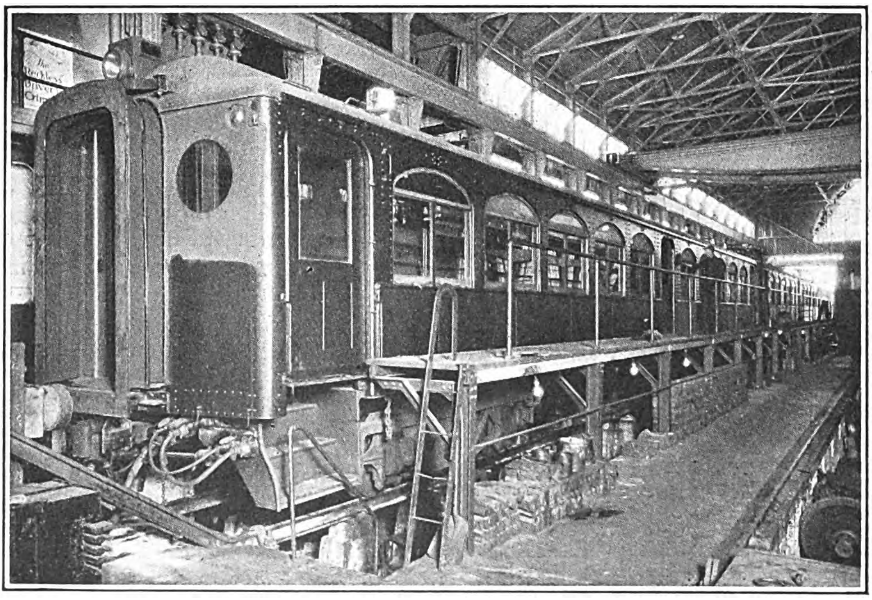

A Platform Level with the Car Floor Has Been Found of Great Advantage in the Shops of the New York, Westchester & Boston Railway

TABLE I—RELATION OF TOTAL SHOP AREA TO NUMBER OF CARS MAINTAINED

Railway	Shop Area, Square Feet	Number of Cars	Square Feet per Car
Boston Elevated Railway, Everett Shop	493,478	2,535	195
Montreal Tramways, Youville Shop	112,052	570	197
Milwaukee Electric Railway & Light Company, Coldspring Shop	284,600	1,190	240
Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, Shop	45,680	200	228
Pacific Electric Railway, Torrance Shop	296,880	1,800	165
Portland Railway & Light Company, Portland, Ore	142,950	640	223
Seattle Municipal Railway	87,810	450	195
Toronto Transportation Commission, Hillcrest Shop	223,226	1,153	194
Union Traction Company of Indiana, Anderson Shop	79,710	300	266
West Penn Railways, Connellsville Shop	50,250	300	168
Total	1,816,636	9,138	2,071
Average			207.1

the arrangement and size of departments now being used by 50 electric railway properties was made by the equipment and building and structures committees of the American Electric Railway Engineering Association in 1921 and 1922. Based on the figures obtained in this survey, a table has been prepared showing the relative area of departments desirable for roads operating 50, 200 and 1,000 cars respectively. This information is given in Table II. These figures may be taken as a guide for approximating desirable areas where new shops are to be constructed, but individual ideas of designers and local conditions will affect the arrangement and proportioning of shop areas to a large extent.

In general, it can be said that a modern railway shop should be wide rather than long, so that cars can be run in and out without interference. Through tracks with ample connections at both ends are desirable.

The larger electric railway properties have a number of shops, some of which are devoted to special classes of work. In general, the maintenance of cars can be divided into three classes of repairs. First, there is what is commonly called inspection work, which includes renewals, replacements, adjustments and lubrication of wearing and adjustable parts together with a general inspection of the car body, truck and equipment. The second class of work includes what is generally termed overhauling. This includes the dismantling and thorough cleaning of the equipment parts, together with the renewing and replacing of all broken and worn parts. The third class of work may be termed general repairs. This includes the reconstruction of cars, together with repairs, such as painting, varnishing and work which necessitates holding the cars from service over an extended period. The various classes of repairs are sometimes combined so as to coincide as to time.

Sometimes the three classes of repair work are done at one shop, and of course its size and the arrangement of departments will be influenced by the scope of work to be done. There is also a considerable amount of maintenance repair that is generally concentrated at the one point. This includes the rewinding and repair of armatures and fields, the overhauling of controllers, circuit breakers, resistances and other equipment parts, together with such work as the babbitting of bearings, repairs to seats and curtains and the general manufacturing work which is usually carried out by electric railways in order to provide maintenance parts. A discussion of the equipment and arrangement of all the various departments would consume more space than can be devoted to this subject in a single article. But a discussion of some of the outstanding conveniences which should be in use in a modernized electric railway shop will be of value.

Lye Tanks for Cleaning Metal Parts

Quite a number of electric railway shops are provided with lye tanks for cleaning the grease and dirt from various equipment parts. Their use reduces the time and labor of overhauling enormously. The Kansas City Railways and the New York, New Haven & Hartford Railroad at its Van Ness shops have large tanks of sufficient size to dip complete motor truck frames. The Kansas City tank is 14 ft. long, 10 ft. wide and 6 ft. deep and is installed at one side of the track on which trucks are stripped for overhauling. Results show that a truck that has been through the lye vat is assembled in from 10 to 15 per cent less time than one that has not.

The New York, New Haven & Hartford Railroad has a separate building containing its lye vat at the Van Ness shops. This is adjacent to the repair shop and is connected to it by transfer tracks, so that material may be handled between the two points with a minimum amount of labor. The building is 43 ft. x 30 ft. and is of concrete, waterproofed on the inside.

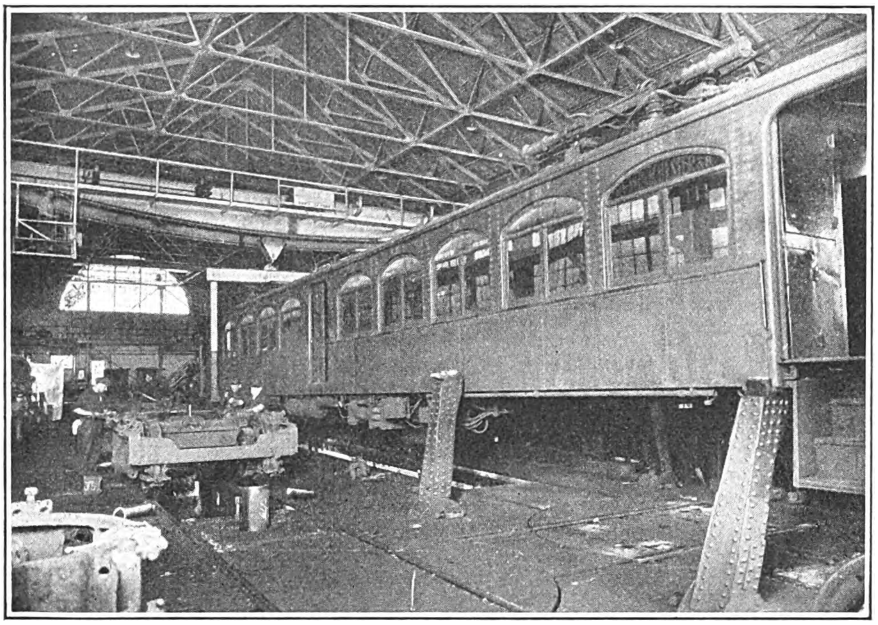
The New York Municipal Railway cleans all of its air compressor parts in a lye tank, 41 in. x 32 in. x 31 in. All parts except gears, pistons, crankshafts and connection rods are placed in the tank and are allowed to remain for half an hour, when they are removed and brushed briskly with a hand brush or broom. Then they are rinsed in water and placed on the overhauling bench. Such a tank is also found to be a great time saver in removing the insulation from field coils where these are to be torn down and reinsulated. Another use for such a tank is that of removing the paint from signs which are to be relettered. After a railway shop is provided with such equipment, many uses can be found for it which were not thought of before.

Spray Washing for Cars

While the washing and cleaning of cars is not always taken care of by the mechanical departments of railways, still it appears that some efficient provision should be made in shop construction for car washing. One of the most efficient methods which has been incorporated in several electric railway shops consists of using vertical perforated pipes

TABLE II—DESIRABLE AREA OF SHOP DEPARTMENTS

Departments	Per Cent of Total Area	Area, Square Feet: 50 Cars	200 Cars	1,000 Cars
Overhauling and truck	19	1,966	7,866	39,330
Machine, wheels and axles	9	932	3,726	18,630
Blacksmith and welding	4	414	1,656	8,280
Air brakes	1	104	414	2,070
Office	2	207	828	4,140
Armature and electrical	5	517	2,070	10,350
Carpenter and mill	22	2,277	9,108	45,540
Paint	18	1,863	7,452	37,260
Paint mixing	2	207	828	4,140
Sand blast	2	207	828	4,140
Storeroom	12	1,242	4,968	24,840
Oil house	2	207	828	4,140
Wash room	2	207	828	4,140
Total	100	10,350	41,400	207,000



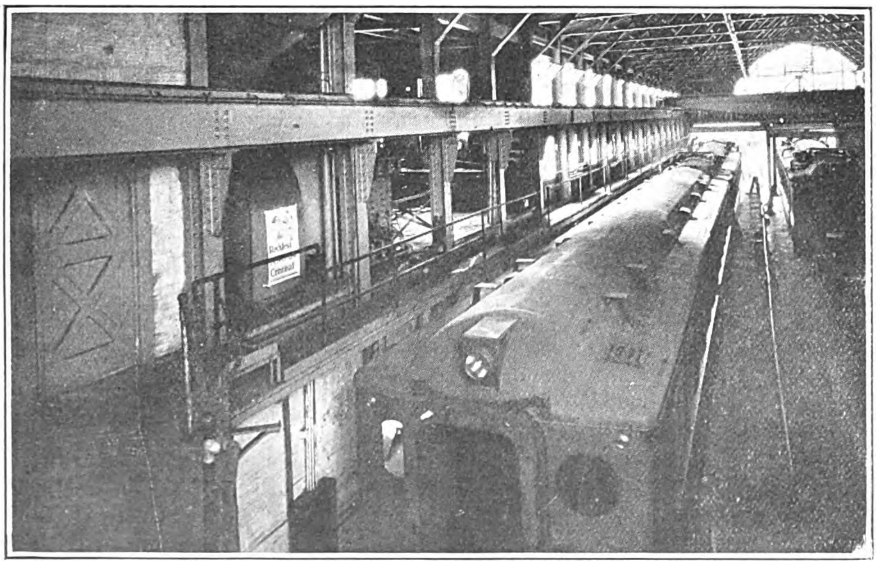
An Overhead Traveling Crane Lifts the Car Bodies, Which Are Held in Their Raised Position by Steel Supports While the Trucks Are Run Out and Placed on the Adjacent Overhauling Tracks. Turntables in the Floor Provide for Removal at the Side of the Car

located on either side of a track. Water is sprayed on the cars as they pass between these pipes, and men with brushes rub down the sides and windows. With this construction it is the usual practice to obtain the water directly from the city system.

The valves for operating and controlling the flow of water are manipulated from the floor by one man, while it is usual to have two others to scrub and loosen the dirt. The man operating the car stays inside during the washing and takes the car away as soon as it is completed. Average figures obtained from railways using this method show that ordinary sized cars can be washed in from 2½ to 3 minutes and the installation of such equipment produces substantial savings.

In connection with the cleaning of cars it appears that full advantage has not been taken of the economies to be gained from vacuum cleaning. Probably the most notable example of the use of this type of equipment is in Cleveland. In this shop one cleaner is used in the washroom of the paint shop for removing dust and dirt from car interiors previous to painting and varnishing. This method could be extended to the cleaning of cars on ordinary maintenance inspection to good advantage in other railway shops. The removal of dust and dirt from inaccessible places, such as corners, window pockets and underneath seats, is almost impossible with a broom or brush, but a vacuum cleaner with a small nozzle reaches such places readily, and there is also freedom from discomfort to workmen, which is a particular disadvantage where a brush or broom is used.

In the Cleveland shop, vacuum cleaning has been extended to other departments. Thus, in the motor repair shop a cleaner is used to remove the dust and dirt from motor frames preparatory to overhauling, and in the armature room, the armatures are blown out and at the same time the dirt is drawn off by connection to the suction end of the cleaner.



By Having the Trolley Repair Department Located in the Balcony with a Footwalk on a Level with the Roofs of the Cars Much Time Is Saved in Making Inspection and Repairs of Equipment in the Shops of the New York, Westchester & Boston Railway

Provision for Spray Painting a Modern Requirement

The cost of painting the various parts of car equipment can be brought back to a pre-war basis by the use of paint-spraying equipment. Many roads which are now using this system report that the actual time of painting has been reduced to approximately one-third of that required by the old hand brush method. There is still considerable room for reducing the time required in drying paint. A modern shop should have heating facilities for this purpose.

In connection with the use of paint-spraying equipment several problems present themselves, for in order to obtain the greatest advantages, it is necessary really to design the paint shop particularly for this work. Many railways which are now using paint-spraying methods report that with adequate and proper facilities the time consumed in painting could be reduced still further. Most railway shops are designed without adequate space between the centers of tracks to provide for efficient use of paint-spraying equipment. This is a great handicap. The distance between track centers should be not less than 15 ft., and it is desirable to have this 20 ft. or more if the space can be obtained.

There are several reasons for the need of increased space. One of the principal ones is the need for adequate scaffolding or movable platforms, so that the paint spraying can be done economically. Many roads have installed very ingenious designs of platforms in their painting department, but in general most of these are affected to a considerable extent by space limitations. Another reason for an increased spacing of tracks is to avoid fumes from spray painting and to prevent the interference of one class of work with another.

If paint spraying is to be carried out in the most efficient manner, the shops should be piped with a supply of compressed air with convenient outlets, so that this can be used in connection with the paint-spraying equipment without the necessity of running long lines of hose which must be carried over the floor and up to the platform, taking up valuable space and also requiring considerable time in their movement and adjustment and difficulty in avoiding leaks.

In Rochester the paint shop is piped not only with a supply of air but also of gas, so that a combination of air and gas is used to burn off the paint from the car body.

The most effective use of paint spraying at present is on trucks and for the priming coats of car bodies. Railways which are using this system extensively report that the spray gives a better penetration than a brush in the cracks and nail holes, and therefore holds the putty and surfacer much better than the brush methods.

In regard to platforms particularly adapted for spray painting, many roads have found a movable platform, or rather a tower mounted on wheels, of great convenience. The operator pushes this along the side of the car as his work progresses and thus does not need to move from his position. Such movable towers, however, require more space between tracks than is ordinarily provided in paint shops, and this is an added reason for increased track centers where new designs permit.

Repair Department Should Be Convenient for General Overhauling

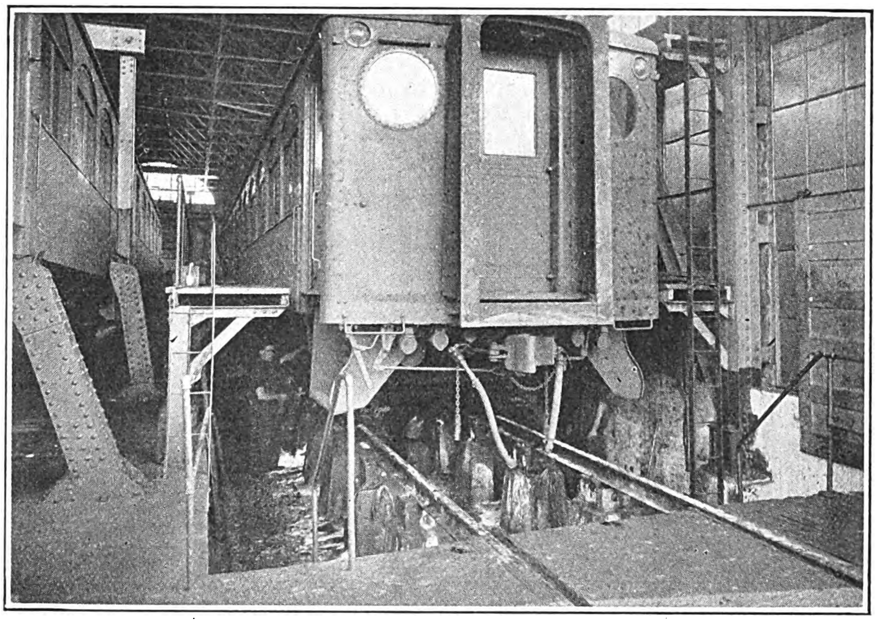
A modern shop should be small and equipped with every known practical device for making repairs quickly.

The work of repairs to the car equipment must be carried out on various levels. Thus, there is equipment underneath the car body and on the truck, inside the car and along the outside of the car, and also on the roof. This particular phase of repair work has been amply provided for in the design of the New York, Westchester & Boston repair shop. In this shop provision is made for three different levels of work. No scaffolding or ladders are necessary, and their absence materially adds to the rapidity of operation and the freedom of various groups of workmen as well as to the general appearance of the shops.

Repairs and inspection of the trolley bases, wheels and poles must necessarily be made on the roofs of cars. It certainly adds to the arduousness of the employees who do this work if they are required to climb up and down repeatedly from the floor to the roofs of cars. In the New York, Westchester & Boston shops a walk is provided along one side of the shop on a level with the car roof, and the department where trolley equipment is repaired is in the balcony leading off from this walk.

Men can thus bring any material to the benches for repairs without carrying it up and down ladders. Also, repairs on the trolley equipment itself can be carried out much more efficiently by such an arrangement. The use of a permanent platform on the level of the car floor for cleaning windows and for convenient access to the body generally has proved of particular advantage in this shop.

Pit construction has been given considerable study by various electric railway men, and in general the ideas in this connection are well advanced. All realize the advantage of having open space at the sides of the cars as well as underneath, an open pit construction with a walk in the center between the two tracks having been found to work out most satisfactorily.



A Type of Pit Extending Outside the Cars and Having Rails Supported on Concrete Piers Gives Convenient Access to All Under Body Equipment in the Shops of the New York, Westchester & Boston Railway

Material-Handling Equipment Important

One of the principal factors in the rapid repair of equipment is provision of cranes, telphers, hoists and the like for handling and transporting parts to the particular locations at which they are to be repaired. The work starts with the removal of the car bodies from the trucks and continues through the dismantling of the equipment and removal of individual parts to the particular tools at which the work is to be done. In deciding on the best type of equipment for any particular shop, some of the points that should be given consideration are initial investment, time required for doing the work, adaptability to other services in the shop, convenience of operation and accident hazards. There is no doubt that an overhead traveling crane is the most efficient and convenient means for removal of car bodies. Certainly, in equipping a shop which is modern in every respect, this should be included. It is better to put the money into the best means of doing a job in the shop than to invest a smaller sum in a slower, less efficient substitute which may delay the return of a car to service.

The overhead traveling crane has the advantage that it can be used for handling heavy parts and dismantling or assembling the equipment in the truck shop, as well as for lifting car bodies, and thus can be kept in almost continuous service.

As an auxiliary to the overhead traveling crane, a complete system of traveling telphers is desirable. Through the use of such a system the various detail parts can be taken up from the floor of the overhauling shop and delivered directly to the machine tool on which the work is to be done. Such a system should connect the various departments and run adjacent to the principal tools. In addition, ample equipment of jib cranes and hoists will be necessary in order to provide for the lifting of heavy parts into and out of the machines.

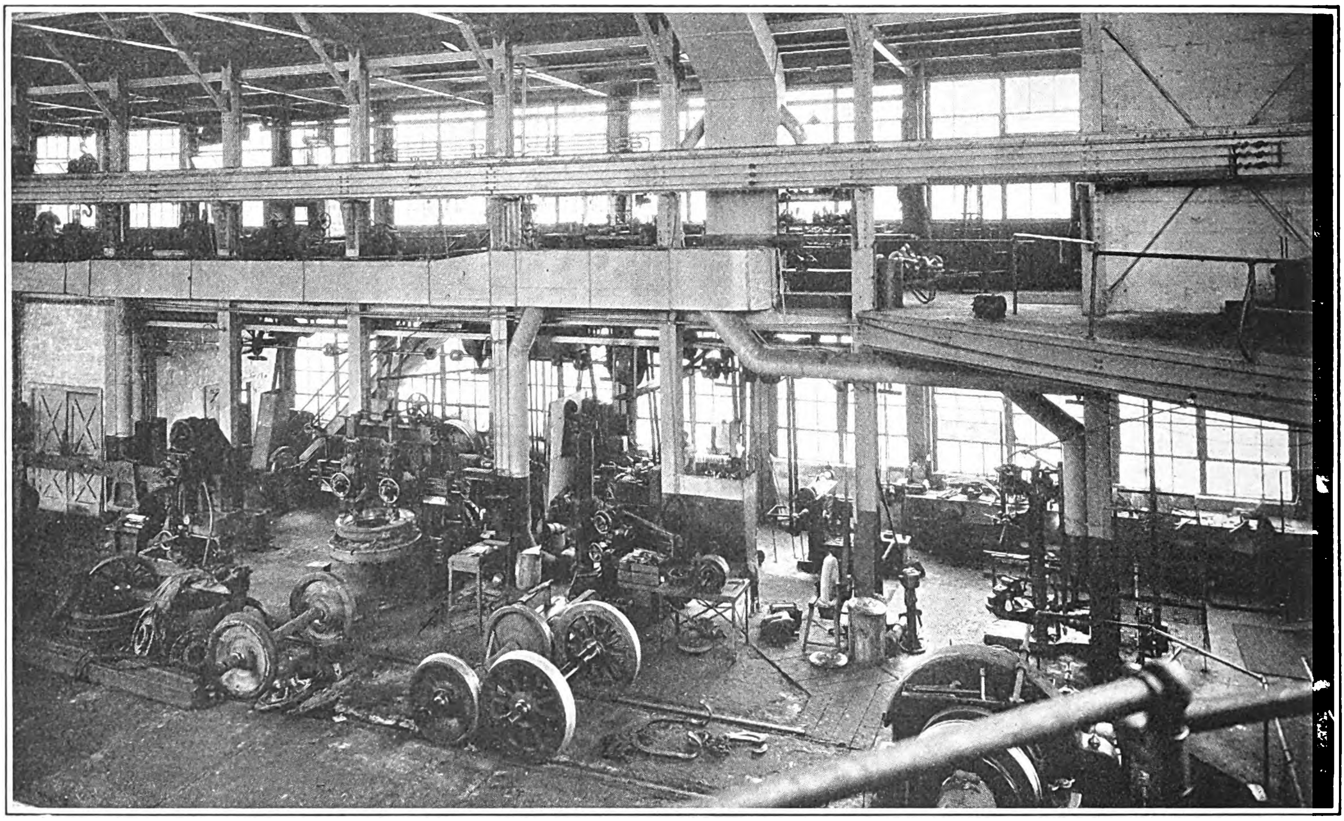
Such equipment, however, is only a part of that required for material handling. The use of truck tractors by electric railways is infrequent, but these can be used to great advantage and with material reduction in cost of labor. Several of the larger electric railway systems are using truck tractors and find innumerable uses for them.

It is not the intention to go into the desirable grouping and arrangement of departments in a shop, but this is a matter which should have very close attention. The arrangement of shop departments is frequently responsible for double handling of material and the necessity of transporting some pieces of apparatus through another department before they finally reach the machine on which the work has to be done.

The dipping and baking of railway armatures and the impregnating of field coils have now become quite general practice among electric railways. Hence, in laying out an up-to-date shop ample provision should be made for this work. The equipment recommended consists of an insulated oven with forced ventilation and thermostatic control of the heat, a dipping tank for armatures and an impregnating tank for field coils. In addition, an overhead trolley system should extend from the dipping tank into the oven. Where material handling trucks are provided, these can be used to transfer the equipment in and out of the oven.

Large economies in the maintenance of rolling stock can be realized by making special provision for reclamation work. For salvaging material and reworking it for further use, the various types of welding equipment are the main items needed. Parts which are to be scrapped are most quickly cut apart by the oxyacetylene or arc process. Work of repair such as building up worn surfaces and welding broken parts now constitutes the major part of electric railway reclamation work. The Washington Railway & Electric Company has a system of wiring such that leads from the welding room equipment can be brought out and work done in most any nearby location.

There are many other departments, in addition to those which have been considered in this article, which should have careful consideration in planning a modern shop. Such features as are necessary for ample lighting, ventilating and heating systems could each well be given as much space for consideration as has been given in this article. The intention here, however, has been to point out only a few of the high points of a modern electric railway shop layout.



A Balcony Over the Machine Shop Gives a Very Efficient Arrangement of Space in the Shops of the New York, Westchester & Boston Railway

Accounting Practice

By W. L. DAVIS

Auditor Lehigh Valley Transit Company, Allentown, Pa.

Different economic conditions, regulation and the growth of the industry are responsible for many changes in accounting matters during the last twenty years. This article considers methods of organizing the staff, handling distributions and selection of forms. Later articles will consider modern methods of arranging the ledger accounts, preparing the reports, divisional accounting, budgets, capital records and other matters.

THOSE of us who have spent the past twenty years in electric railway accounting have had to keep pace with the numerous changes and developments through which the industry has passed during that time. Different economic conditions and governmental and municipal regulations have been responsible for some of these changes, but the normal growth of the industry has been one of the principal factors.

The primary functions of the accounting department during this time have been the preparation of financial data, such as balance sheets and income accounts, and the compilation of a history of the company. These functions still remain and will continue to represent the main responsibility of the men in charge of the accounting branch of the industry. The modern railway accountant, however, does not and cannot consider that his duties are those of an ordinary bookkeeper, the problems of the industry at the present being such that he must assume much larger responsibilities. He must be prepared to furnish all kinds of cost analyses both for operating and construction purposes, to compile regular reports and special data for regulatory commissions, and to handle numerous other requirements unheard of twenty-five years ago.

A survey of the accounting requirements of the modern electric railway should begin with a review of the essential qualifications of the modern electric railway accountant. The man in charge of this work should have the necessary technical education both as to accounting and finance, together with a fund of practical knowledge that can only come with experience. While he should not be expected to be familiar with all of the problems of the maintenance of way engineer, the superintendent of the distribution system, the master mechanic, the power station engineer or the superintendent of transportation, he should know enough about the work in the various operating and construction departments to pass intelligently upon such accounting problems as may present themselves to him. He should supplement his knowledge of the industry and his own branch of it by being thoroughly familiar with operating conditions on his property.

The auditor should also keep himself advised not only on general economic conditions but also on the industrial situations in the territory through which his company operates. Briefly speaking, he should be a man who is thoroughly competent to handle his own department, who can make the proper decisions at the proper time and take full personal responsibility for them, who merits the confidence of the executives, and who can organize and supervise the work of those to whom he delegates a part of his responsibility.

As the auditor is responsible for the accounting records of his company he should provide himself with not only a competent staff of assistants but also a comprehensive accounting system suited to his own requirements. He should be familiar enough with his own problems and requirements to handle both.

The Accounting Staff

It is not an easy matter to develop an accounting organization which can meet the complicated problems of the present day, and in doing so the auditor should profit by the lessons learned during the past years. The average man entering the service of the accounting department of an electric railway seldom has any previous experience in that direction, and considerable educational work is necessary before the new employee can be intrusted with anything other than routine clerical work. It might also be added that the new employee should also be encouraged to familiarize himself with the property of the company.

Every electric railway accounting department is required to prepare from time to time numerous special statements, exhibits, analyses and the like, and it is usually necessary to assign this work to the best men in the department. As this kind of work must usually be given preference over routine requirements, it will be found advantageous, particularly in the larger offices, to provide for this in the accounting organization. This can usually be done to advantage by assigning the newer employees to the routine work and relieving the older and more experienced men of as much detail as possible, assigning them to the special work as required.

The routine work should of course be handled under the supervision of an experienced man, to whom the auditor should delegate as much of his detail responsibility as possible. The men to whom the detail work is intrusted should be instructed to develop the newer men to such an extent that, when the time comes for promotion, there will be plenty of valuable talent available. The special men should be recruited in the same fashion, thereby utilizing the experience of the older men to the best advantage and enabling the organization to develop within itself.

The extent to which this method can be advantageously used depends of course upon the size of the organization and the amount of work of all kinds required of it, but any accounting organization should be flexible enough to take care of special work, annual reports, vacations and time lost through illness or accidents, and if there are enough people to handle these requirements the routine work and the daily and monthly reports compiled therefrom are subjected to a minimum of delay.

There should also be at least two men familiar enough with the requirements of the department and the policy of the company to handle the work required of the organization in the absence of the auditor. The auditor should consider the development of such men his personal responsibility and should go out of his way to see that their education along the lines of his own work is as complete as he can possibly make it. In this respect the man in charge of the department should subordinate his personal convenience to the requirements of the service and should consider it a duty to provide the company with some one who can take his place.

The proper development of the modern accounting organization is predicated upon a proper selection of personnel, and the auditor should consider this a most important branch of his work. This is a very broad subject and one upon which books have been written, and it is of course entirely outside the province of this article to discuss it in detail. It might, however, be well to say at this time that the employees should be selected and trained for the positions that they are expected to fill, and toward this end their past experience and personal preferences should be carefully considered. It would be manifestly unfair to place a man whose past experience might only have covered storeroom accounting upon general ledger work and expect him to make good, and on the other hand a man with an exceptionally good line of experience upon general books could hardly be put on a routine job in another department and be expected to stay with the organization.

When the new man is employed, or even before he is employed, he should be informed of just what is expected of him, and he should be given all possible assistance in that direction. On the other hand, he should be told just what he may expect, and if any promises are made to him they should be fulfilled to the letter. He should be employed with the idea that he is becoming a member of an accounting organization and taking up a share of the responsibilities of the department.

Every employee should be given to understand that he cannot be advanced in the organization until he qualifies for such advancement and until the opportunity for promotion presents itself. When such an opportunity does present itself the position should be filled from the organization whenever possible, but this probably should not be an inflexible rule. It is sometimes desirable to inject a little of what is usually called new blood, as new ideas are often very necessary, but the men in the organization should always be encouraged to develop themselves for something better. Above all, a competent, conscientious and loyal employee should not be kept on one job indefinitely with no opportunities to improve himself or his position just because he does happen to be fitted for his work and because he is making good on it.

There have been numerous cases of employees being kept in the same positions indefinitely because "they couldn't be spared" until other organizations discover what they can do and make offers that are soon accepted. It is usually the valuable employee who does not make his presence known from year to year as he keeps on doing his work, but that is no reason why he should not be considered for promotion or a better position just because he is competent on his present work. A failure to promote a man of this kind to a better position may temporarily save the auditor a little work and personal inconvenience, but when the time comes to fill both positions he may remember the circumstances to his sorrow.

A competent staff (and an economical staff) is a well-satisfied staff, and it is hardly possible to build up the former without the latter. A well-satisfied staff is not made so without a fairly liberal salary policy, but the salary policy is not the only element. The employees should be encouraged to develop themselves, should receive all possible assistance toward an education in the requirements of their work, should not be misled by false promises or statements, should have the most pleasant and satisfactory working conditions possible, and should not be expected to do the impossible. Merit should always be recognized and incompetence should always be handled in the most effective fashion.

While the employees should not expect (and the better employees do not expect) to be continually complimented for doing what they are paid to do, a friendly word of appreciation often goes a long way. Criticisms should be given tactfully and with some regard for the feelings of the other fellow, always bearing in mind that the employee didn't make the mistake intentionally and is usually anxious to correct his own faults.

When an employee is requested to prepare a statement or do some extra work that is apart from his usual routine, he will usually handle it better (and more quickly) if he not only knows what to do and how to do it, but why he is doing it. If the employees in the accounting department are well satisfied they will not only do better work in a more efficient manner, but will also prove valuable "boosters" for the company on the outside.

Comparison with Older Methods

Before discussing the subject of modern methods in accounting, it might be said that the present-day requirements of the industry are such that the records must be kept in an entirely different form than those considered satisfactory twenty-five and thirty years ago. The accounting records should not only provide the necessary routine for preparing periodic profit and loss statements and balance sheets, but should also reflect a more or less complete history of the operating, construction and financial transactions of the company.

In order to accomplish this end, it may seem, at first glance, that there would not be much room for economy of time and labor when comparing the modern records with the old-fashioned bound ledgers, cash books and journals of an earlier day. It is true that our present requirements are such that the records must necessarily be somewhat more elaborate, but if the auditor is familiar enough with his own conditions and has the necessary knowledge of detail he can often make one entry serve more than one purpose and thereby effect a substantial saving in expense.

As the work in the general offices is such that the final results depend to a great extent upon the daily transactions as recorded in the operating offices, any efforts toward reducing work and effecting economical accounting methods in handling modern requirements must begin at the source. The basic figures, from the very nature of the work, must be compiled daily, and if this feature receives sufficient attention it will be found possible to handle the work economically and at the same time avoid peaks at the end of the accounting period. The present-day auditor, in devising his accounting systems, will find it of considerable advantage to avoid, as far as possible, the practice of allowing important work to wait until the end of the month. This is especially true of payrolls and material distributions, not to mention credits to revenue accounts for daily earnings. This is, of course, subject to some limitations, as it would be manifestly unnecessary to attempt a daily compilation of a small payroll or material distribution, which, from the nature of the work and the size of it, might be done in a half day's time at the close of the month.

Simplifying Payroll Distribution

In preparing payroll distributions it will be found advantageous to enter the time of each man each day and charge it to the proper accounts, preferably by dollars and cents, but at least by hours. This in turn requires each employee to prepare, or some one to prepare for him, a daily report of his time on which a complete description of the work is shown. The usual form of time ticket may be supplemented by an extra column in which can be shown the allocation of the amount earned each day, these amounts being accumulated daily by accounts. If the charges are made and accumulated daily, it is not only possible to arrive at a total of the payroll distribution within one day after the close of the accounting period, but it is also possible, if desired, to prepare a daily report of operating costs. It is desirable to summarize the daily charges from the time tickets of the individual employees to each operating expense or construction account and have these totals subjected to daily accumulation. The department head may then be in a position to review each day's payroll costs and have a thorough understanding of his labor charges as they are incurred, instead of being required to wait until the close of the accounting period to find out what is included in his costs.

The monthly payroll distributions as forwarded to the general office should be prepared on standard forms. Such forms should provide spaces for the charges to each controlling account, the number of controlling accounts depending entirely upon the requirements of the company. It will be found very advantageous to draft this form in such a way that the charges to the various detail accounts under each controlling account may be grouped and sub-totaled accordingly.

If there is only one payroll distribution, such as might be required in a small property, a printed form is not essential, but if a number of payroll distributions are used a printed form will be found very valuable. These forms can be ruled so that the charges are grouped automatically by detail and controlling accounts, thereby making it very easy to prepare a summary of the payroll distributions to be used as a journal entry. The totals by control accounts shown on the summary may be posted direct to the general ledger and the detail accounts to a detail ledger. Each section of the detail ledger may be balanced separately with its control account and the difficulties sometimes encountered in preparing a payroll distribution journal entry reduced to a minimum.

If divisional accounting is used, the detail ledger sheets may be prepared accordingly in columnar form, with the description, total and reference columns on the left side. The monthly charges from each payroll may then be entered and the total charges to each operating and construction account determined accordingly. These totals can then be transferred to the operating and construction ledgers in one item with the assurance that they are in balance.

If the company is maintaining a fixed capital record, it is very important to have a system whereby the charges to fixed capital accounts may readily be analyzed, and if the charges to the various construction accounts can be readily supported by comprehensive analyses of the work by man-hours and amounts, the preparation of monthly cost analyses will be materially facilitated. The daily record of man-hours and amounts will also be found to be of advantage in preparing analyses of operating costs, cost curves, and similar data, together with estimates for budgets and other purposes. It will therefore be seen that one set of records, if made properly and kept up to date, may be used for different purposes, even though the basic figures are only entered once.

Material Distribution and Fare Collections

Material distributions may also be handled in much the same way. Daily distributions of material issues may be summarized by accounts, and the total charge to each operating account may be readily determined with comparatively no delay at the close of the accounting period. These daily distributions may be summarized both by accounts and by articles, thereby enabling the company to keep a very complete record of material costs by articles and amounts, not only representing debits to operating and construction accounts, but also credits to the stock accounts. If it is not considered necessary to prepare such details daily, they may be prepared on a weekly or monthly basis, but it will be found preferable under ordinary circumstances to prepare them daily.

The monthly material distributions when reported to the general office may be summarized upon the same kind of a form as has already been suggested for payrolls, and it will be found advantageous to use the same form with different headings, thereby reducing the number of active forms in use.

Complete daily records of material issued may also be used for a number of different purposes, particularly in the preparation of cost analyses for fixed capital records, and if the routine records are self-analyzing they may be reviewed at any time by any officer or employee who may be interested.

The same general principle may be used in accounting for fare collections, whether cash or tickets. As the operations are usually handled on a divisional basis, the accounting should of course follow the same course. No matter what form of registration may be in effect, it is necessary to account for the fares collected in the most complete manner possible.

In this article no attempt will be made to discuss the numerous forms of fare registration, as that is a subject in itself and one which each company should decide for itself. However, it might be well to suggest that the accounting for the receipts be handled in such a way that every fare may be accounted for, and this can best be attained by a method which enables the accounting department to compare the fares registered as reported by the conductors with similar data prepared from records taken from the cars.

Conductors' trip sheets should show the number of cash fares and revenue tickets collected on each car, and this record can be supplemented by a daily record of registration showing the number of fares collected on each car by each conductor. When the conductors' returns are audited and the cash and ticket collections of each conductor are compared with the trip sheets or trip reports, the collections on each car can be determined without much additional work, for the reason that the registrations are necessarily reported by cars. Forms can be prepared for this purpose and the fare collections by cars compiled along with divisional earnings, car-miles, car-hours and other statistical data.

On the other hand, the records prepared by cars can be summarized in accordance with the number of fares collected by each conductor, and one record compared with the other. If the form of registration does not furnish the accounting department with data from which the registration by conductors may be determined, this information may be had from cards which stay with the car and which show opening readings as taken by carhouse employees, readings taken when conductors change off, and closing readings taken at the end of the day.

If each day's collections are audited in this manner, every registration can be accounted for and each day's earnings can be determined on the day after. The general accounting department can take the daily collections direct into the income account, either on the basis of cash collections, ticket sales or tickets lifted. Even if tickets lifted are not used as a basis of determining each day's earnings, the revenue tickets should be accounted for.

In taking the earnings into the general accounts, divisional segregations may be made as required, and if this information is needed, it should be prepared at the time the daily collections are audited. This subject will, however, be discussed later.

Proper Selection of Forms

In order to handle the work of a modern accounting department in the most efficient manner, special attention should of course be given to the preparation of standard forms. This is a subject which, in the past, has not received the attention that it should have had, and as a result, there have been hundreds of printed forms produced without any uniformity as to size, quality of paper, binding space and the like. If the auditor, or some one to whom this particular responsibility is delegated, determines in advance the exact purposes for which a form is to be used and the number of figures to be entered in each column, he can often cut down the size of his form or adjust it to one of the standard sizes of paper stock. A few square inches of economy in a form of which a hundred thousand sheets are ordered at a time will result in a substantial saving on the annual stationery bill.

If a standard size for ledger sheets is determined in advance, it will facilitate ordering of ledger binders, particularly for stores accounts. It may seem rather difficult to arrive at a standard size, 11x17 in. for example, for all kinds of ledgers, but in instances where all of the information cannot possibly be put on one side of a sheet it is often possible to have the forms printed so that the record will be divided in the center and entries can be made on both sides. If this method is still unsatisfactory, short sheets can be inserted and indefinite expansion provided for. If this is done, the office work need not be delayed (and the office morale lowered) by the use of large and cumbersome ledgers, which are not only expensive, but also very awkward to handle. Another advantage in standard size ledgers will be seen when determining requirements for safe and vault space.

During the past ten or fifteen years substantial improvements have been made in loose-leaf binders and accessory equipment, and it will be found advantageous to make use of these inventions to a considerable extent. Of course, there is a difference of opinion as to the desirability of bound books as compared with loose-leaf records, but to some extent this is a matter of opinion and something for each individual to determine.

Considerable efficiency can also be attained by proper arrangement of columns on the various forms. For example, in the preparation of a voucher record it is very desirable to prepare the form in such a way that the columns for charges to the accounts most generally used are near the "accounts payable" column. This will be quite an item when five or six thousand vouchers have to be posted in a month. It will be advantageous to design other forms with the same idea in view.

It will be found economical to prepare printed forms and ruled paper for as much of the routine work as possible. Computations can often be put in permanent form with almost no additional effort. As an example, it might be said that as simple a process as the distribution of a voucher may be made easier if printed forms are provided for use in listing invoices. There may be instances when a number of invoices, charging different accounts, are vouchered at the same time. A recapitulation of these charges listed on a small form will serve not only to facilitate the preparation of the voucher but also to enable the voucher clerk to charge the proper accounts and the operating expense ledger clerk to make the proper entries.

Forms can often be devised to serve different purposes. The payrolls and material distributions may be entered on the same form, and the same kind of a ledger can be used to control both general ledger and operating expense accounts. A study of this situation will result in substantial economies not only in stationery but also in filing space. With a uniform size for ledgers of 11x17 in. it is no longer necessary to use the old-fashioned, uncomfortable high top desk.

In later installments of this article Mr. Davis will discuss other phases of modern accounting practice.

Claims and Safety

By J. H. HANDLON

Claim Agent Market Street Railway, San Francisco, Cal.

The tremendous increase in number of automobiles and other features of modern street traffic have greatly increased the problems of the claim agent and their complexity. But by safety work, training of employees and other ways, he is doing his best to overcome these handicaps.

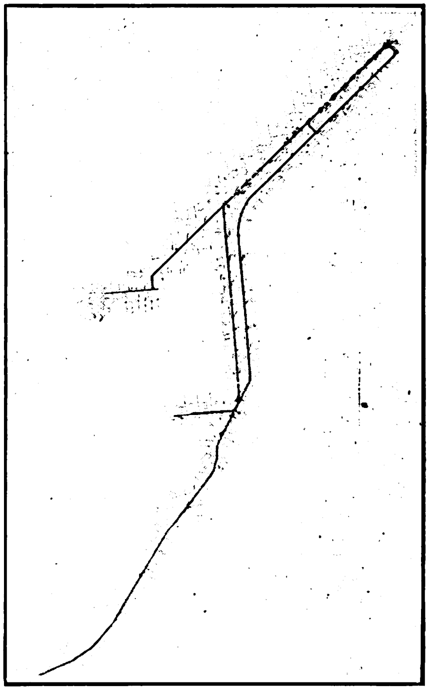
THE greatly increased traffic in the streets of our modern cities, even on our suburban highways, has added to the problems of the claims department. Traffic accidents have increased and electric railway claim agents have been compelled to advance their methods to meet these new and trying conditions. Today a modern claim department of a large street railway company is similar to a laboratory where the strength of the warp and woof and dye of a fabric is tested, for every effort is made honestly to determine whether a claim is meritorious or not. Haphazard, hit-and-miss methods have been abandoned.

In former days, before the art of adjusting claims had reached its present state of advancement, it was not unusual for claim agent of a street railway corporation to be accused of practices that would not be countenanced by a modern railway claim agent. Probably the claim agent had been a former detective—many claim agents were—who was influenced by his former environment to such an extent that he was likely to be very critical of all claimants and to consider every claimant his natural enemy. Such a claim agent looked upon an immediate settlement as a "consummation devoutly to be wished," and ordinarily all suggestions of ethics were cast to the winds. Claim agents today are fighting against the evil impressions caused by such practices.

If I should undertake to prepare a creed, a summary of principles for the guidance of street railway claim agents, I would outline it somewhat as follows:

"Let me so do my today's work that my actions will not reflect upon but benefit my employers tomorrow. Therefore, in disposing of yesterday's accident, I must be just and equitable to all concerned. I must use the lesson yesterday's accident taught me to assist in preventing tomorrow's accident, if possible, and failing to dispose of yesterday's accident I must use every resource at my command to gather all of the facts with regard thereto that can be accumulated, so that my employers will be fortified should litigation arise."

The experienced claim agent knows that there is always an opportune time for pressing a settlement, and that time is rarely immediately after the accident occurs, especially in serious personal injury cases. Until a few years ago the Market Street Railway made an immediate appraisal of the damage to all automobiles involved in collisions with their cars. Then we abandoned the practice and found that the proportion of claims for damage to automobiles decreased from 29 per cent to 19 per cent of all such accidents, and the cost to the company was lessened. By adopting such a policy, we relieved ourselves of the annoyance of being compelled to reject claims where we had taken the initiative of sending a company appraiser to call upon the automobile owner.

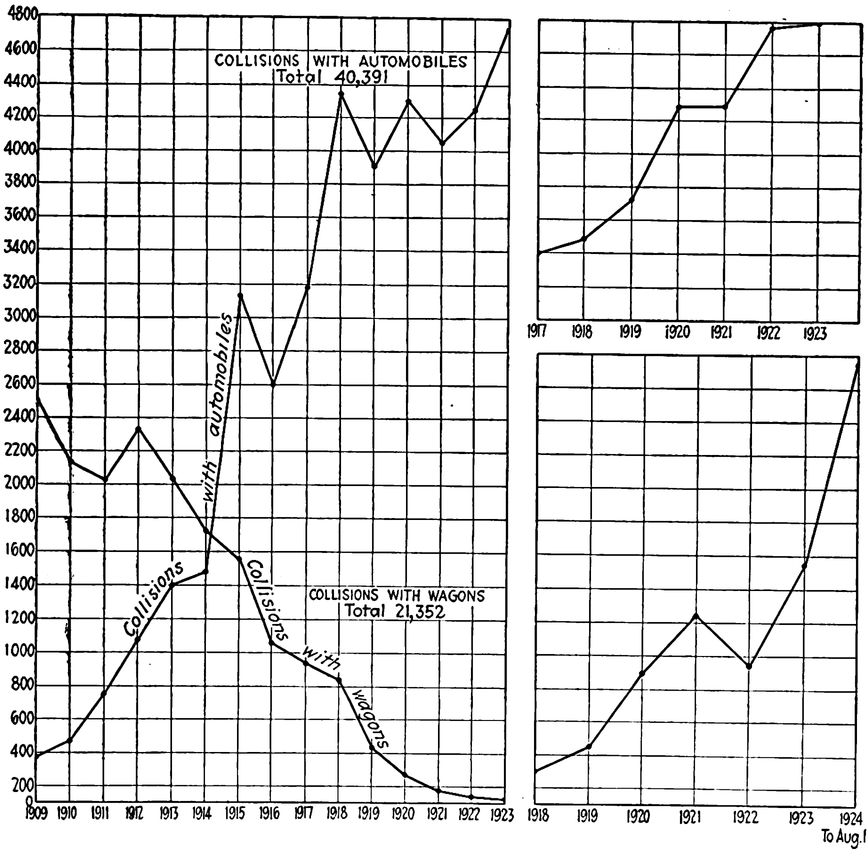


In Each Carhouse a Map Shows the Number and Character of Accidents on Each Route

Some of the modern methods now used by claim agents are these: Comparative records are kept on a weekly or monthly basis of all classes of accidents, underlying causes of accidents and their costs. Comparisons are made of accidents by lines or divisions. The individual cost per accident of each platform man is recorded, and a record is maintained of the discipline imposed by each operating official, both in individual accidents and in group form, because operating officials who become lax in enforcing discipline indirectly encourage a "don't care" attitude among the trainmen.

Occasionally, records are made of the accident costs of employees according to their length of service and the hours when most accidents occur and of the increase or decrease of accidents on lines recently rerouted and where the running time is reduced.

Accidents are investigated regardless of whether a claim is filed, and a close check is made on all unreported or "blind" accidents. Monthly contests between divisions are regularly conducted with a view of increasing the number of witnesses per accident, the number of miles traveled per accident, and passengers carried and car-hours operated per accident. Some street railways publish in their "house organ" photographs of motormen and conductors with exceptionally good records as regards freedom from accident; others reward such men with a bonus; others apportion among all trainmen a proportion of all money saved from their "Injuries and Damages" allotment; on other systems prizes are awarded to those whose records are free from accidents.



Accident Statistics of Market Street Railway, San Francisco

At left, chart showing annual number of collisions with wagons and automobiles involving electric cars.

At right, top, increase in automobile claims brought by automobile insurance companies against the Market Street Railway.

At right, bottom, increase in claims collected by the Market Street Railway from automobile owners.

Some Recent Liability Cases

Recently, so far as I am aware, there has been no material change in the law of liability, especially as regards automobiles.

Street railway attorneys on the Pacific Coast, however, are now citing, when defending litigation against their employers, the California Supreme Court decision in the case of the New York Lubricating Oil Company against the United Railroads of San Francisco, 65 Cal., Dec. 427. In its decision the Supreme Court of that state held:

1. Where the driver of an auto truck, although fully aware of the approach of an electric car, closed his eyes to the danger necessarily involved in any attempt to cross the track, and blindly drove his truck into the path of the oncoming car, he was guilty of contributory negligence as a matter of law.

2. It is the duty of automobile truck drivers, approaching an electric railway crossing, to give way to an approaching car, if necessary, to avoid collision.

3. A traveler in approaching a railroad track is not justified in relying upon the assumption that the motorman will not in any way be negligent in the operation of his car, and therefore he is not warranted in believing that the car is being operated at the usual and ordinary rate of speed.

4. As much care is required of a person crossing the tracks of an electric railway upon a private right-of-way in the open country as is required of a person crossing the tracks of a steam railway.

5. It is the duty of a traveler to note the speed at which an electric car is approaching, and if, when he last looks at the approaching car, it is within such a distance and going at such an apparent rate of speed as to cause a reasonable apprehension of danger, it is negligence to attempt to make the crossing.

6. Where the physical facts shown by the undisputed evidence raise the inevitable inference that a person approaching a railroad crossing did not look or listen, or that, having looked and listened, he endeavored to cross immediately in front of a rapidly approaching train which was plainly open to his view, he is as a matter of law guilty of contributory negligence.

7. In an action for damages resulting from a collision on a crossing, if the judgment for the plaintiff can be sustained only on the theory of the doctrine of the last clear chance, it is essential that the court find that the defendant had the last chance to avoid the collision.

8. Where the driver of a truck, which could have been stopped within a distance of 3 ft., was aware of the approach of an electric car going 30 m.p.h. yet closed his eyes to the danger and drove his truck into the path of the oncoming car, and the motorman, while he was yet some distance from the point of collision, was likewise aware of the approach of the truck, it was held that there was no room for the application of the last clear chance doctrine.

9. The doctrine of the last clear chance is only applicable to a defendant who actually perceived the predicament and danger of a plaintiff in time to have avoided the accident by the exercise of due diligence, and defendant cannot be held liable on the theory that he would have discovered the peril of the other but for remissness on his part.

Automobile Legislation Needed

There is crying need of some constructive legislation in the law of liability so far as automobiles are concerned. For instance, it was at one time held that the negligence of a stage driver was imputable to the passenger upon the theory that they were engaged in a joint enterprise. The courts have since revised their opinion, although in community property states the negligence of either husband or wife is imputable to the other on the theory that the community property will be benefited by a judgment, and this should not be so if it was due to the fault or error of one or the other. While the negligence of the servant is imputable to the master and in some states the negligence of the parent is imputable to the child, the courts are not in accord as to what constitutes a joint enterprise, but they enterprise exists, the negligence of are in unison that wherever a joint either party is imputed to the others. The question at issue is whether two persons traveling together on the same errand are engaged in a joint enterprise. Some courts say they are and others say they are not.

In cases where the owner of an automobile is concerned, collusion oftentimes exists between that owner and the injured occupant in an endeavor to mulct the insurance company, and under such circumstances the street railway company, if it is involved, sometimes suffers. Legislation should be enacted which would prohibit such recoveries where evidence of conspiracy exists.

The compulsory examination of automobile drivers to eliminate the physically or mentally unfit should be a part of the statutes of every state, and automobile owners should be required to carry liability insurance or provide a bond that will indemnify those they injure. I can foresee the time, and it is not far distant, when automobile insurance companies will classify their risks according to past performances and such hazards as whether the insured is to be the sole driver of the automobile or if the other members of his family are allowed to drive the insured machine, also to what extent the machine is used and where it is used. Insurance premiums will then be paid according to the classification given above, and each owner will strive to reduce his insurance cost by taking more precautions in his driving. This should materially decrease automobile accidents.

In the State of Washington a very satisfactory law is in effect requiring the speed of all automobiles to be reduced to 12 m.p.h. at 50 ft. from all railway crossings.

There is a growing tendency to make the pedestrian assume more responsibility than he has in the past. "Jaywalking" ordinances have been passed and many are under consideration.

If the laws on the statute books were enforced there would be far fewer accidents, but this will not be brought about until those having charge of law enforcement are aroused to the importance of doing their duty. Perhaps, some day, the federal government will seek the co-operation of all of the states in establishing uniform laws throughout the country, and the conscience of the public will also be awakened to a realization of the sanctity of the law and the respect they should show it.

In my opinion, a street railway claim agent should be primarily a good business man and not primarily a lawyer. Preferably, he should be experienced in the operating department of a street railway company so that he may have a keener conception of whether an accident is avoidable. If primarily a lawyer, he is disposed to measure a claim with the same yardstick a jury would use, or has used under like circumstances, where an unreasonably high award has been made—a condition of mind that is expensive to his company. He is also inclined to set up a technical defence, forgetful of the fact that by reason of the peculiar nature of his employment he should not be an advocate but an impartial observer reviewing the facts. Further, in his seclusion, he is likely to construct a theoretical defence which frequently fades away in the light of opposing testimony.

The safety engineer should report directly to the claim agent, for the claim agent is an accident specialist, daily analyzing the causes of accidents, and is in a better position to know immediately where the responsibility for the accident should be placed and to suggest prompt preventives. Besides, the claim agent knows the costs of accidents, and he is vitally interested in reducing them.

Some of the methods of promoting safety employed by electric railways are:

Safety Methods

The formation of safety committees among the employees, the employment of a safety engineer, the installation of safety devices on the street cars and other equipment and the adoption of safety methods of doing work, the putting in effect of arbitrary full stops or check stops for cars or reducing the speed at danger points, using more intelligent and scientific methods of selecting and training platform men and supervising them more closely in their work.

The Market Street Railway requires all student trainmen to pass through a probationary period of three months before being finally accepted as full-fledged employees. While they are undergoing an extensive course of training they are instructed by the claim agent on the causes of accidents (more than 30 accident charts being used for that purpose); how to avoid accidents; what to do in the event of accidents; the importance of obtaining witnesses and how to do so, especially those whose position gives them the best view of what has happened; the need of reporting all accidents and

Student Trainmen in the Employ of the Market Street Railway, San Francisco, Being Instructed by the Author of This Article, by Means of Accident Charts, on the Causes of Street Railway Accidents and Methods of Preventing Such Accidents.

incidents occurring near the car and of not discussing the facts of the accident except with accredited representatives of the company; how to prepare an accident report, etc., etc. Interwoven in these lectures by the claim agent, talks are made by him on what the executive officers of the company expect from the officials having immediate supervision of the trainmen; i.e., that they will be impartial and just in their relations with the platform men, on loyalty and the importance of courtesy.

Each of the thirteen carhouses on the Market Street Railway's system is equipped with maps upon which different colored pins are daily placed showing the various types of accidents occurring on the tracks over which the cars from that carhouse operate. In this manner each trainman is informed of the danger points and what type of accidents he may expect at those danger points, unless he is cautious. It also keeps each trainman acquainted with the number and classes of the accidents that have happened to cars operated from other carhouses on the same trackage.

It is my firm belief that the claims department should co-operate to the fullest extent in the selection and training of trainmen. No radical change in the construction of the Market Street Railway's cars has taken effect since 1908 with the exception that front gates have been installed and the pay-as-you-enter system has been adopted, yet the cars of the company today carry 51 per cent more passengers per accident and travel 53 per cent greater distance per accident than they did in 1908. All this is in spite of the fact that during the intervening period the population of the city has increased at least 37 per cent and automobiles have increased in number from about 5,000 to 85,000.

Since Jan. 1, 1924, the Market Street Railway has presented claims against owners of automobiles who have damaged standing street cars. Previous to the date mentioned, no definite plan was followed by the company of presenting claims of this kind. An accompanying chart shows the claims of this kind collected by the company from Jan. 1, 1924, to Aug. 1, 1924, as compared with the years 1918 to 1924, inclusive. Another chart shows the increase in automobile accidents and decrease in wagon accidents involving cars of the Market Street Railway since 1909. The peak in automobile accidents in 1915 was due to the large number of jitneys and outside automobilists in San Francisco that year because of the Panama Pacific Exposition. A third chart shows the increase in subrogated claims presented by automobile insurance companies against the Market Street Railway from 1917 to 1923.

Public Co-operation

The co-operation of the public in accident prevention is now being sought throughout the country by resorting to such publicity as placing warnings signs on the cars, installing illustrated posters on the car windows, utilizing the backs of transfers, using motion pictures, advertising in the newspapers, lecturing to school children ("the missionaries of the home") that they may acquire safety habits that will prove beneficial while they are juveniles as well as in their adult life; encouraging the formation of safety patrols and safety scouts in the schools, lecturing to clubs and societies, forming branches of the National Safety Council with different branches of the city government participating and enlisting the aid of large employers of labor, sending letters to careless automobilists and employers of automobile drivers such as taxicab, express and draying companies, establishing schools for automobile drivers, passing of ordinances prohibiting "jaywalking," and promoting safety campaigns. These spasmodic, intermittent safety campaigns, while they ordinarily result in an immediate decrease in accidents, do not bring about such beneficial results as continually, everlastingly enforcing, day in and day out, precautionary measures, never relaxing for one moment the efforts to reduce accidents.

There is no doubt as to the tangible monetary returns from safety work, possibly not to the extent its fondest supporters allege, but the "proof of the pudding is in the eating." The experience of the Market Street Railway, which I have cited, has reflected itself in the savings which the company has made in its accident expenditures, although juries are now awarding larger verdicts than heretofore. Juries are influenced in granting exorbitant verdicts against street railway companies by like verdicts rendered against automobile owners, for there is a strong inclination to punish the automobile owner having an accident by hitting his pocketbook or that of his insurance company, or both.

The experience of the Market Street Railway is general throughout the country. With larger jury verdicts and more hazards to contend with in the operation of street cars, most street railway companies are expending proportionally less for their injuries and damage account than they were 10 or 15 years ago.

Some question arises as to whether a street railway should take the active lead nowadays in safety work in a community, and if so should it do so in the open or merely be the motive power behind some civic organization?

Much would seem to depend upon local conditions. If a street railway company is not being made the subject of bitter and unreasonable attacks or severe criticism, and in the minds of the public there exists the thought that the company is making an honest effort to please the public, then it would appear advantageous for the street railway company to take the initiative and itself promote the safety work of a community, not only with a view or reducing accidents but in connection with public welfare work.

Sometimes in communities where there is an active, powerful chamber of commerce or other influential public body greatly interested in civic affairs it would be well to enlist the support of such an organization and allow it to benefit by the publicity derived from public safety work, on the theory that a civic body could accomplish more than the street railway company in securing co-operation from all sources, especially from the newspapers, the police department and the police courts.

In undertaking company safety work and community safety work the fact should always be borne in mind by street railway officials that far greater results can be accomplished through their own organization than by merely obtaining the half-hearted support of the public. The street railway management has immediate and direct control over the actions of its own employees, and on the other hand it cannot regulate the doings of the general public; it can merely suggest what should or should not be done in the interest of safety.

Fire Insurance

By JAMES S. MAHAN
Western Actuarial Bureau, Chicago

An outline is given of seven ways of securing lower insurance rates by reducing the fire risk. Practical suggestions on "Good Housekeeping" and other helps toward fire protection are presented.

HOW to reduce insurance premiums is a question which every street railway official has asked himself many times in the course of the past few years. The answer is that only by a consistent reduction of losses may a general reduction in insurance premiums be enjoyed.

The contributing features to a reduction in fire insurance premiums are:

1. Better building construction.
2. Better electrical construction.
3. Improved housekeeping practices.
4. Reduction or segregation of hazards by the use of standard cut-offs.
5. The installation of approved fire-fighting appliances in the required quantities.
6. The institution of a proper system of supervision during inoperative periods.
7. A detailed study of the special features connected with individual conditions, and closer co-operation between the public service company officials and the fire prevention engineers of the insurance companies.

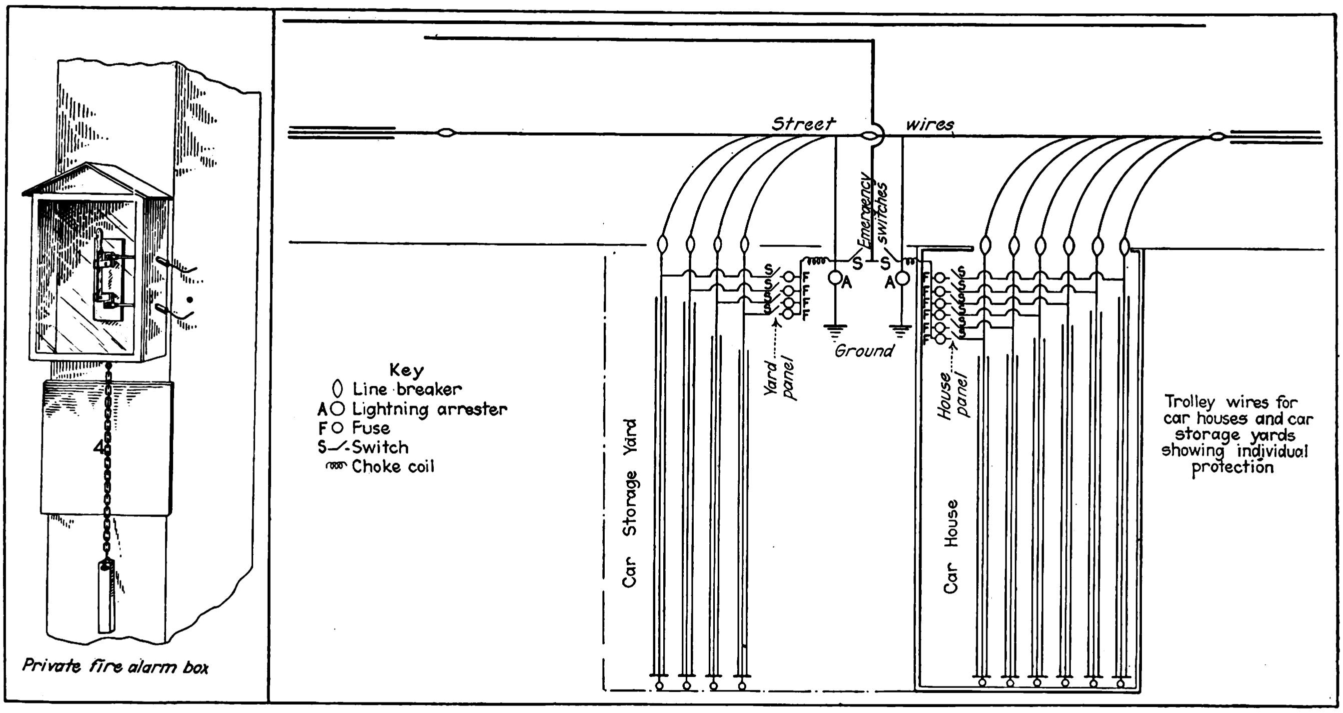
These matters will be treated more fully later.

After determining the general method of reducing insurance premiums, the extent of modern coverage for street railway properties must be considered.

This question resolves itself into a list of the classes of insurance which should be carried by the street railway company to protect properly its operating funds and capital and reserve accounts. The wide range of coverage is shown by the following 18 forms which are the most common: (1) Fire, (2) tornado, (3) common carrier (merchandise in transit), (4) public liability, (5) workmen's compensation, (6) overlapping liability (cars on foreign properties), (7) use and occupancy, (8) riot and commotion, (9) electrical breakdown, (10) flywheel, (11) boiler, (12) car trust (trip) transportation, (13) rent and leasehold, (14) plate glass, (15) bond surety, (16) burglary, (17) life (against death of chief operating officials), (18) group life insurance.

Many of the above forms of coverage overlap considerably.

Reduced rate contribution clauses, commonly called co-insurance classes, should apply to all standard fire policies. The most commonly used of the above clauses are the 80 per cent co-insurance on buildings and



At Left, Alarm Station Switch of the Positive Knife Type. At Right, Individual Protection for Trolley Wires in Carhouses and Car Storage Yards contents other than rolling stock and the 100 per cent co-insurance clause on all rolling stock. In the latest clauses approved for insertion in "Fire" and "Use and Occupancy" policies, considerable increased coverage is gained.

Blanket coverage on cars is desirable at all times. Fire insurance never should be limited to cars on tracks within a specified division of a system. Individual coverage should be used only when it is necessary to cover a particular car or group of cars in order to comply with some car trust agreement.

Requirements in the Modern Carhouse and Shop

In a new carhouse the following features should be included, in order to secure the most favorable fire insurance rate:

The latest standards of construction, both building and electrical, should be adopted as included in the National Board of Fire Underwriters' requirements covering electric railway carhouses and cars.

The purchase of labeled appliances only should be the rule for equipment such as fire doors, clothes lockers, fire hose, waste cans, safety gasoline cans, oil and paint handling tanks, conduit and other electrical fittings, sand pails, chemical extinguishers and watch-clock equipment.

The purchasing department may render valuable assistance in this matter by purchasing only listed and labeled materials. The savings in insurance premiums will easily offset the small extra cost above that of the unlabeled products. The best guides for the purchasing department in this connection are the two pamphlets issued by the Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago. These are known as the "List of Inspected Electrical Appliances" and the "Supplement to the List of Inspected Mechanical Appliances."

A track arrangement should be adopted which will permit the ready removal of cars from both ends of the carhouse and at the same time permit the uninterrupted work of the fire fighters. Operating, storage and inspection carhouses should have all tracks run to the street or to a main track, well away from the buildings. Shop buildings, when it is desired to move out-of-service cars from one to the other by means of a transfer table, should be built back to back with the transfer table operating in between, and all tracks should connect to the outside on ends away from the transfer table. There should be no switches or crossovers inside the buildings in either case.

Proper provisions should be made for a private fire alarm, with the proper arrangement of inside standpipes, hose, outside hydrants, and other fire-fighting apparatus, including approved watchman service, either of the central station or portable clock type. Provision should be made for the handling of hose without obstructing the removal of cars.

Suitable arrangements should be made to separate the various special hazards which exist around a car shop. The carpenter, blacksmith, paint, armature and machine shops, as well as the smaller serious hazards, should be in separate fire sections. The division walls should be standard fire walls, parapeted 36 in. above the roof. All openings in walls between sections should be protected by approved, double, automatic fire doors. Oil and paint storage should be in a separate, detached building or in a separate, fireproof section, with all openings into the main building protected by approved automatic fire doors. The door sill should be built up at least 6 in. above the floor level, and a suitable vent and drain to the outside should be provided.

Fire sections should not be more than 20,000 sq.ft. in area and should not inclose more than four tracks. Fire sections of reasonable area mean fewer cars destroyed.

In an old carhouse, it may be impracticable to conform to the National Board of Fire Underwriters' standards, as far as building construction and track layout is concerned, but there should be no trouble in the gradual realization of all of the other requirements for a new carhouse. As a general rule, older buildings require closer supervision and more intensive housekeeping activities. On many systems, the replacement of non-standard equipment and worn-out apparatus has been undertaken upon a progressive program, extending over several years, with the saving in insurance premium paying a big dividend upon the amount invested.

A comprehensive program of fire and safety inspection (they go hand in hand) should be undertaken on every system, the extent of the program, of course, depending upon the size of the operating company. In many cases the saving in safety developments is a very profitable byproduct of the fire prevention activities.

The management should appoint some one man in the official personnel to have charge of this work. In the large organizations, this man can profitably spend his entire time looking after safety, accident compensation and fire insurance features and, to some extent, welfare work. In the smaller organizations, this work will require only part of the designated man's time.

Where the self-inspection system is used, the man in charge of the work should designate some representative at each location to make weekly inspections and report promptly on a printed form furnished for the purpose. These individual risk reports should be examined carefully when received and then filed for ready reference. The chief fire prevention inspector should make at least monthly inspection trips over the property and report on the conditions at each location, and this report should also be filed for further reference.

In order to locate readily any defective or missing equipment, a number should be assigned to each fire pail, chemical extinguisher, waste can and other movable equipment, and a corresponding number, together with an outline of the device, should be painted in a conspicuous color on the wall or post where it is supposed to be. All lockers, fire doors, trolley and "No Smoking" signs, inside standpipes, outside private hydrants, sprinkler valves and watchman stations should also have numbers. With the equipment thus numbered, it is easy for the weekly and monthly inspectors to check each item in the equipment and see that it is in place and in good operating condition. A blank form convenient for the chief fire prevention inspector is published in the accompanying panel.

Watchman and Fire Drill

Watchman service at night is an essential part of the private protection required by property of the kind under consideration. The watchman should be alert and able-bodied and should be instructed as to his duties and examined at regular intervals to determine his mental and physical fitness to carry them out. In cases of emergency, he may have to act with speed and judgment.

When watchmen clock systems, either the portable clock or central station method of recording rounds, are installed, a system approved by the National Board of Fire Underwriters should be selected to insure proper recognition from the insurance companies in the fire insurance rate. The watchman stations should be well distributed around the premises so that all parts will have proper supervision by the watchman when making his rounds.

One of the best precautions against a disastrous fire loss is a well-drilled private fire brigade. The time to extinguish a fire is in the first minute of its existence. This can best be accomplished in a property where every employee is trained for just such emergencies. Fire drills and practice by private fire brigades have been severely ridiculed, but let it be said in their behalf that a well-organized and properly-drilled private fire department will pay for the time lost in weekly drills many times over in the course of a year.

To assist in establishing and instructing a private brigade the principal features will be outlined briefly:

The private alarm system should be laid out and stations located to cover the entire premises, including both buildings and yard, with the stations registering upon a suitable indicating device. This may be the usual annunciator gong, with key diagram showing station location, or it may be a more elaborate device in the form of a diagram of the premises with the fire alarm station indicated by a red globe which will automatically light when the corresponding alarm switch is closed. The latter system provides an unmistakable guide to the location of the trouble. This indicator, as well as the annunciator type, should be provided with a gong.

The alarm station switches should be of push-button or of positive knife-switch type, as illustrated, the latter being preferable. A suitable weight to insure the prompt breaking of the protecting glass should be chained or wired near the alarm switch box.

Every man should be instructed and drilled in just what is expected of him when that alarm sounds.

Monthly Detailed Inspection by Special Company Fire Prevention Inspector

Company ....

Building ....

Date Inspected .... *by* .... *Approved* ....

Oily Waste, Rubbish and Sweeping Cans

1. In standard can?..................
2. Can emptied daily?..................
3. Defective can?..................
4. Standard cans needed?............

Lockers

1. Clean inside and on top?..........
2. Clothing hung in lockers?........
3. Made entirely of metal?..........
4. Ventilated?......................
5. Sloping top?.....................

Bucket Tanks, Water Pails and Sand Pails

1. Missing?.........................
2. Full and in good condition?......
3. Sand wet, coarse or caked?........
4. Access obstructed?...............
5. Wooden scoop in sand pails?......
6. Additional requirements?..........

Chemical and One Quart Extinguishers

1. Missing?.........................
2. Full and in good condition?......
3. Acid bottles properly filled?.......
4. Hose or nozzle missing?..........
5. Access obstructed?...............
6. Additional requirements?.........
7. Does tag on chemical show date of re-charging more than 12 months previous?........................
   Are chemical tanks and extinguishers protected from freezing?....

Show Number of Chemical Extinguishers

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Show Number of One Quart Extinguishers

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Fire Trap and Other Doors Are Supposed to Be Kept Closed or Held Open by Fusible Link

1. Operate freely and in good condition?..........................
2. Unobstructed?....................
3. Link exposed? ....
4. Link free from paint or corrosion?..

Defects (if any) and Location

....

....

Stoves, Forges, Chimneys

1. Set on wood floors or near wood partitions?.....................
2. Are ashes removed daily?.........
3. Ashes kept in metal receptacles?...
4. Stove pipe passes through wood partition?..........................
5. Chimney brick from foundation through roof (This refers to offices, warehouses and dwellings)?......

Transformers, Etc.

Are transformers, regulators, and lightning arresters in standard separate fireproof compartments?..............

Paints and Oils

Are fireproof doors to oil rooms kept in operating condition and free from obstruction?.....................

Are oil room drains open or obstructed? ....

Matches (Safety Only)

1. Supply kept in metal work?.......
   (No matches to be used in garage)

Inside Hose Outfit

1. Connected to supply pipe?.........
2. Hose defective?..................
3. Hose properly racked?...........
4. Nozzle missing?..................
5. Spanners missing?................
6. Access obstructed?...............
7. Additional requirements?..........

Gasoline

1. Is daily supply kept in approved safety cans?....................
2. Is main suppley kept outside of risk?.........................
3. Are blow torches, when not in use, kept outside of buildings?........
   Metal polishes and other liquids of combustible natures to be treated the same as gasoline.

Automatic Sprinkler Equipment

1. Tanks full?....Tank frozen?.....
2. Tell tale in order?..............
3. Tank in good condition?.........
4. Pipes in good condition?........
5. Check valve buried in proper pits?..
6. Post indicator valves turn easily?
7. Post indicator valve window glasses in good condition?..............
8. Gate valves properly installed and properly working?..............
9. Valves sealed?...................
10. All gate valves open?............
11. Systems dry?........ Wet?......
12. Dry systems operating wet?......
13. Air systems in good condition?...
14. Air pressure maintained at...... pounds.
15. Water pressure...........pounds
16. Alarm valves in good condition?..
17. Alarm circuits, battery in condition?..........................
18. Annunciator in condition?........
19. Sprinkler piping hangers loose?...
20. Heads corroded?.................
21. Any storage above sprinkler head level? ....
22. Sections not equipped?...........
23. All valve keys and wrenches readily accessible?..................

Miscellaneous

1. Are all lamp shades of non-combustible material? ....
2. Are portable electric lamps equipped with wood handles and wire guards?..........................
3. Are there two chemical fire extinguishers or 5 pails for every 2,000 sq.ft. of floor space in carhouses? ....
4. Is there one extinguisher for every 2,500 sq.ft. of floor in every substation, power-plant or garage?...
5. Is property within 300 ft. of at least one city fire hydrant?......
6. Are gas heating devices rigidly connected? ....
7. Are cards conspicuously placed, indicating location of nearest fire alarm box? ....
8. Are "No smoking" signs displayed and the rule observed?..........
9. Is a lantern, equipped for emergency service, readily accessible? ....(Except in gas plant)
10. Are wooden box cuspidors used, or any receptacle for this purpose containing sawdust? ....
11. Is watchman service standard and records properly filled and dated? ....
12. Is wiring in accordance with the National Code? ....
13. Are trolley poles kept pulled down from contact with trolley wires while cars are in barn?..........
14. Are all car aisles kept free from storage? ....
15. Are open flame oil torches and lanterns used in carhouse?.......

In carhouses and shops, the foreman or some other person in authority should be chief of the department, and, as soon as he has had an opportunity to visualize the cause for the alarm, he should send a particularly designated and coached man to turn in the city fire alarm and wait at the alarm box to direct the city fire department to the location of the fire.

All men capable of operating cars should board those present, while certain car cleaners and other such employees should place the current collectors in contact with the current supply. Still others should have the track doors open by this time so that all serviceable cars can be started toward the outside.

Every man not instructed to move or assist in moving cars should be trained to attend some particular piece of fire-fighting apparatus. Answering each alarm should be men with sand and water pails and 2½-gal. acid soda or foam-type and carbon tetrachloride-type fire extinguishers, as well as men with hose connected to inside standpipes and outside hydrants. At each hose connection, a designated man should be in position to turn on the water at the word from the chief.

"Good Housekeeping" Desirable

The influencé of housekeeping on the insurance rate is marked. Although the initial installation may have been standard in every way, improper maintenance may prevent the railway from receiving full credit for its expenditure or may be the reason for a heavy "after charge" on the net estimate. Some of the more common housekeeping items are listed below. Bad habits when once contracted upon a property tend to become epidemic. They should promptly be corrected in each instance.

Every effort should be made to prevent the accumulation of trash about the property, particularly in corners—one of the principal hiding places of trash and old rags. Such refuse should be put in approved, self-closing, metal trash containers, and these receptacles should be emptied daily.

The use of rags or sawdust to absorb surplus or leakage oil and grease is a bad practice. It forms an ideal condition for spontaneous combustion.

The much discussed practice of smoking is another feature which carries a heavy penalty in the insurance rate. Smoking should be prohibited except in the men's room and club room. "No Smoking" signs should be posted in conspicuous places, and the rule should be rigidly enforced. This should apply especially to the higher officials of the company, who are frequent offenders in this line. Officials should not ask employees to observe a rule which they ignore.

Trolley poles or other current collectors should not be left in contact with the current supply when cars are not in use. A car which is electrically dead is much less liable to catch fire than one left continually in electrical connection. Signs to the effect that "Trolley poles must be pulled down from contact with trolley wires" will help enforce this rule.

Storage in the car aisles is a bad practice, as it is a decided hindrance to the proper and prompt action of the fire department. The aisles should be kept clear at all times.

The car pits and the space under the floor between pits should be kept free from combustible storage. A fire in this location is both stubborn and hard to reach.

Oily clothes strewn around the premises and the use of wooden lockers for clothing draw a heavy penalty. All discarded clothing should be destroyed, and an approved ventilated locker of the two compartment type should be provided for each man's clothing. This allows one compartment for the employee's working clothing and one for his street clothing, so that there is no good excuse for clothing being left out of the locker.

The placing of storage articles against fire doors or other obstructions to their operation practically destroy their usefulness for the purpose for which they were installed. The track on which these fire doors run should always be kept clean, the rollers well oiled and the automatic attachments in position. A standard fire-door installation is a good safeguard against the spread of fire.

Obstructions to ready access to fire pails, chemical extinguishers and standpipes may cause just enough delay in the prompt extinguishing of a fire to permit it to get beyond control. A clear aisle should be provided to all fire-fighting equipment. Storage should not be allowed to accumulate around sprinkler valve houses or pits.

An out-of-service piece of fire-fighting apparatus is worse than none at all. The fire pails and the tetrachloride extinguishers should be kept full at all times. All 2½-gal. acid soda and foam-type extinguishers should be recharged at least annually and the date of the last charging should appear upon a linen tag attached to the extinguisher. These extinguishers must be well protected from freezing at all times.

Poorly racked hose or hose containing water is a decided hindrance to its prompt handling and also adds to its deterioration. Care should be taken that all hose is thoroughly dried and racked properly on an acceptable reel. In most instances a small petcock in the under side of the standpipe just ahead of the hose connection will clean the pipe of any seepage or condensation and add many months to the life of the hose.

Sprinkler valve houses should be used for no other purpose and should be free from storage at all times. Likewise, sprinkler piping should be free from all obstructions.

The handling of gasoline inside buildings is a dangerous practice, and gasoline should never be used in open receptacles or in ordinary cans. It is better to provide a standard safety can for the working supply and to keep all other supply in a detached oil house.

Carhouse or Open Storage

Undoubtedly it is better from a fire insurance standpoint to use open storage than to store cars inside of a building. Where outside storage is used, the tracks should be divided in groups of not more than 3,000 sq.ft., separated by 12-in. brick firewalls extending 36 in. above roofs of the cars or else by clear spaces of at least 40 ft. These outside storage yards should be equipped with standard hydrants sufficient in number to permit every part of the yard to be easily reached with 100 ft. of hose attached to each.

Competent engineers representing both the electric railway industry and the fire insurance interests have been working together diligently for the past year in an endeavor to arrive at a workable standard for the construction and equipment of carhouses and cars. Lack of space prohibits the reproduction of the entire report here, although tentative copies may be secured by application to the National Fire Protection Association, 40 Central Street, Boston, Mass.

The engineers working on this subject have collected data from many sources in an endeavor to meet all conditions, as far as it is possible to do so in a standard. In combining the numerous ideas, they have made some radical departures from past practice, looking toward the needs of the present-day electric railway official in his efforts to modernize his equipment and his premises. A few of the most radical departures will be set forth in order that the industry may visualize the savings which may be achieved by their adoption.

Conduit for Car Wiring

For many years there has been an attitude of passive opposition to the use of rigid metal conduit for car wiring. Therefore, the new standards permit three types of construction, in the hope that the manufacturers will develop a product which will meet the new requirements and pass the test of the Underwriters' Laboratories. As far as is known, no such product is now on the market, although the writer is advised that several manufacturers have anticipated a demand for these materials and have already made good progress toward quantity production. The new rules permit wires and cables to be run in any one of the following ways:

1. In rigid metal conduits or cable boxes.
2. In approved flameproof and waterproof non-metallic ducts.
3. With approved rubber insulation, protected by an approved flameproof and waterproof outer covering.

All wires except those run in rigid metal conduit or cable boxes must be so concealed or isolated that unauthorized persons cannot come in contact with them.

Standard rubber-covered wires for lighting or signal circuits may be run in wooden or metal raceways, constructed in accordance with the requirements of the National Electric Code. Such raceways must be accessible but not on the exterior of car bodies or where exposed to moisture.

Approved flameproof and waterproof non-metallic ducts or approved flameproof and waterproof non-metallic outer covering for wires or cables must be so constructed as to resist mechanical injury and must run all the way into the inclosing cases of terminal devices without a break, as is required for conduits.

All metallic parts, such as conduit, apparatus cases, etc., which might possibly become charged, when so located that unauthorized persons may come in contact with them must be permanently and effectively grounded. Apparatus such as air compressor motors, etc., having insulated non-grounded mountings, must be located on the exterior of the carbody where passengers are not liable to come in contact with it.

Headlight frames must not be used as conductors, and portable headlights must be wired for double plug connections. All plug connections must be so wired that the female end will be attached to the source of energy.

Heater Installations

All fuel-burning heating devices located inside of the car must be well grounded. One of the most productive sources of car fires is the car heater, the safe installation of which depends upon the addition of certain thicknesses of fire-resisting, insulating materials or a certain air space between the heater case and combustible mounting surface. It is frequently impossible to maintain these spaces or the fire-resisting insulating material is not handy and the mechanic, rather than provide the necessary safety precautions at some trouble to himself, mounts the heater "as is." The natural outcome, sooner or later, is a rolling stock fire. If this occurs when the car is out on the line, the damage may be confined to one car, but if the car is in the carhouse, the odds are greatly in favor of the loss of many cars and possibly of the entire premises. In an endeavor to overcome this trouble the following standard has been established by the committee:

> Heaters shall be constructed in such a manner with regard to their heating elements and inclosing cases that they may be mounted on combustible portions of car body without danger of exceeding safe temperature limits of any combustible portions of cars. Metal inclosing cases shall be effectively grounded.

Later on in the report, a series of recommendations were made, at the request of a few members of the A.E.R.A., in an endeavor to make it still possible to use the old type heaters by the employment of various accessory materials. A little thought on this matter will convince every operating official that with the addition of each accessory material the installation and replacement cost will be considerably increased.

One manufacturer has already developed a complete set of heaters, with spacings and protection in the heater case itself, making the only necessary mounting accessories four bolts or screws, so that it may be repaired while in its permanent position in the car. Certainly this is modernization as regards heater construction and installation.

Carhouse Tracks

A large percentage of the heavy losses from carhouse fires may be traced directly to the inability of the man on duty at the time of the fire to move the cars from the building. There are two principal contributing features to this non-movement. One is the poor arrangement of the tracks, which has been covered elsewhere. A possibly more important feature contributing to the non-movement of cars is the failure of the current supply.

After due consideration, a system of protection for the power supply to cars has been designed which calls for a separate switch and fuse or an automatic circuit breaker to be installed in a separate feeder to the supply conductor for each track. With this arrangement, a short circuit due to a fire on one track will not operate the main circuit breaker at the power station, but instead, will deaden only the supply conductor for the particular track in question and will still permit the ready removal of cars on all other tracks. Such a layout is shown in the illustration on page 523.

No attempt will be made to answer the question for any individual company as to whether this type of construction will be adapted to its particular system. The claim is made that it is modern construction. Its use will permit the removal of cars, and the fewer the cars destroyed by fire, the smaller will be the fire insurance loss ratio. The loss ratio for the whole industry is what governs the basic insurance rate.

Ride Salesmanship

By WALTER JACKSON

Fare and Bus Consultant, Mount Vernon, N. Y.

While many advances occur in material things such as track, power and cars, human nature as expressed in salesmanship is not affected by time, but by competition or the need to avert financial disaster.

> "For almost all things have already been found out, but some have been neglected and others which have been known have not been put in practice."—*Aristotle's "Politics," Book II, Chapter V, Ellis' translation.*

IF THIS article is an exception to the keyword of this issue, "Modernization," the reason is that it does not deal with material things that unquestionably do improve with the years, but rather with one particular aspect of human nature—that "human nature" which most philosophers assure us has not changed sensibly for the better since the first *pithecanthrope* decided to stand on his hind legs only. This particular aspect of human nature is that we tend to be patient, pleasant and persistent when we have to compete for favor, and indifferent, discourteous and tyrannical when the spur of rivalry is absent.

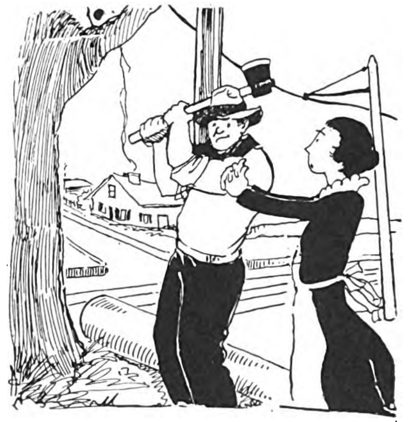
The Insull-Budds only prove the rule.

No discussion of how the railway can sell its product must ignore the fact that this industry began with competitive conditions that made for salesmanship, continued through a generation of monopoly that stifled salesmanship and finally emerged into a situation where it is realized that the old ride-selling spirit must be recaptured and heightened.

What! Are we to go back to horse car days to learn how to convert our industry into a business? Why not? Surely "there were giants before the flood"; nor did all the wisdom of the world begin with the twentieth century.

Equipment changes, but the meaning of salesmanship is ever the same.

"When I was a little, tiny boy" there were few transport monopolies. Often two rival roads paralleled each other for miles with but a block or two between them. How they vied with one another to draw trade! It is true that they could not offer a tithe of the actual comforts which their monopolistic successors gave because of technical advances. But everything is relative. People don't grumble for conveniences they never heard of, but they do get angry about the omission of any good things they have become used to.



Lineman, Spare that Tree, Touch Not a Single Bough

As a child in its innocence of greater values is "pleased with a rattle, tickled with a straw," so did our parents appreciate the blues, reds and yellows of the car bodies, the liberal display of gold leaf, scrollwork and beading, the Brussels carpet on the seats and the floor straw "of the better kind."

In those days, also, rides were sold on what was roughly a distance basis. A separate fare had to be paid on each of the separately owned routes. Nor were the fares uniform on even the same system, for evidence of which we have the following jingle made famous by Mark Twain:

Conductor, when you receive a fare
Punch in the presence of the passenjare.
A blue trip slip for an 8-cent fare,
A buff trip slip for a 6-cent fare,
A pink trip slip for a 3-cent fare,
Punch in the presence of the passenjare.
Punch, brothers! Punch with care!
Punch in the presence of the passenjare.

The selling spirit lived on into the earlier days of electrification when free or sample rides were offered to offset the fear of electrocution.

That isn't all. In still earlier days, when people were afraid to use the steam railroad, there had been such pleasing commutation plans as season tickets which called for no limitation of rides, no tearing out of coupons and no punching of cards. So it was not altogether a shock when an old gentleman on hearing of the weekly pass trebled: "Why, we had something like that in Toonerville sixty years ago."

So far as salesmanship goes, Rabbi Ben Akiba was right in asserting: "There is nothing new under the sun." But this should not discourage us. Old thoughts reminted may prove current coin.

Even the Engineer Must Consider Sales Aspects

In discussing the sale of the ride, fares and headways are of chief concern. But it is not well to put all the responsibility on the operating personnel. A sales viewpoint on the part of the engineering forces is also essential. For example:

Should trackless trolley or gasoline bus be adopted for a given situation? Pure engineering considerations may point to trackless because "it's the good old trolley on tires and juice is cheaper than gas." Temper this by the viewpoint of the citizens affected, and it may prove that the prospective patrons are so eager to keep their tree-line undefiled that they would rather pay a higher fare on the bus. In one instance where the trackless was installed over the protests of the residents, the saving in cost of operation over gasoline far from offset the factors of better public relations and greater earning power possible with a gasoline bus. You can't treat a factory district and a residence street alike.

In other departments, the sales viewpoint has a less obvious effect on good business, but it is there just the same. In far-off Hamburg the municipal power station is one of the show places of the city. How many of our power plants are built with no regard whatever to impressing the public with the monumental importance of the structure that is truly the heart-pump of the community in the circulation of its citizens. Instead of acquiring a feeling of respect, the public can't help having a feeling of contempt for the drab brick structure and its owners—when it finds out who the owners are. Yet any despairing architect will tell you how little difference there is in cost between a handsome building and an ugly one.

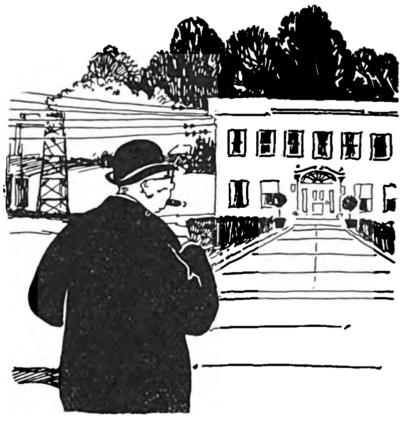
If coal piles and railroad sidings make beauty, and publicity therefor impossible, what is wrong with our substations? We have plenty of good-looking "subs," but how many of them carry anything but an obscure monogram—if that little? If you have put up the handsomest building in the neighborhood, don't hesitate to brag a bit about its owners, its purpose and its usefulness.

Good Housekeeping Is Also Good Salesmanship

While ownership of power plants and substations may remain a mystery to the many, everybody can identify those responsible for the looks of carhouses and shops. These are commonly located along some trunk highway. Their appearance impresses many thousands of persons, favorably or otherwise. Here are two examples of the layouts that make a favorable impression:

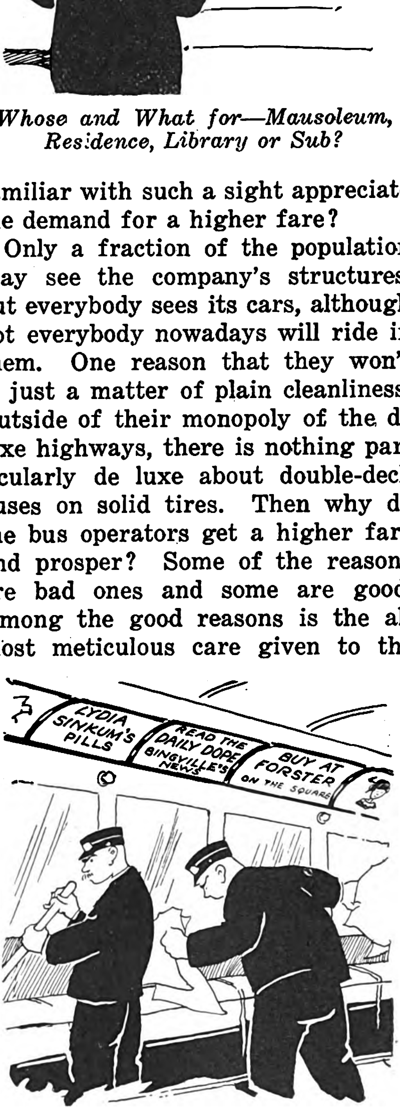
In one of our large cities half a dozen routes run by the carhouse. It is a busy place, but not too busy to have a lawn and garden spots that elicit many a compliment from the rider-by. In a second, much smaller city every automobile entering from the west must roll by the railway headquarters. Here the lawn is used to excellent advantage for snappy artistic pictures and sayings so that even he who rides rapidly may read the railway story.

Contrast this with the car-house which exposed to public view a lot of rusty sprinkler piping and pits filled almost to the brim with the junk of bygone years. Would any citizen familiar with such a sight appreciate the demand for a higher fare?



Whose and What for—Mausoleum, Residence, Library or Sub?

Only a fraction of the population may see the company's structures, but everybody sees its cars, although not everybody nowadays will ride in them. One reason that they won't is just a matter of plain cleanliness. Outside of their monopoly of the de luxe highways, there is nothing particularly de luxe about double-deck buses on solid tires. Then why do the bus operators get a higher fare and prosper? Some of the reasons are bad ones and some are good. Among the good reasons is the almost meticulous care given to the spruceness of the buses and the men who run them—not always at the high trolley wages either.


LYDIA SINKUM'S PILLS
READ THE DAILY DOPE BINGVILLE'S NEWS
BUY AT FORSTER ON THE SQUARE

Cleanliness Is Next to Godliness and Pays, Too

The trolley car, unstinted as to light and heat and free from noxious gases, should be ashamed to let the bus get ahead of it in drawing power on the score of cleanliness or general appearance. How many electric railways are following the example of the common-sense manager who has housewives ride his cars to report if the car standard of cleanliness is up to theirs? A car isn't a home, but it's astonishing how these reports, a day's vacation, a $5 bill and public commendation can give to the platform men a hausfrau's interest in the nattiness of their cars.

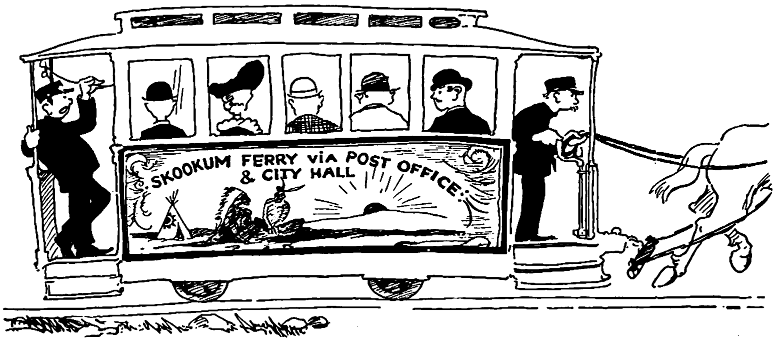
Apropos of this, a manager tells the following story: Uncle Tom was a good and faithful operator, but the invention of a whole flock of safety razors had meant nothing in his long life. The only modern invention of interest to him was the use of celluloid in place of linen. No use talking to Tom about sartorial advancement. Came a day, as the pictures say, when Uncle Tom's shuttle car, which had been the derision of the town, was at last replaced with a shiny safety. A few days later, with no suggestion from any one, there was a transformed "Traction Tom." No baggy coat and trousers, no loose buttons, no unmowed facial lawn, but a Tom brighter and cheerier than ever. "Like cars, like men." Was the joke on Tom or on his boss?

Make Your Cars Compel Favorable Attention

Of course, not the cleanest trolley in the world can draw as much attention as an ordinary bus does at the present time. Why is that? Novelty. How can we restore the trolley to the plane where it will get a second look? Give it novelty. A hair bob can turn an old wife into a new one. Paint will do the same trick for wives and cars.

"In the dear dead days beyond recall" the value of car painting and general ornamentation for sales reasons was far better understood than now. Memories of childhood days include pictures of noble red men smoking peace pipes at charming brooksides painted on the sides of the cars, entrancing scrolls of gold leaf, fine carvings and beadings, bronze or brass fitments and the spectrum's own variety of colored panes in monitor and bulkhead sash.

To what a low estate we fell when grim materialism swept all these charms away. Instead of compelling cleanliness by using bright colors that would show the dirt, we went to dreary shades that promised to hide it. Luckily the "safety first" movement came along and with it a return to brighter colors for the sake of high visibility.


SKOOKUM FERRY VIA POST OFFICE:
& CITY HALL

Panel from the Horse-Traction School of Art, Circa 1880

Let us go a step further than color for safety's sake. Another suit of clothes makes even our closest associates take notice. Why stick to the same car colors indefinitely if a change from yellow to red, from red to blue, from blue to gold, and so on, will shock the public into realizing that we are alive? This doesn't mean scraping down to the bottom every year or so, but simply a pleasing rotation as the cars come through the shops for body color. It hasn't hurt Glasgow to have a different color combination on every route, although identification by passengers and not desire for diversity caused this practice.

In dropping pictures and lettering as well as color, the efficiency innovators went so far as to drop the name or special insignia of the railway. Isn't there something to learn here from those British municipal tramways whose cars carry the civic coat-of-arms? Or from the Southern manager who painted his cars a rich blue and gold in honor of the local university? Or more recently, from the Northern property where the latest cars are identifiable through a wondrous and much-talked of sunburst or spider-web on the dash?

Here one seems to hear an anguished cry about sacrilege toward the god "Standardization," America's own private fetish. Standardization of bolts and nuts, of motors and brakes, of controllers and sash—yes. Standardization of appearance to the point of repulsion—no. Of what profit to save a little money in the paint shop and lose a horde of fares? The death of Egyptian and the stagnation of Chinese civilization were caused largely by a slavish adherence to standards; in another word, tradition.

But perhaps there is the more reasonable protest: "We haven't the money." How about the chap who was in that fix too, and couldn't afford to paint his cars, but who scraped together enough pennies to tint his dashers a lively orange? There's hope for him, just as there proved to be for the hustler who bathroom-enameled the interiors of old cars while waiting for new ones. It is just these evidences of sales ingenuity that inspire the granting of credit.

So much could be written about other sales aspects of the car that one hesitates to begin. Let us say a word or two about the hoary question of seats.

FAIR
GROUND
VIA
HILL

Pass On, Me for the Car Behind

That Brussels-covered longitudinal seat in the slow-moving horse car was a real luxury compared with the cane and slat seats that our parents used in their living rooms, for the stuffed horsehair furniture was used only for state occasions. In these days of deep leather library suites and millions of automobile cushions the slat seat of the street car suggests that not all electric railways appreciate the changes going on in the world about them. Worse yet—cars are still coming out with longitudinal seats, where there is no real need for them. It's the voluntary, off-peak rider who brings the profits. Alternate longitudinal and cross-seat cars on a route, as one railway did, and see how often the prospect prefers to let the less comfortable car go by. There is some reverse English in the remark of the lady who said: "I wait for the side-seat cars because I can always be sure of a seat in them."

Heating, lighting and ventilation are old subjects, you say. Granted. But so long as we have so-called "electric" cars spouting noxious smoke over that nice new varnish or soiling the fresh enamel inside, we'd better continue arguing for electric heating with thermostatic control. As for ventilation, there's so much imagination about it that no matter how good your automatic ventilators are, let the passengers see some openings somewhere! Why sacrifice those inimitable advantages of the electric car, viz., abundant light, clean warmth and uncontaminated air? Play them up. They are part of your stock in trade.

As to signs, we have improved a great deal over the miserable tin and block signs of a decade or two ago and similar alleged identifications of the route traversed. Perhaps we will never tell the customer as much as on the long side signs of the old-time horse cars, but how comforting it is to a stranger to know something more about where the car is going than its terminals. And, by the way, you single-enders, do your platform men invariably change the signs when they loop around, so one will know whether the cars are going or coming?

Finally, there is the vexed question of life. The placid Chinese temperament would consider longevity an ideal characteristic of the trolley, but the restless American cries ever for "Change, change, change." Consider the automobile maker. He turned out an "absolutely faultless car" last year, but this year he makes the auto user feel cheap if his "boat" has no balloon tires, four-wheel brakes and one-shot lubrication. So next year there will be a profitable turn-in for Mr. Manufacturer, although the present car may be giving perfect satisfaction. The automotive industry would be in a sad way if it played for longevity.

Yet some railroaders still pipe about durability and brag that their passenger cars are heavy enough to serve as snowplows. The public may laugh at the safeties, but they *ride* 'em.

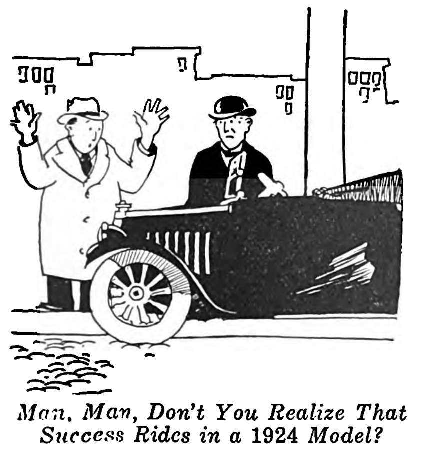
Let our motto be: "Ten years life, but a busy one."

When we had 5-cent fares and universal transfers this gave the passenger the simplest possible fare system, except that the transfer was a frequent source of irritation. The later odd-fare combinations have added to the work of passenger and platform man and slowed down the interchange of passengers. Under these circumstances, it was the obvious duty of every operator to strive for ticket and token rates that would be used by most of the passengers.

The majority of operators have come to appreciate this fact, but there are still plenty of cases where the purchase of tokens is inconvenient or unprofitable. What shall we say of a combination such as a 7-cent cash fare and four tickets for 26 cents, and these tickets purchasable only at stores where the prospective passenger is naturally expected to buy something else in return for the favor? Then, again, there are cases where tickets are sold fifteen for $1 when the cash fare is 7 cents, and other instances where there is no difference whatever in the cash and token rates.

Companies unwilling to push tickets may argue that with a 7-cent fare they cannot afford to sell tokens at 6¼ cents. One remedy lies in seeking a higher cash fare while retaining the old rate for a token. For example, if the present cash fare is 7 cents, it may be possible to get a cash fare of 10 cents provided tokens are sold at seven for 50 cents or, possibly, as low as four for 25 cents. If the token rate proves too low, there is still the possibility of securing the convenient rate of three for 25 cents. In between is the rate of two for 15 cents as another eventuality.

In short, if the present cash fare is too low to risk an 80 to 90 per cent token ratio, there must be sought a cash fare high enough to produce an attractive gap between the new cash and token rates. One city of 30,000 which had a 10-cent cash fare and a four-for-25-cents token produced a 92 per cent ratio of riders on tokens. Under these circumstances, residents always referred to the fare as "four for a quarter." It is plain that any person who would not invest the price of four rides, good any time, had no call to complain very loudly about the 10-cent rate for casuals.



Man, Man, Don't You Realize That Success Rides in a 1924 Model?

"Pass" the Fare Box and Get the Vacant Seat

The foregoing is the first step in producing a fare schedule that sells itself to the public on a merchandising basis. It not only serves the customer's convenience and saves his time, but also shows a desire to favor the regular patrons. Still, it must be recognized that while tickets, tokens and punch cards are very helpful, they do not differentiate between regular and semi-regular riders. Such a differentiation can be partly effected by two different token rates, such as three tickets for 25 cents and sixteen tickets for $1.

Better than twofold token rates are the monthly card and weekly pass, both of which come pretty close to assuring the operator that the lowest rate is being enjoyed by the steadiest customer. This is because the concession must be used within the period noted on the card. Under the monthly card plan, the cash fare is usually set at 10 cents. Persons who purchase a card at prices from 50 cents a month upward thereby obtain a warrant which permits them to drop only 5 cents each time they ride. In this way, odd fares are eliminated and change-making reduced to insignificance. Pass riders require no transfers.

In most of the railways using it the weekly pass was added to preexisting cash and token fares. In one case the popularity of the pass with regular riders secured the company permission within three months to raise the casual fare from 6 cents to 7 cents. More recently, the pass has been added simultaneously with an increase in cash to 10 cents, while the old cash fare becomes a token rate or else the previous token rate remains.

Thus, in one case a schedule of 8 cents cash and two tokens for 15 cents has become 10 cents, six tokens for 45 cents and a $1.25 pass; in a second case, the schedule has changed from 7 cents cash and 7 cents token to 10 cents cash, five tokens for 35 cents and a $1.25 pass, and in a third case, from 7 cents cash to 10 cents cash and a $1.25 pass.

With either the monthly card or the weekly pass, with or without intermediate token rates, it becomes easier to secure a truly commercial scale of rates because an increase to casuals is accompanied by a decrease to regulars. Such a course disarms much opposition.

UNITED STATES INTERNAL REVENUE SERVICE
Your statement of income returns shows tax

A Cold Start Is a Bad Introduction

These plans do not pretend to be universally applicable or inevitably profitable. They are simply offered in the hope that if the expense to the rider is lowered in some proportion to his patronage and his ease of using the cars is enhanced the results in revenue and good will may frequently be worth while. Both plans also depend for their success upon the condition that a reasonably large proportion, say 35 per cent, of the rides is taken by people traveling to and from work, and that there are sufficient off-peak attractions in the community to give scope to building up off-peak business. Failure to realize these basic conditions is responsible for a number of miscues with both card and pass.

A factor often overlooked is that any special fare plan can serve as sales leader for the rest of the company's service. The Pittsburgh cross-town transfer is a good example. On Sundays and holidays it is now possible to get a 16⅔-cent crosstown ride for 10 cents. Although the number of such transfers sold has nearly tripled since their liberalization, the real point is that in advertising this concession the company advertised all its other services by implication. A general advertisement reading "Use the Trolleys to Schenley Park" would have had little vim, but one reading that "You Can Now Reach Schenley Park for a Dime" not only made a direct appeal to the crosstown rider but also left a pleasant aftertaste for those who could reach the park on a regular 8⅓-cent fare.

All of which means that no fare plan is worth a tinker's wiping felt unless it is advertised.

Every Railway Should Have Some Truly Local Advertising

This naturally brings us to the last section of the story—how to put our ride-selling or service-giving endeavors into words. It is taken for granted that what is wanted is words for deeds or thoughts in actual being, since "Words without thoughts never to Heaven go."

No utilities have a better opportunity for setting forth their arguments than the electric railways. Their car exteriors are seen by everybody, and dasher placards or window cards cost much less than the newspaper space which others must use willy-nilly. But it would not do to follow the example of the railway which ran a safety plea on cars equipped with fearsome home-made fenders or to carry "Clean-Up Week" notices on dirty windows!

Economy in some cases and diffidence in writing ability in more cases have led to large use of syndicated publicity. Much of this is excellent, but no one will ever succeed in writing syndicated copy that won't be out of place somewhere. In using such material, the railway must still exercise executive supervision. When a series of syndicated advertisements is put up by the carhouse men as a matter of routine, we get such "bones" as the plea for fair play against jitneys in a community that never knew that pest.

In syndicated publicity there is also lacking that local touch which goes straight home. An advertisement reading "Use the Trolley to the Park" means little; one reading "Take This Car to Snaggle Park" is a definite invitation and one reading "Use this or that special rate transportation for trips to such and such places" is the best of all because it appeals to the bargain instinct.

Most car advertising contracts are sufficiently liberal to permit the railway to carry almost any advertising that definitely promotes travel, and in most instances where some special event is coming along its promoters are willing enough to bear the printing cost for the sake of such excellent free publicity. All that the operator has to do is to overcome his fear of expressing himself in printer's ink. No great genius is needed to tell a straight story in a few words. If given a few examples of style the least-lettered man with the proper enthusiasm will soon learn how to express himself. His grammar may need correction, but his ideas will hit the local fancy more truly than more elaborate efforts by a professional advertisement writer writing for the world at large.

A last word. Have you ever been chilled by the formal "Sir" of a government letter? Then you can guess how your customers feel when they read a stilted or arbitrarily worded announcement of a change in fares or service. Not long ago one of our large companies voluntarily made most important concessions in transfers. The wording was left to a schedule man, who succeeded miraculously well in making the casual readers of the closely printed placard believe that something more was being taken away from them.

L'Envoi

The moral of this is that when we have a long story to tell we should follow the newspaper style of giving the high spot in the headline. How much better it would have been to have headed this statement: "These Free Transfers Begin June 1" instead of the meaningless "Announcement" or "Transfer Changes." Walk through any good department store and copy the wording of directions to customers. Then compare this wording with that on tickets, transfers, car placards, etc. In the former statements courtesy is an invariable note and in the other it seems to occur by accident.

We have all heard of the woman who cried: "Oh, that blessed word, Mes-op-o-tamia!" But thrice blest is "Please." As the master word in the transportation lexicon, it will go just as well with the sale of rides as with the sale of shoes and collars.

American Association News

Convention Announcements

ADMISSION to the events at the convention will be by badge. No one will be admitted to the Pier except by displaying the official badge to the gateman. This applies to the evening events as well as to the technical sessions.

Official programs for the convention were mailed Sept. 25. To insure delivery before the delegates leave home those for far Western members were sent by air mail—another evidence of modernization.

A special attempt will be made this year to have all events start promptly at the hour announced in the program. This is necessary because of the large number of papers, reports and entertainments scheduled. Delegates are urged to co-operate by being on time.

Advance registration this year is far in advance of last year's at the corresponding date. With the exhibit space completely sold out, there is every assurance that this convention will be the biggest ever.

To Make a Trip to the Convention More Valuable

ACTING on the belief that often the member companies of the A.E.R.A. have not realized the greatest possible value from the visits of their representatives to the annual convention, the association is distributing to member executives "convention notes" booklets. These are blank books in which persons attending the convention may make notes at meetings and during their inspection of exhibits. A letter from President Budd, pointing out how railway men can get the greatest benefit from a trip to the convention, accompanies the booklet.

Take Your Golf Clubs

THE golf tournament in connection with the Atlantic City convention will be held from 9 a.m. to 5 p.m, Sunday, Oct. 5.

The golf committee has arranged for a number of prizes well worth competing for. Please send your golf handicap immediately to George A. Barnes, 1700 Liggett Building, New York, N. Y. No matter how good or how poor a player you may be you want to get into this tournament, as there will be a prize for you to shoot at.

Canadians to Meet at Atlantic City

ARRANGEMENTS have been made to hold an informal mid-year meeting of the Canadian Electric Railway Association at Atlantic City during convention week. The meeting will be held on Oct. 7, at the Marlborough-Blenheim, beginning at 10:30 a.m.

The News of the Industry

Trailers Prohibited

New York City Authorities Against Their Use—Skip-Stop Plan Started —Commuters' Habits Charted

The Board of Estimate of New York City, sitting on Sept. 22 in committee of the whole, adopted a resolution prohibiting the street railways in Brooklyn, including those operated by the Brooklyn-Manhattan Transit Corporation, from using "trailers" on trolley cars.

It is the intention of the Board of Estimate to hold a meeting in the near future devoted exclusively to the subject of bus route franchises. This was decided on Sept. 22 on the suggestion of Mayor Hylan, but a date for the hearing was not fixed.

A study of the proposed bus routes will be made by the Merchants Association in conjunction with the Russell Sage Foundation. This was also decided on Sept. 22 at a meeting of the executive committee of the Merchants Association upon recommendation of its committee on city transit, of which Theodore Beran, district manager of the General Electric Company, is chairman.

Although formal action will not be taken until Sept. 29 the Board of Transportation virtually adopted on Sept. 23 the route which it will recommend to the Board of Estimate and Apportionment for the uncompleted portion of the Fourteenth Street-Eastern District subway. That section of the line which until now has remained undetermined extends from Eldert Street and Wyckoff Avenue, Brooklyn, to its connection with the existing Broadway elevated line to East New York.

The skip-stop plan of operation was put into effect on Sept. 21 as a police measure in the interest of greater safety and to speed up traffic. The new arrangement appears to be working satisfactory, but sufficient time has hardly elapsed for the officials charged with the responsibility to carry out the provisions of the order accurately to appraise the accomplishments under it. Patrons of the various companies were told of the change in advance through the public press and by means of placards in the street cars. These placards varied in their wording, but the import of all of them was the same, namely, a plea for co-operation on the part of the rider with the railway officials. The notice posted in the cars of the New York Railways read as follows:

> SKIP STOP
> ISSUED BY POLICE DEPARTMENT
>
> Commencing at 12.01 a.m., Sunday, Sept. 21, all north and southbound cars will stop only at even numbered streets between 146th Street and Eighth Street, except at railway crossings and points where "car stop" signs are placed to designate special stops.
>
> The company is desirous of co-operating in every way with the authorities and we ask that our patrons help us toward relieving the serious street congestion, thereby speeding up the car in which you are riding by keeping in mind the regulations which the police department has ruled shall be put into effect.

New Jersey commuters have been taking part in the biggest public count ever attempted, outside of a war draft. It is being made by the North Jersey Transit Commission for the purpose of marshalling "flow of travel" information to be used in mass formation in the working out of a plan for the improving of transit service in Hudson County and in the other eight counties of northern New Jersey.

This information is being given by a very simple check-up system, on cards distributed at the entrances to the Tube stations and ferry stations and to the passengers on the steam railways. Each branch of each railroad has its own form of card, with stations printed upon it, so the work of the passengers will be most simple.

The railroads are co-operating, as are also the police and firemen in some sections, and the commission hopes to be in a position to work out a plan that will make possible an efficient solution of the problem that it is declared now makes commuter life none too enjoyable in New Jersey.

A typical card handed to the commuter if checked properly by him will show the facility used by him in getting to the station, the type of steam railroad ticket, the station at which he boards the train and the station at which he leaves, his approximate destination in New York whether east or west of Broadway and how far north or south, and the route used in New York, whether west side subway, east side subway, B-M. T. subway, elevated, surface lines or bus or whether he walks.

Railway at St. Louis Gets First Bus Rights

The Board of Public Service of St. Louis, Mo., on Sept. 16 issued a permit to the St. Louis Bus Company, a subsidiary of the United Railways, to operate a bus line from the terminus of the Natural Bridge car line, Natural Bridge Avenue near Kings Highway, west on Natural Bridge Avenue and Natural Bridge Road to Pine Lawn, St. Louis County. This is the first bus permit granted to the St. Louis Bus Company. Other bus applications by the company are pending.

The proposed line will connect with the Union Boulevard and Kirkwood-Ferguson divisions of the United Railways. It is proposed to charge a 10-cent city fare with transfers to and from the street cars. Street car patrons desiring a bus transfer will pay an extra 3 cents for the privilege. The street car fare is 7 cents.

Ten-Cent Fare in Springfield

Conceding that the Springfield Street Railway, Springfield, Mass., has not been in a desirable financial condition since 1917, the Massachusetts Department of Public Utilities has authorized the company to increase its fare unit to 10 cents. The order providing for a cash fare of 10 cents and three tickets for 25 cents went into effect on Sept. 21. The former cash fare was 7 cents.

Zones have not been changed under the new arrangements, but interzone and intercity ticket strips are sold that enable patrons in many cases to ride at only a small increase over the old rates. This arrangement gives a ride to the Holyoke city line for 12½ cents, as against 11 1/9 cents previously; to Westfield for 20⅝, as against 17 11/18 previously; to Chicopee for 10 cents, as against 9 1/11 previously, and to Palmer for 45⅝ cents, as against 39 1/9 previously. The state board says:

> Apart from any question of law, we think it obvious that a public utility should be allowed rates which, under reasonably prudent and economical management, will yield a return upon capital employed in the enterprise sufficient to make that capital an attractive investment. Under the laws of the Commonwealth a street railway company is obliged to sell its stock at par or not at all. Thus any policy which results in a failure to maintain the value of its stock at par cripples its ability to meet the growing needs of the community, impairs its credit, and, if long continued, results in financial disaster to the company and great inconvenience to the public. The board further justifies its decision when it says: The passengers desire the service at the lowest cost. This service cannot be given unless the passengers pay that which is necessary to give the service.

Last June a special arbitration board awarded an increase in pay to the company's employees. This increased the expenses by $235,000 a year, and at the same time there was a decrease in riding, due to general business depression. In the opinion of the department the company could not continue its present service without additional revenue, and the department dismisses as a proved fallacy the argument that a reduction of fares would stimulate riding and increase the company's income.

Interurban Advertises Service by Special Car

The Rochester, Lockport & Buffalo Railroad, operating between Rochester and Buffalo, N. Y., has put into service a large car painted black and white on the sides of which are the words, "Ride the Electric Cars and Save the Difference." On the ends of the car is painted, "Ride with Us." The car was designed by W. W. Foster, general manager of the company, as an advertisement. It was built by J. D. Nailor, superintendent and master mechanic. L. L. Lang, trainmaster of the line, is in charge of the car.

Subways to Be Recommended for St. Louis

A rapid transit system for St. Louis to cost upward of $100,000,000 and to provide subways for all street cars entering the downtown business district will be recommended to the St. Louis Board of Aldermen when they reconvene on Sept. 26 after their summer vacation. The special aldermanic committee which recently toured Eastern cities to study transportation methods will present the recommendation. It will provide for the appropriation of $25,000 for an immediate investigation and survey of the rapid transit needs of the city.

In a report prepared by C. E. Smith, the investigating committee recommends that $100,000,000 be raised for a rapid transit system, the first step to be a downtown subway, to be followed as soon as possible with elevated lines into the residential sections and a crosstown subway at Grand Boulevard. This plan will provide that all street car lines in the district bounded by Jefferson Avenue and the river, Chouteau Avenue and Cass Avenue be put underground. It is further suggested that several rapid transit lines be developed for the best interests of the entire community. Alderman Wimer, chairman of the committee, favors the city building the subway and renting it to a private company to operate, preferably the United Railways.

The committee found that elevated railroads are receiving increased consideration in many cities because of their cost compared with subways.

The committee visited New York, Chicago, Philadelphia, Boston and Detroit. It found that Boston and Philadelphia's transportation problems more closely resembled those of St. Louis than the other cities.

Under a provision of the Missouri State Constitution adopted in 1920 St. Louis has ample authority to vote the $100,000.000 in bonds needed to finance the subways and rapid transit system outlined to the Aldermen.

Detroit Commission Members Reappointed to Construct System

All members of the old rapid transit commission in Detroit have been appointed by acting Mayor John C. Lodge to serve on the new commission provided for in the charter amendment approved by the voters at the Sept. 9 election. The new commission will have charge of construction of the rapid transit system and will turn the various sections over to the city for operation upon completion.

In order to pave the way for following out the mandate of the voters when they approved the charter amendment providing for a financial plan for subways, and for the appointment of the commission, the City Council has rescinded the resolution adopted about two years ago which made possible the establishing of a rapid transit commission.

It is the opinion of Sidney D. Walden, chairman of the old commission since Dec. 5, 1922, that between now and next January the new commission, with the work already accomplished, should be able to complete its plan of routes for the initial system and be ready to submit such plan at the earliest spring election.

Special Rate for Advertising Purposes

Between 3,000 and 4,000 persons residing along the line of the Fort Wayne & Northwestern Traction Company, a subsidiary of the Indiana Service Corporation, took advantage on Sunday, Sept. 14, of a special advertising feature promoted by the local company, by which passengers along the line from Fort Wayne to Kendallville were hauled from any place to any other point for a flat fare of 25 cents.

The campaign was started to acquaint prospective car riders with the new equipment which has been placed in use since the line was taken over by the local corporation and several new interurban cars were used. Every car during the day was double headed, while two trailers were added to several of the cars to handle the crowds. The regular tariff for the Kendallville-Fort Wayne trip is 95 cents.

Temporary Ten-Cent Fare in Philadelphia Upheld

Through a decree handed down by the Superior Court on Sept. 19 the Public Service Commission's ruling granting the Philadelphia Rapid Transit Company, Philadelphia, Pa., a 10-cent cash fare, with two tokens for 15 cents, was upheld and went into effect on Sept. 25. Simultaneously the new schedule of free transfers also became effective in all but the central business district, where 3-cent exchanges are now required. The new zoning system, with its 8-cent fares in the city limits and 5-cent fares outside, was another change in operation made Sept. 25. The new rates are to continue in force until the fare question is settled finally by the commission.

City Solicitor Joseph P. Gaffney and his staff are preparing for two steps in the city's fight against the increase in fares. The Superior Court on the first Monday in October will take up the city's appeal against the recent order of the Public Service Commission temporarily increasing fares. Shortly thereafter the city will ask the Public Service Commission to proceed with the hearings on the company's petition for permanent increase of fares.

In its order of Sept. 19 the court held that the commission was legally justified in issuing the temporary increased fare order, that the company had fulfilled its obligations at the commission's hearings and had presented a case justifying the increase asked, and further, that the city of Philadelphia, protesting the increase, had not been ready to present its case, which was not the fault of the Philadelphia Rapid Transit Company. The court held that if the company was not permitted to begin collecting the higher fares pending completion of the hearing "irreparable injury" would be done to the company.

Opposes Bus Lines on Car Routes in Kansas City, Kan.

The City Commissioners of Kansas City, Kan., have taken a position definitely opposed to the operation of bus lines on street car routes. An ordinance giving a franchise to a bus company to operate between Kansas City, Kan., and Kansas City, Mo., has been held up for several weeks, and while it has not been finally denied, the bus operators have been instructed to designate some route other than that now used, which follows the street car lines on Minnesota Avenue, the main street and over the intercity viaduct, the route of the intercity street cars. This bus line plies on the main street of Kansas City, Kan., to the union station, of Kansas City, Mo., going through the main business district of the latter city also.

Fort Wayne Lines Rerouted

After several months of intensive investigation, the Indiana Service Corporation has rerouted its lines in Fort Wayne, Ind., in an effort to relieve congested traffic conditions in the center of the downtown district. The changes were put into effect on Sept. 15.

Under the new routing schedule several of the "double-end lines" have been so hooked up with other routes that a large amount of the traffic is diverted from Calhoun Street, the congested business thoroughfare. The number of transfers necessary to be issued has also been reduced by the change in routing.

Experiment with Pass Being Studied in Pittsburgh

Members of the Traction Conference Board at Pittsburgh and officials of the Pittsburgh Railways are watching with interest the result of the weekly pass experiment in the McKeesport district.

Lines on which the pass is in use are Route 56, Lincoln place to Sinclair Street, 3.97 miles; Wilmerding to State Road, 3.77 miles; Wilmerding to Market Street, 5.81 miles, and Glassport to Sinclair Street, 3.18 miles. The Wilmerding to Market Street pass costs $1.70 and the other passes cost $1.25. The experiment will continue until Jan. 1.

International Would Establish Buffalo-Tonawanda Bus Service

The International Railway, Buffalo, is attempting to induce its bondholders to consent to discontinue interurban service on the Buffalo-Tonawanda and Military road lines and to agree to permit the tracks to be taken up. It is the aim of the company to start bus service in Delaware Avenue between the Buffalo city line and Tonawanda in place of the Buffalo-Tonawanda interurban division and along the Military road from the Buffalo city line to Tonawanda. The village of Kenmore will agree to the abandonment provided the International Railway will establish a crosstown bus service between Kenmore and the River road industrial district, a distance of about 2 miles.

First Trackless Trolley Route for Albany

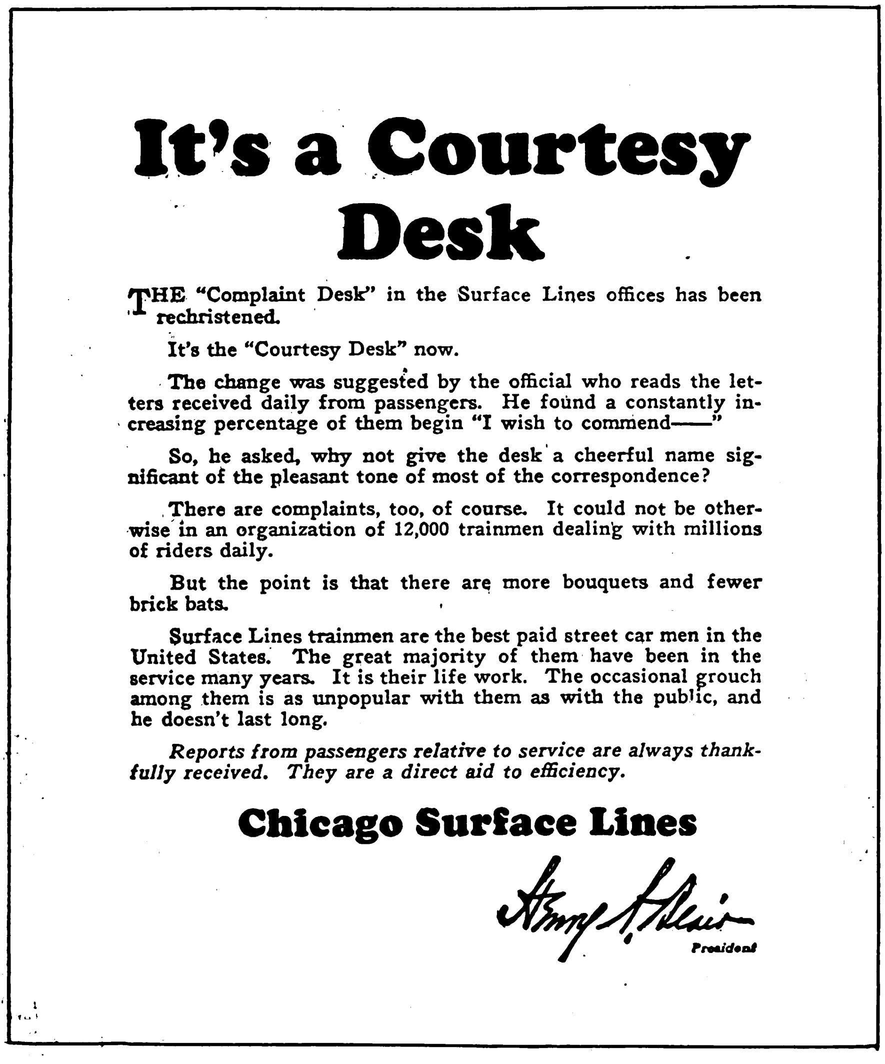
Following a conference in the Mayor's office it was decided that the United Traction Company, Albany, N. Y., will have its first trackless trolley line in operation as soon as possible. The plan is to operate over the Country Club route instead of the present trolley line as the opinion of those at the meeting was that the trackless trolleys would solve the transportation problem of that section.

The decision to operate trackless trolleys over the Country Club route, instead of the present trolley line, came after those at the meeting unanimously decided that the trackless vehicles would solve the transportation problem of that section. By extending the line to McKownsville, the line will give hundreds of persons trolley service to Albany's business section. Those living at McKownsville now are compelled to walk to the Country Club terminal station.

The transportation problem for the Country Club section has been under discussion for some time and several months ago delegations from the improvement associations of that section, representatives of the United Traction Company and Mayor Hackett inspected the Rochester trackless trolleys.

The United Traction Company will deed to the city of Albany the right of way in Western Avenue, 33 ft. of roadway, for which the city is to grant a franchise for the new line. It is expected that an ordinance will be introduced at the meeting of the Common Council giving the traction company the franchise. Unanimous consent of the Council will be asked, and if given, the ordinance will also be passed and will be signed immediately by Mayor Hackett. The company will then make application to the Public Service Commission for the certificate of convenience and necessity.

Buy Your Tokens in Advance.—The public relations department of the Pittsburgh Railways, Pittsburgh, Pa., has sent a communication to school principals asking their co-operation in placing before the students the matter of providing themselves with car tokens in advance of their intended use. The company promises to send to the school the required number of tokens for sale the day previous to any intended trip to any of the Pittsburgh institutions or manufacturing plants. The belief that car checks in advance will speed up traffic is the company's motive in making this suggestion.



It's a Courtesy Desk

THE "Complaint Desk" in the Surface Lines offices has been rechristened.

It's the "Courtesy Desk" now.

The change was suggested by the official who reads the letters received daily from passengers. He found a constantly increasing percentage of them begin "I wish to commend——"

So, he asked, why not give the desk a cheerful name significant of the pleasant tone of most of the correspondence?

There are complaints, too, of course. It could not be otherwise in an organization of 12,000 trainmen dealing with millions of riders daily.

But the point is that there are more bouquets and fewer brick bats.

Surface Lines trainmen are the best paid street car men in the United States. The great majority of them have been in the service many years. It is their life work. The occasional grouch among them is as unpopular with them as with the public, and he doesn't last long.

Reports from passengers relative to service are always thankfully received. They are a direct aid to efficiency.

Chicago Surface Lines

Henry A. Blair

President

More Bouquets than Brickbats in Chicago Suggests Department Change

Will Run as Belt Line.—The Tacoma Municipal Railway line beginning Oct. 1, will operate as a belt line, under a contract between the city of Tacoma and the Northern Pacific, Great Northern, Milwaukee and Union Pacific Railroads. The ordinance providing for the contract bore an emergency clause, permitting it to become effective immediately.

Five-Year Grant Accepted. — **A. F. van Deinse**, president of the Columbus, Delaware & Marion Electric Company, which operates the street railway at Delaware, Ohio, announces he will accept the new 5-year grant made by the Delaware Council. The new franchise reads that the company will not have to pave or repair streets in the city in the future.

Outing to Railway Officials in Rochester. — The annual party given by Edward H. Chapin, vice-president National Car Wheel Company, Rochester, to the railway officials of Rochester and vicinity took place this year on Sept. 17 at Mr. Chapin's summer home on Conesus Lake. A number of prominent traction executives and public officials from central New York were present and had the usual good time.

Fire Wreckage Purchased.—The Buffalo Sash Weight & Foundry Company, Inc., Buffalo, has purchased the wreckage involved in the $400,000 fire which recently destroyed the carhouse of the Grand Rapids Railway, Grand Rapids, Mich. The purchase involves the remains of about 60 street cars, a large quantity of miscellaneous car parts and all the rails and structural steel forming part of the damaged carhouse. The wreckage will be moved to Buffalo.

Extension of Time for Bus Service.—An extension of time until Nov. 30, 1924, has been granted the Key System Transit Company in which to install a satisfactory local bus service, supplementing its Alameda-Oakland service, as recently directed by the California Railroad Commission. Application had been made by the Peerless States, Inc., for permission to install such intercity service.

Authorizes Additional One-Man Cars.—Authority has been granted the Columbia Railway, Gas & Electric Company by the South Carolina Railroad Commission to put on one-man cars on additional lines in the city of Columbia where travel conditions warrant. R. L. Peterman, for the company, stated that the intention is to extend gradually the one-man car system as conditions warrant. One-man cars are already in use on a number of the lines of the railway.

Service-at-Cost Contract Ready.—The public utilities acquisition committee of Milwaukee, Wis., through its chairman, Fred S. Hunt, has announced that its reports and contract terms embodying a service-at-cost contract between the city and the Milwaukee Electric Railway & Light Company have been completed for submission to the Common Council on Sept. 29. If the proposed contract, which is the result of a four-year period of investigation, is approved by the Council it will go to the voters at a referendum election.

Financial and Corporate

Sale of United Railways, St. Louis, Discussed Again

Discussion of the terms for the reorganization of the United Railways, St. Louis, Mo., was expected to result in the adoption of a plan in final form at the meeting of the reorganization committee in New York on Sept. 26. In anticipation of that meeting it was stated that the holders of St. Louis Transit 5s had agreed to accept $300 cash and 5½ shares of new 7 per cent preferred stock for each $1,000 of bonds, with the right also accruing to them to purchase new common stock. In this way Transit bondholders would receive $2,937,000 cash and 53,845 shares preferred stock. Holders of the present $16,383,000 of preferred stock would also have the right to purchase new preferred stock. It was not stated in advance of the meeting just what the fate of the $24,913,000 of common stock would be. That issue is of nominal present value and is of future potential value only as its holders may be permitted to participate in the reorganization. It is expected, however, that the North American Company will furnish most of the capital for refinancing.

The Missouri Public Service Commission fixed the railways valuation at $53,000,000 as of January, 1919, and the reorganizers added $4,200,000 for betterments and extensions since that date. They anticipate no difficulty in having this valuation accepted by the state and city of St. Louis. A return of 7 per cent on the $57,200,000 valuation would mean an income of $4,004,000.

The reorganization committee plans to pay off in cash $4,100,000 of underlying bonds, $4,200,000 in receiver's certificates and $2,000,000 of the $6,500,000 suburban bonds. This would of course reduce the fixed charges materially.

About $12.000,000 is required to pay off these obligations and provide working capital. The committee also entertains the view that co-ordination of the street cars and buses is inevitable.

The St. Louis Transit Company 5 per cent bonds mature on Oct. 1. It is probable that friendly foreclosure proceedings will be instituted in the federal court under this issue of bonds to work out the reorganization plan.

Detroit Street Railway Profits Decline

Increased costs of operation account for the decline in the profits of the Detroit Department of Street Railways during the fiscal year ended June 30, 1924. Ross Schram, general manager of the lines, so explained on Sept. 23. During 1923-24, the lines earned $834,713, a decrease of $103,752 from the figure for 1922-23, the first year of operation.

The revenue for transportation for 1923-24 was $21,838,003, all but about $7,000 of which was from passengers. Revenue from other sources totaled $758,083. The toal operating revenue of $22,596,087, exceeds that of the preceding year, which was $20,196,163.

Total operating expenses for 1923-24 were $16,374,841, as compared with $14,450,612 for the year before. Included in this item is a $1,100,000 increase in wages, following a concession to the platform men.

One year ago this month the fare was increased from 5 cents to 6 cents, nine rides for 50 cents.

Last Louisville Deferred Dividend Paid

The Louisville Railway, Louisville, Ky., has declared a 5 per cent dividend on its preferred stock, payable on Oct. 2, to stockholders of record as of Sept. 17. This cleans up the last of the deferred dividends on the preferred stock. At one time the accumulation on this issue reached 22½ per cent. The payment represents $175,000 on the preferred of $3,500,000 and brings dividends on preferred up to Jan. 1, 1924.

Revenue in Toledo Improves

The first half of September showed an improvement in revenue for the Community Traction Company, Toledo, Ohio, as compared with a similar period last year. Under a 9-cent cash fare revenue for the first 17 days of the month increased about $7,000, or showed 4.1 per cent improvement as compared with the same number of days in August. Indications are that the present 10-cent cash fare with three-for-quarter token rate will be given a thorough trial, according to President Adams. The company expects to save about $200,000 a year if it can eliminate the Indiana Avenue line and direct bus competition.

Gross revenue in August was $273,922, as compared with $313,958 for the corresponding month a year ago. Operations for the month resulted in a deficit of $47,426, which brings the deficit to the stabilizing fund to a total of $77,846.

In his report to the board Commissioner Graumlich said that there was carried a total of 3,710,460 revenue passengers during the month; that this continued decline in car riding more than offset the changes in the rate of fare so that the passenger revenue dropped to $246,251 for the month. Operating expenses were reduced as compared with last year from $253,838 to $229,156. Car mileage operated was also cut from 666,761 to 562,874. Operation of two bus feeder lines produced a revenue of $1,080 at a cost of $2,176.

Release of Montreal Tramways Voting Control Demanded

The majority shareholders of the Montreal Tramways & Power Company, Montreal, Que., headed by United Securities, Limited, during the week ended Sept. 6 requisitioned a special general meeting of shareholders under the provisions of the English companies (consolidations) act and the articles of association of the company. The Tram Power directorate had until Sept. 10 to comply with the requisition, but failed to do so. Therefore, as provided under the act referred to, and the articles of association of the company, these shareholders withdrew their requisition

Conspectus of Indexes for September, 1924

Compiled for Publication in this Paper
by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Lo
Street Railway Fares* 1913 — 4.84	Sept. 1924 **7.08**	Aug. 1924 **6.99**	Sept. 1923 **6.95**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Aug. 1924 **153**	July 1924 **155**	Aug. 1923 **166**	Sept. 1920 **247**	Aug. 1924 **153**
Street Railway Wages* 1913 = 100	Sept. 1924 **221**	Aug. 1924 **221**	Sept. 1923 **215**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Aug. 31 1924 **3.29**	July 31 1924 **3.19**	Aug. 31 1923 **5.41**	July 31 1920 **11.12**	July 31 1924 **3.19**
U.S. Bank Clearings Outside N. Y. City (Billions)	Aug. 1924 **15.25**	July 1924 **16.24**	Aug. 1923 **14.60**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures	Aug. 1924	July 1924	Aug. 1923	Jan. 1924	Sept. 1923
Number	**1 533**	**1,533**	**1.440**	**2 258**	**1.279**
Liabilities (millions)	**40.85**	**49.18**	**48.75**	**109.1**	**30.83**

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Eng. News-Record Construction costs 1913 = 100	Sept. 1924 **211.2**	Aug. 1924 **213.2**	Sept. 1923 **221.5**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Aug. 1924 **149.7**	July 1924 **147.0**	Aug. 1923 **150.1**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Sept. 1 1924 **12.81**	Aug. 1 1924 **12.62**	Sept. 1 1923 **12.91**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	Sept. 1 1924 **188.7**	Aug. 1 1924 **188.0**	Sept. 1 1923 **188.0**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Aug. 1924 **144**	July 1924 **143**	Aug. 1923 **146**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Aug. 1924 **162.8**	July 1924 **161.7**	Aug. 1923 **161.6**	July 1920 **201.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

for a meeting, and require the president and directors of the company to call a meeting. The objects outlined in the document served upon the board on Sept. 10 call for certain changes in the articles of association, and also for the issuing of notices for a further extraordinary general meeting, at which the resignations of the present board are demanded, and a new board substituted, and also that further specified changes be made in the articles of association, and that a proxy representing the controlling votes of the Montreal Tramways Company be turned over to the new interests by the trust company.

When Bankers Are Philanthropists.—The Community Traction Company, Toledo, is not now paying dividends on its 8 per cent preferred stock, due to operating deficits. However, holders of the stock are being paid the regular distribution by Henry L. Doherty & Company, who is taking an assignment of the dividends when and if they shall be paid in the future.

Fate of Niagara Line Uncertain.—Partial confirmation of the report that the Niagara Falls Power Company, Inc., will take over the Niagara Gorge Railway, Inc., Niagara Falls, N. Y., has been obtained, but it is stated no early abandonment of the scenic line in the lower Niagara gorge is contemplated until after approval has been obtained for the super-power project proposed by the power company in the lower gorge at Niagara Falls. The Niagara Gorge Railway is one of the most famous scenic electric lines in the world. The road extends from Lewiston to Niagara Falls.

Interborough Elects Two Directors.—H. M. Fisher and Robert C. Rathbone have been elected directors of the Interborough Rapid Transit Company, New York, to fill vacancies. Mr. Fisher is secretary of the company and Mr. Rathbone is president of Robert C. Rathbone & Company, Inc., New York.

Duluth Dividend Deferred.—A. M. Robertson, president of the Duluth-Superior Traction Company, Duluth, Minn., has sent a letter to preferred stockholders explaining that earnings during recent months have not been sufficient to cover dividend requirements for the three months ended Sept. 30, 1924, and that in view of this the directors deemed it advisable to defer the dividend due on the preferred stock at this time.

Capital Decreased.—The Lafayette Street Railway, Inc., Lafayette, Ind., has decreased its capital from $200,000 to $100,000.

York Dividend Increased.—The York Railways, York, Pa., has declared a quarterly dividend of 75 cents a share on the common stock payable on Oct. 15, thus placing the stock on a $3 annual dividend basis. Heretofore the company had been paying dividends at the rate of 50 cents a share quarterly. The regular quarterly dividend of 62½ cents a share also was declared on the preferred stock.

Seeks Partial Abandonment in Yonkers.—Application was made to the Public Service Commission by the Yonkers Railroad, Yonkers, N. Y., on Sept. 22 for an order permitting it to abandon a portion of its route and franchises in the city of Yonkers. The company claims that in some cases the lines are single track and that it is difficult to operate them because of heavy grades. Other lines are on outlying streets and it is claimed that there are not enough passengers using the cars. Other factors are the long average length of ride and the inability of the petitioner to increase the fare sufficiently to meet the continued high cost. The petition further alleges that many of the outlying lines are in such condition that a considerable amount of money must soon be expended by the company for renewal and that there is no prospect of paying for such renewal by continued operation.

Personal Items

Specialist in Public Relations in Bus Organization

William Welton Harris was elected vice-president of the Fifth Avenue Coach Company, New York, on Sept. 17. Mr. Harris will work directly under John A. Ritchie, now chairman of the board of directors of the company. Mr. Harris is well known in newspaper and publicity circles. In 1895 he went with the Chicago *Tribune* as a reporter. Subsequent to that he was for fourteen years with various publications controlled by the late James Gordon Bennett. From 1914 to 1916 he was managing editor of the New York *Sun*.

In 1916 Mr. Harris joined the staff of Ivy L. Lee, for which organization he specialized in finance, steam railroads and public utilities. He handled the publicity work in connection with the reorganization of the utilities at New Orleans as the New Orleans Public Service, Inc. Other activities by him while with Mr. Lee included publicity work for the Southwestern Gas & Electric Company, Electric Bond & Share Company and the Interborough Rapid Transit. In this work he specialized in street railroads and public utility cases as author, lecturer and consultant.

W. J. Jones, superintendent of the Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man., has been appointed superintendent of transportation, succeeding Mr. Beckwith. Mr. Jones is well known in Winnipeg, having been connected with the railway service there for more than 10 years. After serving for several years both as motorman and conductor, he was made traffic supervisor in 1918. Two years later he was appointed divisional superintendent of the central division, and in 1921 he was appointed superintendent with offices at Selkirk.

J. C. Hawes has been appointed superintendent of the Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man., to succeed W. J. Jones, recently made superintendent of transportation. Mr. Hawes has been a resident of Selkirk for a number of years.

Obituary

Arthur S. Huey, chairman of the board of directors of H. M. Byllesby & Company, died at the South Shore Country Club, Chicago, on Sept. 16. Mr. Huey had been connected with the electrical industry since 1885 and had been a prominent figure in the operation and management of the Byllesby properties since 1902. When the firm of H. M. Byllesby & Company was organized in 1902 he became one of the partners and was made vice-president in charge of operation. In this capacity he supervised the operation of about twenty groups of utility properties. In the spring of the present year he was elected chairman of the board to succeed the late Henry M. Byllesby.

Frank P. Redmond, 47 years old, assistant secretary to the Public Service Commission in New York City, died recently at a hospital in Watertown, N. Y., from heart disease. He was formerly chief of the automobile bureau in New York City.

M. M. Shipe, 78 years old, builder of the first electric railway in Austin, Tex., died at his home there recently. Mr. Shipe long had taken an active part in the up-building of Austin and for many years was interested in local street railway operation. As a contractor he laid the tracks of the Austin property.

Matthew James Kennedy, prominent in transportation circles, died on Sept. 1 at the Royal Victoria Hospital in Montreal, at the age of sixty-one years. Mr. Kennedy was a striking example of the young man who begins at the bottom of the ladder and mounts to the top. He served as a driver with the Montreal Tramways when the vehicles used by the company were horse-drawn. Ultimately he became superintendent of the company. Later he joined the staff of the Brooklyn Rapid Transit Company. He returned to Montreal in 1905 and rejoined the forces of the Montreal Street Railway as superintendent of the freight department. He remained with the company in that capacity until 1910, when he resigned to organize the Kennedy Taxi Company, of which he became general manager.

W. B. Rees, pioneer in Los Angeles local and interurban electric railway business, died recently in San Marino. He had been librarian of the Los Angeles Railway since 1918. Mr. Rees entered the railway organization in 1901 on survey work for local and interurban lines. He helped to plan the lines to Whittier, Long Beach and Santa Ana.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Official View of Foreign Business Hopeful

Information from Official Washington Source Indicates that Foreign Competition Will Be Keen in Steel Market—Comments on Other Domestic and Foreign Affairs Significant

FROM an authoritative Washington source, the JOURNAL is able to reflect certain expressions of opinion with regard to domestic and foreign business of particular interest to manufacturers and railway men. As official circles in Washington see it, anything that tends to increase employment anywhere in the world has its direct beneficial result on the business of the world. This the Dawes plan is expected to do. It is considered, at its lowest value, to be an economic truce that will last at least three years. The hope is that at the end of that time the European nations will be so impressed with the virtues of the plan that they will be prepared to carry on indefinitely under its terms.

The prospects are that the American manufacturers will experience keener competition from Europe from now on. This is believed to be particularly true of steel. The whole Ruhr district of Germany has been thoroughly re-equipped with modern machinery. This should greatly reduce production costs and probably make the Ruhr district one of the cheapest centers of steel production in the world, especially for the next year or two, while the scale of wages is at its present level.

However, American steel manufacturers are confident that this competition can be met. To that end a very definite movement is on foot to extend the use of labor saving machines and to re-equip with the most modern methods. This undoubtedly forecasts lower prices. The opinion at Washington is that American manufacturers will hold their own against the Ruhr competition.

Not so much that was favorable was said for British steel production. Opinion on the situation in England was that it is very doubtful whether the competition of the Ruhr can be withstood, in view of the generally bad labor situation and the unsound economic policies being pursued. There is a note of discouragement among British business men. This was not only expressed in official Washington, but both E. J. Mehren, vice-president McGraw-Hill Company, and H. L. Brown, editor ELECTRIC RAILWAY JOURNAL, gathered the same impression from their discussions with business men abroad this summer.

Evidence of the very unsatisfactory labor situation and poor production efficiency in Great Britain is afforded by the negotiations now under way for the sale of 2,000,000 tons of coal for delivery in Italy. An American concern is competing for this business against British coal. With a $40 a week minimum for labor in the coal fields here as against an $8.50 minimum in British coal mines, the American concern is able to quote a better price delivered in Italy than can the British concern.

Russia is still not considered a satisfactory or permanent market for American products. Purchases are all made by the Russian government. The plan of purchasing is to establish a corporation in each country, under the flag of that country, which then buys for the Russian government. The American seller must satisfy himself as to the credit of this corporation and not proceed under any illusion that he can collect his bill in Russia. The only credit behind the corporation to be counted on is that which it can show in American banks. In Italy, Switzerland and Germany, these corporations have been dissolved and the business of the Russian government taken away from those countries because some incident which occurred displeased the Moscow officials.

It was stated that the only reason Russians are buying materials and products here is that they can either get them cheaper or cannot get them anywhere else. The buying has been heavy here recently, apparently a reflection of the Russian desire to influence recognition by the United States through the indirect pressure brought by manufacturers. In fact, certain groups of manufacturers have lent themselves to pressure of this kind on promise of large orders.

The word with respect to Latin America is that selling efforts there should be kept up despite the recent revolutions, labor troubles, currency depreciation, unseating of a president, etc. As long as the goods can be sold and the money collected, there is no reason to cease activities because of local political disturbances.

According to the Washington view, the coal industry is now undergoing a general and fundamental improvement. The things needed for its continued betterment are peace and transportation. It never was possible to bring about any substantial improvement under periodic suspension of production or strangulation of the mines due to lack of transportation. The natural economic laws never had a chance to work in this field. Now that there has been peace for 2 years, with the probability of 2½ years more of it, and a generous supply of transportation, the difficulties of the coal fields are being worked out under the free play of economic laws. In this way both the high cost producer and the surplus of labor are being eliminated. As it was expressed, the industry is now undergoing a surgical operation, a painful procedure, but one that cannot be other than helpful.

Metal, Coal and Material Prices

Metals—New York	Sept. 23, 1924
Copper, electrolytic, cents per lb.	12.975
Copper wire base, cents per lb.	15.375
Lead, cents per lb.	8.00
Zinc, cents per lb.	6.45
Tin, Straits, cents per lb.	47.125
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.15
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.55
Kansas screenings, Kansas City, net tons.	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.55
Weatherproof wire base, N. Y., cents per lb.	18.25
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.03
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.12
Turpentine (bbl. lots), N. Y., per gal.	0.87

Side Shows Are Outlawed

Fred C. J. Dell, director of exhibits of the American Electric Railway Association, has written to all exhibitors of buses at the coming convention of the association at Atlantic City asking for their kindly and whole-hearted cooperation in carrying out the spirit of the executive committee's resolution in which it cites the reasons for its opposition to demonstration of buses on the streets during the convention.

Rolling Stock

Detroit, Mich.—All four bids received by the Detroit Street Railway Commission for furnishing municipal buses have been rejected by the commission and new bids are being asked on new specifications. The new specifications provide for inclosed upper deck. According to a statement from the office of the general manager of the Detroit Street Railway, a sleeve-valve six-cylinder motor is permissible in the design. Bids based on lots of 50, 75 and 100 buses will be called for, to be opened on Sept. 26. Lower bids are expected than were received recently when two local and two outside firms submitted bids. Engineers of the D. S. R. have been working with engineers of interested bus companies, and the revised specifications are the result.

Brooklyn, N. Y.—The JOURNAL was misinformed on certain details of the order for four three-section articulated units for use on the B.-M. T. mentioned in last week's issue. This order was awarded by the New York Rapid Transit Corporation to the Pressed Steel Car Company. Each unit will accommodate 550 passengers. The end cars will seat 56 and the center car 48. The motor and control equipment and the trucks will be the same as mentioned in the item last week.

New York, Saturday, October 4, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Henry W. Blake and Harry L. Brown, *Editors*

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Shall We Rattle On or Meet the Challenge?

THE committee on foreign operation of the American Electric Railway Association came back from Europe with the observation that the tramcars over there are less noisy than ours. In explanation of this a number of contributing reasons were given in the report published in ELECTRIC RAILWAY JOURNAL of September 20, but the committee felt that, simmered down to the main factor, this fault was simply a matter of maintenance. Cars and track, the committeemen said, are better maintained than is the case here. Bad joints and noisy special work are exceedingly rare. Cars are kept tight and free from rattling and vibrating parts.

If this is the principal means of reducing the noise of street cars, is there any reason why we cannot have the same thoroughness of maintenance in this country? And with the street car under fire in the popular mind as a noisy, obsolete vehicle, should we not accept the challenge upon our workmanship made by the showing of our British contemporaries and bring our maintenance practices up to new standards?

One prominent superintendent of equipment in the Middle West, writing to the editors about this subject, said that "the principal reason why the noise exists universally in car equipment today is laziness pure and simple." There is some of that element in the situation, but it goes much deeper. Neither the way engineers nor the master mechanics have been given a fair opportunity to attain a high standard of repair on most properties. There have been in our industry far too few managers who have taken sufficient pride in keeping their plant in first class condition to insist upon the proper expenditures and reserves for maintenance, regardless of the ups and downs of business. Too many have succumbed to the temptation to show profits by skimping maintenance, when for the year there would not otherwise have been any profits. The engineers of way and the master mechanics have been forced to make the most of an ever too scant allowance for repairs and renewals. Way engineers especially have seldom come into their own. The resulting accumulation and excess of broken joints, and broken and worn special trackwork, have only served to increase the wear and tear on the equipment and to further shorten a maintenance allowance already too scant.

We need better inspection and more thorough maintenance in America. With that attained much improvement in quietness of operation will follow. Yet we need not stop there. With American genius set to work at the task, we can certainly devise ways of eliminating the sources of noise or at least of muffling it. This is a part of modernization.

Definite effort in this direction has been exercised only in Minneapolis, so far as the JOURNAL knows. Whether the accomplishment in this case, in its present stage, is of great consequence or not, considerable credit should be given for the start made to overcome one of the most important factors in the general unpopularity of street cars. The brains and the energy to cast aside precedent and designs of decades ago and to start afresh with new ideas are certainly in the industry. Will not the executives give them backing or start the fight against noise?

Modernization a Matter of Determination

MUCH of the effort of the American Electric Railway Association during the past year has been devoted to the topic, "Modernization." The JOURNAL has always been the advocate of improvement and the adoption of more modern methods. Mr. McGraw stood out, for example, in the old days for his advocacy of electrification of the horse car lines—and was roundly criticised, incidentally, by many of the leaders of the industry of that day. The recent movement was crystallized into a motto by President Budd in an article in this paper on Jan. 6, 1923, and since then "modernization" has been the keynote of many of the industry's activities.

In order to give the movement a further impetus the entire Annual Convention Number of ELECTRIC RAILWAY JOURNAL, published last week, was devoted to this subject. In a series of articles by leaders in various departments concrete evidence was given that modernization is a tangible thing. As Mr. Budd pointed out, it is futile to speak of the "good old days," for that is water gone over the dam. We must grow with the times and must give the service that the public demands. What was good enough once is far from satisfactory now.

That modernization pays is told in a striking way in one of the articles. By purchasing new and suitable equipment and rerouting and rescheduling the cars, it was found possible to increase the earnings available for interest from $155,000 to more than $4,000,000, on a property taking in some $12,000,000 gross revenue. The return on the investment was raised by this means from less than one-half of 1 per cent to nearly 8 per cent. Inasmuch as the new capital needed was only some $4.500,000 the improvement represented an enormous profit on that portion of the investment.

But to obtain results such as this, and to give the service to which the public feels that it is entitled, requires lots of hard work and perhaps personal sacrifice on the part of the owners and of the management. It means a fuller appreciation of the job and its possibilities than many of the owners and operators of traction properties have had in the recent past. Many old theories must be thrown aside, and many time-honored practices abandoned. If those in charge have the courage and the determination to forge ahead, they will prove faithful servants not only to those who have supplied the capital, but to the people whom they are striving to please.

Modernization Is Not Merely Conversation

TODAY the electric railway industry is beginning earnestly to grasp the modernization idea and is coming to realize some of its possibilities. But will the industry penetrate the shell of generalization and reach the meat—the specific day-to-day improvements in practices that are possible in every branch of the industry? Talking modernization and generalizing about it are fine. They inspire enthusiasm and help to keep us interested in the subject. But to enthusiasm must be added determination and painstaking analysis.

Modernization of what? Of our thinking, of management, schedules, franchise arrangements, equipment, line department, power facilities, finances, track, freight handling, maintenance methods, accounting methods, handling claims, insurance and salesmanship—everything. No department of the electric railway business is above possible improvement. The modernization idea permeates every activity. Existing practices are subject to critical scrutiny. Improvement will come not only from comparing the practices of one property with those of another, but also from the application to the railway industry of methods which have been developed into other branches of industry.

The reader is urged to go back and finish reading, or read again, every article in last week's Annual Convention Number of the JOURNAL. Articles on this subject by such men as Budd, Dana, Beeler, Maltbie, Thirlwall, Thompson, Gould, Jones, Addinsell, Gailor, Stoffel, Brinckerhoff, Davis, Handlon, Mahan and Jackson are far too valuable in specific suggestion to be laid aside with a single perusal. Every one who reads these articles will find more than one practical suggestion that he can apply to his own company and his own work.

Keeping Down the Fire Risk

SOMETIMES it is not sensed that the law of probabilities is always at work. In the case of fire risk, particularly, this law determines the liability for the future from the experience of the past. While it is impossible to say just where the next fire will occur, or how serious its results will be, the probability that it will occur somewhere can be worked out with almost mathematical accuracy.

The importance of this feature of the probability of fire is emphasized in the article on "Fire Insurance" in last week's Annual Convention Number of this paper. It is only by a consistent reduction of losses that a general reduction of insurance premiums may be enjoyed. These reductions may be obtained in several ways. Better construction, installation of approved fire-fighting apparatus and training of employees in its use, better "housekeeping" and co-operation between the companies and the fire prevention engineers are among the principal means suggested.

Some of the improvements recommended are basic, such as better construction, and can be incorporated only in the design of new buildings or cars. But it is surprising how much can be accomplished with the existing plant. For instance, good "housekeeping" has a marked influence on the insurance rate. This is because the experience has been that where trash accumulates, dirty or oily rags are left in dark corners, where smoking is permitted or where the fire doors or fire-fighting equipment are obstructed so that they do not function, the greater number of fires occur. It cannot be argued that the correction of such conditions requires new capital, but still there are many properties where the necessary care has not been taken to make the conditions as good as may be.

With so much to gain and so little to lose, a study of points such as those mentioned in the article referred to should be made on every property, big or little. This should be set down as one of the first things to do as soon as the convention is over and the executive is back in harness. Fire never gives warning of where it is going to strike, and the best method of fighting it is to make it difficult for it to start. For besides the possibility of low rates, good housekeeping and other fire-prevention activities mean even more in avoiding disruption to service.

"There Is Nothing New Under the Sun"

THOUGH fashions may come and go, and the modernization of today may become the obsolescence of tomorrow, all the evidence of the ages indicates that human nature is not affected by time. This was told forcefully some thousands of years ago by Aristotle, and was quoted in the Annual Convention Number last week as the text of the article on "Ride Salesmanship."

The selling instinct does not seem to be inherent in the railway organization. When it is found necessary to get more business, the executive seems prone to make blunders that any merchant would avoid without much thought. The railways really have something to sell, and the public wants to buy, but without some means of getting buyer and seller together there will be no sale. Life insurance is universally conceded to be practically a necessity for the modern man, but how many of us rush to the company and purchase insurance without solicitation—and very earnest solicitation at that—from anywhere from one to a dozen agents?

As the author pointed out, one cannot make a good sales appeal unless he has something to sell. It is useless to tell of the wonderful scenery to be observed through the car windows when they harbor so much dirt that the outside world cannot be seen. Neither can one boast of frequent service when it is notorious that the cars are often so badly bunched that the actual headways are two to three times as great as those shown on paper.

If the public wants changes, why not let it have changes? Certainly we know that the milliners and the dressmakers could not make a profit were it not for the incessant changes. The aggressive management will be alive to the possibilities of dressing up traction service in a variety of packages. The fundamental service must be the same, but riders can be made to feel that something is being done all the time for their comfort and their convenience.

It will be well for every one to consider these aspects of the business, for while they are not subject to exact rules, as are the engineering features of cars and track, still they play an important part in the success of the railway.

Railway Franchises of Today

By W. H. Maltbie

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This Concluding Installment on Electric Railway Franchises Lists and Discusses the Principal Provisions Desirable in an Electric Railway Franchise Under Present Legal and Economic Conditions

MANY of the older franchises grant only the use of special streets, thus leaving the way open for the creation of competing systems. Such competing systems were frequently created and in some cases such competition still continues.

Even before the period of commission regulation it was very doubtful if the advantages of such competition offset the inevitable economic waste and public inconvenience. Today, under a limited net return, competition in transportation is an economic waste which cannot be justified.

Therefore the modern franchise should grant the exclusive right to furnish mass transportation within the municipal area. Long-distance carriers, steam, electric or motor, must of course enter the city, but they should not be allowed to compete for local city traffic.

This does not mean that the company should have a free hand to lay tracks on any street at will. It does mean, however, that there should be no need of a new franchise for each new extension or new connection, but that new routes or connections, approved by the proper municipal department as in conformity with the city plan, should be built under the original franchise without further grant or legislation.

Form of Motive Power

The motor bus is a permanent member of the transportation family. It has its own field, within which it is a more economic transportation unit than the street car. Experience is not yet broad enough to fix the limits of that field exactly, and the present limits will be much narrowed if the bus is put on a parity with the street car as to public burdens, and as to construction and maintenance of way.

But the moment either vehicle undertakes to go beyond its field the cost of service to the public is increased, not merely because a service is rendered by the wrong vehicle, but even more because the resulting competition cuts down the net return of the proper vehicle and necessitates an increase in rates.

The problem of furnishing mass transportation is fourfold.

1. Over what routes does the public demand service?
2. What type or types of service does the public desire on each route?
3. How many of these routes and services will the public support by the payment of full costs and fair return?
4. What is the most economical vehicle to furnish each service?

If this problem is properly solved there are no adverse interests between the various routes or services, and there is no economic justification for loading upon the public the expense of two administrative organizations, or even the expense of additional accounting necessitated if there are two franchises held by the same investing group. In a word, all mass transportation, rail or motor bus, should be furnished by one company under a single franchise.

Providing for Extensions

The matter of extensions of service—new lines, lengthening of old lines, or increase of service on existing lines—was usually or frequently ignored in the old franchise; but if the modern franchise is to grant the exclusive right to furnish mass transportation, it must provide for such extensions. They cannot be left entirely to the whim of the company, since the municipality must plan for and control its growth, and it cannot do so unless it can be sure of needed transportation. Neither can the matter be left to the mere demand of the municipality, since too great or rapid an expansion may make it impossible to earn, on a satisfactory rate schedule, that fair return which is absolutely essential for the preservation of credit. This is the additional danger previously mentioned which threatens the scheme of rewarding efficiency by increased net return.

The problem is too complex for discussion in the limits of this paper, but it centers about two factors which have received too little attention in schedule and rate making—the average length of ride and the load factor.

A transportation company manufactures seat-miles, and today they cost in general, including a fair return, something between 1 cent and 1½ cents each, say the latter figure. If the load factor, defined as the percentage of seat-miles sold to seat-miles manufactured, is 100, a 7½-cent fare will pay for a 5-mile ride. If the load factor is only 50, and it is requently lower than this, a 7½-cent fare will pay only for a 2½-mile ride. Anything which lengthens the average ride, or lowers the load factor, automatically raises the cost of the ride.

Additional service on an existing line, or the opening of a new line which divides the traffic of an old line, lowers the load factor, and the extension of a line usually both lengthens the average ride and lowers the load factor.

It follows that efficiency stands little chance of a reward if that reward depends on a lowering of the fare, whether measured in money or in purchasing power, if the municipality can demand at will whatever extensions of service it desires.

The problem has not, so far as the writer knows, been satisfactorily solved. Probably the best suggestion so far is to provide in the franchise for a reference to the commission in those cases where the municipality and the company cannot agree; with the provision that increased cost, if any, shall be met by increased fare, and that the company be not penalized for this increase.

The constant expansion of American cities, and the general demand for a flat fare within the city limits, is a special illustration of the danger previously mentioned. Already in all larger centers the short rider is paying a large part of the cost of caring for the long rider. If the average ride continues to lengthen, the time may come when the short rider will decline to pay, and will walk.

The franchise, therefore, should not bind the parties permanently to the flat-fare-to-city-line plan, but should leave it possible to turn to the zone plan at some future date. Moreover, so long as the public continues to pay the full bill, the choice between the flat fare and zone systems should be left to the public, rather than to the company, provided that the latter is not penalized by a reduction in net return if the change brings about an increase in costs.

If however, the system is suburban, as well as urban, it may be necessary to lodge final authority in the commission in order to protect the suburban rider.

Paving and Other Burdens

The older franchises usually involved a cash payment by the company to the municipality, the payment of an annual charge, or both. They also usually involved the assumption by the company of special burdens, such as paving, street cleaning, free carriage of municipal employees and similar items. Under the old legal and economic conditions such provisions were merely a part of the price paid by the company for rights which were essential to the creation of a profitable business, and it was good business on the part of the municipality to get all it could, in first price, annual charge, or assumption of expense.

Today conditions are entirely changed. If a municipality charges a cash sum for a franchise, the amount paid, whether it be one dollar, or a million, goes into the rate base, and the public pays 7 or 8 per cent on it in perpetuity. The public could much better afford to borrow by an issue of municipal bonds than to raise money by sale of a franchise.

In the same way it is no longer sound economics to impose special taxes of other special burdens on the transportation company. Under the present system, these are all passed on to the rider, who is thus made to pay, in proportion to his use of transportation, a public charge which in equity should rest equally on all citizens. It is just as logical to make water users pay all the expenses of the fire department as it is to make car riders pay for paving; just as logical to make the grocer feed the policeman and prorate the charge among his customers as it is to make his fellow riders carry him.

Cheap transportation is essential to public prosperity. Therefore, transportation should carry its own costs, *and no more.* The modern franchise should be granted without charge, should call for no special taxes, and should impose no special burdens not shared by all forms of business.

Tax Exemption

This raises the question as to whether or not a public utility should be granted an exemption from ordinary taxation. In view of the fact that all taxes are passed on to the car rider, it is sometimes urged that the utility should be entirely exempt and that transportation thereby would be cheaper.

That such action would actually cheapen transportation is undoubtedly correct, but transportation should bear its full costs. Those elements of municipal expense which are generally covered by the general tax levy (police protection, fire protection, public health, public education, etc.) are just as essential to the operation of a transportation system as they are to any form of manufacturing, or to wholesale or retail trade. Consequently, there would seem to be no reason why the transportation dollar spent by the car rider should escape its share of these expenses any more than the food dollar, or the housing dollar spent by the same individual.

In time we may conclude that taxation which is more or less directly passed on to the ultimate consumer should be based upon the cost of the service rather than upon the capital investment necessary for its performance. If this happens, it will be held unjust to charge the purchaser of transportation 10 per cent of its sale price for taxation, and the purchaser of food perhaps one-half of 1 per cent or less for the same purpose, merely because the food business is one which makes six to eight turnovers per year, while the transportation business takes from three to five years for a single turnover. At the present time our taxing theories have not recognized this distinction, and transportation systems must probably continue to be taxed on the basis of investment rather than on the basis of gross or net incomes.

The modern franchise, therefore, will not exempt the utility from those forms of taxation which are borne by other industries.

Life of Franchise

An important element in the old-time franchise was the term within which it was to be operative. Many of the franchises still in force were limited to 15, 20 or 25 years, with or without provisions for the purchase of the property by the municipality at the end of the franchise period, and with or without provisions for automatic renewal of the franchise if such purchase was not made.

Under the old legal and economic conditions such provisions were not entirely unjustified, but they involved the assumption that the transportation company could expect, during the term of the franchise or its renewals, to recoup construction costs and early losses, or at least the difference between this sum and the price which would be paid by the municipality if it exercised its option to purchase.

Under the new legal and economic conditions there is no possible chance of such recoupment, whether the franchise calls for service at cost, or for a rate schedule subject to constant commission revision. The company is in either case limited to a fair return, and has no opportunity to liquidate even its bond indebtedness, much less its capital stock.

Under these conditions it will be practically impossible to finance expensive modern construction and equipment under a limited term franchise, unless it is made clearly evident that the ultimate purchase will constitute a full return of the initial capitalization, plus a recoupment of losses.

If there were any doubt of the accuracy of this statement its demonstration is to be found in numerous cases where a utility approaching the termination of its franchise without having been able to recoup the original investment has found it absolutely impossible to secure the necessary credit in order to make extensions to its system and service demanded by the needs of the growing municipality.

The modern franchise therefore should not provide for termination at any definite time.

Privilege of Purchase

It does not follow, however, that the municipality should enter into a service contract, or franchise, which binds it permanently to a given organization. Each of the parties to the contract should have the opportunity of withdrawal. The company has this opportunity through its power to sell its property as a going whole. The investors have the same power of withdrawal through the sale of their stock or bonds. The municipality, if it becomes dissatisfied with the service and fails to secure satisfaction by any of the safeguards which have been included in the franchise, should have the privilege of discharging the company and entering into a new service contract with other parties, or, if it so desires, of undertaking to run the service as a municipal function.

It is inconceivable, however, that such a change is to be accomplished by tearing up tracks and scrapping equipment. The only practical economic method of dealing with such a situation is for the municipality to acquire for its own use, or for resale, the plant of the existing system.

But, if the credit of the operating company is to be preserved, this provision for purchase by the municipaliity must be so drawn as to make it certain that the investors will receive dollar for dollar the money which has been furnished by them. Moreover, since the entire contract has been based upon the assumption that the municipality will pay the costs of operation, the costs of maintenance, and a fair return, any deficits which have been accumulated in any of these items must be added to the purchase price before the property can be taken over.

It will also happen in many cases that change in the art, inadequacy, or public requirement has forced the retirement of portions of plant or equipment before they were actually consumed in service, and before an adequate reserve has been accumulated for their retirement. In such cases, under modern practice, the capital invested in prematurely retired property will be amortized, and the purchase price must necessarily include the unamortized portion of such capital.

It follows, of course, that any reserves which have been accumulated, either to meet future retirements of property, whether worn out in service or to be withdrawn through obsolescence, inadequacy or public requirement, pass with the property to the municipality, and this no matter whether they are held as cash on deposit or have been invested in additional property.

It is also true that if the company has been guilty of dereliction, if it has failed to keep its side of the contract, if it has dissipated the funds collected for maintenance or replacements, and the result of this dereliction is a deterioration of the property, the company itself must expect to pay the penalty of such action in the form of a reduction in purchase price.

This provision for purchase contains one very serious danger to the company which is operating under the plan of service at cost plus a reward for efficiency. For example, assume that a service-at-cost franchise has been based upon a 6 per cent return with a sliding scale under which an efficient management has been able to push the return to 8 per cent. If the property can be taken over at any time by the municipality on a mere cost basis there is an immediate incentive to take over such a property and resell it on a 6 per cent basis. In other words, the efficiency of the operating organization creates the desire, and the franchise offers the opportunity, to take over the property.

The most natural safeguard against such a condition is to recognize in provisions for taking over the property the possible existence of a going value. While similar in kind, this going value will differ in quantity from the going value which enters into a valuation, whether for purposes of condemnation or for the determination of a rate base. The going value which enters into the franchise purchase provision should not exceed, in a service-at-cost franchise, the capitalization at a reasonable rate of the right to excess earnings acquired through efficiency, and, in a commission rate scale franchise, should not exceed the accumulated difference between the actual and the maximum allowable return.

It is important both to the municipality and to the company that definite provisions as to the price to be paid for the property should be incorporated in the franchise, and that this price should not be left to be determined by a condemnation proceeding under the power of eminent domain, or covered by any vague phraseology, such as the provision that the municipality shall pay the fair value of the property. In either of these cases the municipality runs the risk of being compelled to take the property over at a very substantial advance over the actual investment, due to such economic changes as we have recently experienced, while the company, particularly as to investments made at the present time, runs the risk of having its property taken over at less than the investment cost. Moreover, under this plan the company runs the risk of being compelled to carry all of the accumulated losses due to obsolescence, inadequacy, or public requirement.

Under such conditions the investment to some extent becomes a speculative one and the cost of money is correspondingly increased. This hampers the company in its development, and increases the cost of the service to the car rider.

Conclusions

The modern franchise, if it is to rest logically upon the present legal and economic situation, should provide for service at cost, with a sliding scale of net return to promote efficiency, safeguarded against changes in the purchasing power of the dollar and against public demands for extension of trackage or service which injuriously affect the average ride or the load factor.

It should cover all mass transportation in the municipality and include the right to make future changes in trackage and future extensions.

It should leave questions as to zone system or general flat fare within the municipality open to change from time to time.

It should call for no purchase consideration, no special taxes, and no special burdens, but should provide for the same property taxes as are paid by other industries.

It should run for an indefinite period, subject to acquisition by the community at any time, on reasonable notice, at a price which can be definitely determined under the provisions of the franchise, which price should include total invested capital, any foregone returns, and compensation for going value, in so far as such going value may be evidenced by the ability of the company to earn an efficiency reward. When this price is paid the purchasers should acquire with the property all accumulated reserves.

Applications of Modern Methods in Accounting Practice

By *W. L. Davis*
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In This, the Second of Three Articles, Plans Are Discussed for the Arrangement of the Office, Ledger Accounts, the Journal and Cash Books, the Preparation of Reports, and Divisional Accounting of Receipts and Expenses, Non-Operating Income, Fixed Charges, Depreciation, Etc., by a Modern Accounting Department

THE modern accounting office should be laid out in such a way that there is little lost motion in handling vouchers and other routine work from one desk or section of the office to another, and the departments should also be arranged with due regard for filing and storage vault facilities.

In handling current work, each day should be a unit as far as it is possible to arrange it. This is not so easy to accomplish in the general office as it is in an operating or division office, because of the variety of work handled, but it will be found advantageous to give it some thought. Frequent checks on operating and construction records save considerable time at closing, and if these records are balanced with the controlling accounts regularly and frequently the man in charge of the work can prepare analyses of costs and comparisons of increases and decreases very soon after the accounts are closed—in fact, he can review them before they are closed and readily discover any large inaccuracies.

Arrangement of Ledger Accounts

There have been numerous substantial improvements made during the past twenty years in the basic records of the accounting department formerly known as the cash book, journal and ledger. Although it is far from universal practice, the modern general ledger is gradually being changed from the bound style to the loose-leaf record. Both have their advantages, but it should be said of the loose-leaf record that it is usually more economical, easier to handle and easier to arrange. The accounts, in either form of ledger, should be grouped in such a way that a trial balance will automatically group the accounts in balance sheet form, thereby not only saving time in grouping the accounts at the end of the month but also establishing uniform balance sheet grouping from month to month. The assets and liability accounts should be in one section of the ledger and the profit and loss accounts in another, in order that separate trial balances may be taken of each, at which time the balance in the current year profit and loss account, when added to the corresponding balance at the close of the period, will represent the corporate surplus or deficit at the end of the current period. This can be arranged in such a way that the trial balance, balance sheet and profit and loss statement can be prepared at the same time.

In former years the general ledger contained practically every account that was used by the company, but our modern accounting requirements are such that this would be a very cumbersome method and one which would result in all kinds of delays when monthly figures are needed. In order to obviate this difficulty the use of controlling accounts has become almost universal, and in this manner the general ledger accounts are subdivided and carried in separate records.

It will be found preferable to control as many accounts as possible and reduce the general ledger accordingly. This is particularly true of operating expenses, construction accounts and tax and other accruals. All necessary details can be kept in sub-ledgers, the totals of these sub-ledgers being kept in agreement by frequent checks with the corresponding account in the general ledger. By this method the number of accounts can be expanded indefinitely without adding very many accounts to the general ledger.

The old form of ledger sheet usually provided for debits on the left side and credits on the right, without much space for explanations. In fact, such explanations as were shown were usually made in the form of a brief description of the contra account represented by the entry. This was entirely satisfactory from a mechanical point of view and doubtless saved considerable of the bookkeepers' time, but when it becomes necessary to analyze an account drawn up in this fashion numerous difficulties are presented, and the individual preparing the analysis is put to some inconvenience and considerable delay in investigating each entry. The modern accountant can profit by this experience and insist upon full explanations on all entries, providing for such explanations by a ledger sheet with a wide space for description of the entries and three columns on the right-hand side of the sheet, one for debts, another for credits and a third for balances. This form will not only provide more space for explanations on a standard size sheet but will also enable the bookkeeper to make his entries in consecutive order and carry his balance after each entry if he desires.

Improvements to the Journal and Cash Book

Substantial improvements have also been made to the old-fashioned journal, or day book, as its name indicates. This also took the form of a bound book, and contained a record of the daily transactions as they pertained to the different accounts, each item being in the form of a debit or debits to one or more accounts and credits to other accounts, sometimes accompanied by a very brief explanation of the entry. These entries were written up daily and posted to the general ledger accordingly—a very simple process with a small company or when comparatively few accounts are carried, but an absolutely impossible method under modern conditions in a large organization.

The modern journal, or voucher record as it is usually designated, consists of a large book, usually in loose-leaf form, which provides space for a description of each entry and columns for the charges to the various accounts. Separate columns are provided for the accounts more often used and for the control accounts which are supported by separate detail ledgers, and a "sundries" or "miscellaneous" column for debits and credits to accounts not often used, the totals of these control columns and the individual entries in the sundries column being used for much the same purpose as the individual entries in the old-fashioned journal.

This form of record may be used for any kind of an entry, but it will be found to be of advantage to maintain a separate section for entries crediting accounts payable for current purchases. The same form of sheet may be used, however. The entries in the journal or voucher record should be supported by proper vouchers, approved bills, written authorities for entries, and the like, each entry being given a reference number and posted to subledgers as required.

The old form of cash book can also be changed to advantage by providing separate columns for the various accounts to which the cash receipts are to be credited and the disbursements charged. It will often be found advantageous to segregate receipts and disbursements and maintain separate records for each purpose.

Preparation of Reports

One of the primary functions, if not the most important function, of the accounting department is the preparation of regular reports for the executive department. As the modern executive is a very busy man, he requires this information in concise form and as soon after the close of the month or other accounting period as it is possible to prepare it.

The results of the operation of the property from month to month should be sent to the executives and financial connections in a report setting forth the financial condition of the company. This should be done in the form of a balance sheet and its earnings in the form of a tabulation of the various items entering into the income account. In order to save time for the man reading the report, the information can be condensed to the extent that a short form of income account may be shown on the same page with the balance sheet. This income account need only show gross earnings, operating expenses, net from operation, other income, gross income, deductions, and net income available for dividends. Comparative information showing corresponding data for the prior year and for the year to date or preceding twelve months may also be shown. Information of this kind may be prepared very readily after the accounts are closed and can be used as a preliminary report of the business for the month and the current financial condition of the property. If the accounts are properly grouped in the general ledger this information can be abstracted in a few hours.

Of course, this cannot be prepared until after the accounts are closed, and the accounts cannot be closed without prompt reports and thorough co-operation from the operating department. A definite schedule should be worked out between the accounting department and the other departments toward this end, and this schedule must be adhered to if the executives are to receive their reports promptly enough for them to be of any service. This should be understood by every one handling the routine.

This preliminary report may be supplemented by a few memoranda concerning abnormal increases and decreases in earnings and expenses. If the figures for the prior year are worked up in advance, and if the current records are handled in such a way that they are self-analyzing, this subject will not cause any difficulties. In preparing figures and data for use outside the department, the use of accounting terms and technicalities should be avoided as far as possible.

Before the balance sheet is prepared, the more important details of the asset and liability accounts should be available in order that any questions as to the respective items may be answered.

In addition to the preliminary report the executives should also be furnished with a complete summary of earnings, expenses, fixed charges and net income, set up by accounts and compared with corresponding periods as required. It will also be of interest to report the status of all construction work which may be in progress as of the close of the accounting period, showing a description of the job, total estimated cost segregated as to capital and other accounts, total expenditures to date and balance remaining to be spent. In addition to these subdivisions the report should include such analyses of balance sheet accounts as may be considered necessary or desirable, with special attention to maturities on short-term obligations.

The preparation of these reports may be materially speeded up if the forms are prepared in advance and figures for prior years entered before the accounts are closed.

Need for Divisional Accounting

One of the subjects to which the modern electric railway accountant should give considerable attention is the study of divisional accounting, or the allocation of the income account over the various operating units of the property. This information is not only of considerable value for general purposes, but also in establishing the cost of operating non-productive lines.

At first this problem may appear rather simple, but the more it is studied the more complicated it appears to be. It is, of course, manifestly impossible accurately to allocate all revenue and expenses to operating divisions and units of the property, but fairly satisfactory results can be attained if the accounting system is drawn up with that end in view. Of course, before divisional accounting can be handled satisfactorily, the accounting department must be advised of the divisional lines determined upon, with a full description of each operating unit. Necessary physical data pertaining to this subject should be available at all times.

Divisional Accounting of Receipts

A study of divisional accounting should of course begin with the most important item, which, in most electric railways, is represented by passenger receipts. In order to allocate passenger earnings properly the supervisory employees of the transportation department must be familiar with divisional lines and must be instructed that conductors' reports be made accordingly. For this purpose separate trip sheets may be used, but it might under some circumstances be preferable to use one trip report, upon which could be noted the trips made on each division by each conductor each day, the total number of fares collected on all divisions in a certain day being equal to the total number of fares registered on all cars on that day. This analysis need only be made by the conductor as to the number of fares, as the necessary revenue compilations may be made either in the division accounting office or the general accounting department.

The same general scheme may be used in reporting revenue tickets, tokens, etc., as collected, the only difference being in the record of registration shown by the conductor, who would under normal conditions be required to segregate cash fares from other kinds of fares as they are collected. At the close of the day's business the number of fares registered on all cars may be compared with the total number of fares on the various divisions.

Divisional accounting for freight receipts presents a somewhat more difficult problem, as it is obviously necessary to analyze each waybill and ascertain the correct proportion of the freight earnings as applicable to the various divisions. This may be considered a rather complicated matter, but should any company be required to handle a problem of this kind it would likely find a tabulating and computing machine very helpful. If it is not considered necessary to install a machine for the purpose, the waybills may be assorted daily and allocations made on a number of waybills at a time. Percentages for divisional prorations may be worked out and be determined upon in advance.

Other revenue items should be allocated upon the best information available and applicable to the particular account under consideration. As some of the revenue accounts represent comparatively small items it might be advisable to apply arbitrary allocations based upon past experience. However, the revenue from station and car privileges may be arrived at fairly closely, and the rentals received for tracks and buildings may be determined accurately. Allocations of these accounts, however, often depend upon conditions on various properties.

Divisional allocations of operating expenses present numerous difficulties, and in order to obtain any results at all it is necessary to make a number of arbitrary allocations. This subject, however, is one of increasing importance and should be given considerable thought.

Divisional Allocations of Operating Expenses

In considering divisional accounting as applied to operating expenses the first item that should be considered is the cost of maintaining ways and structures. There are many charges to the accounts included under this caption that can be positively identified as belonging to certain divisions, while on the other hand there are always numerous common charges which must be prorated on some arbitrary basis, and in addition there must be allocated the expenses of maintaining joint track and overhead lines used by different divisions. These common charges can, with some degree of satisfaction, be prorated on the basis of car mileage, but this is not altogether desirable for the reason that there may be items applicable to one or more combinations of divisions and not to the property as a whole, thereby requiring the accounting department to make certain segregations of such items in order to apply the proper proportions to each.

The best results will likely be obtained by considering each section of joint track as a separate unit and applying direct charges accordingly, dividing these charges at the close of the accounting period between the divisions involved on the ratio of car mileage or any other basis satisfactory to the company. After the proper allocation of these items is determined upon, the general supervision and other items common to all divisions may be applied on the basis of the amount of direct charges allocated to each division.

In order to accomplish this end within a stated period after the closing of the accounts, the operating expense ledgers may be drawn up in such a way that the charges to the individual divisions and the units represented by joint trackage can be set up in separate columns and the totals of columns representing common charges divided after the closing period by means of a journal entry charging and crediting operating expenses. This will not affect the general profit and loss statement and will not necessarily interfere with any preliminary reports of financial condition and income for the current month which may necessarily be sent to the executives before the complete report.

Divisional allocations of equipment costs are comparatively simple if certain cars or certain types of cars are definitely assigned to different divisions, but as this is not always done by the operating department it is necessary to devise other methods of arriving at this result if such allocations are required by the company. In order to effect this result it might be well to consider the subdivisions of the accounts covering maintenance of equipment in such a way that the cost of types can be determined.

The accounting department, of course, needs the assistance of the equipment department in arriving at this result, and it will be necessary for the accounting department to assign subclassification numbers to the equipment accounts in order that the shop employees may be familiar with the requirements. As labor charges are incurred and material taken from stores, the account numbers applied thereto should include the sub-account numbers and the detail records in the general office handled accordingly. If this is done, all of the equipment costs will be subdivided in such a way that the maintenance of each type of car can be arrived at. In order to make the necessary divisional allocations, however, it will be necessary to supplement this record by analyses of the mileage made by individual cars on each division, with a view toward determining the mileage made by each type of car on each division. The maintenance cost on each type of car can then be applied to each division in the ratio reflected by the analysis of the car mileage.

This method will automatically provide for the necessary accounting when cars are transferred from one division to another. In order to accomplish satisfactory results, however, the individual car mileage must be carefully worked out in accordance with the divisional segregations already determined, and it will of course be necessary to have the divisional schedules used in providing the cost parallel similar data used by the department figuring the car mileage.

A study of the allocation of power cost by divisions is, under ordinary circumstances, very difficult and involves so many engineering technicalities that it is often outside the province of the accounting department to arrive at a reasonably accurate set of figures. If power costs are to be subdivided on this basis it might be well for the accounting department to receive the proper engineering advice on the subject and determine its basis of allocation accordingly. Each company possibly has a different situation to work out and it would be very difficult to recommend any definite rule to follow, although in the absence of a more satisfactory method a straight allocation of power costs on a car-mileage basis might be reasonably close, particularly if the averages of power consumption in kilowatt-hours for the various types are anywhere near equal to each other.

Conducting transportation can possibly best be subdivided by daily analyses of the time of trainmen, or, in the absence of such method, on the basis of car-hours on each division. Although the former method involves a little more work it is undoubtedly the more accurate of the two. There are a number of other charges to this account which may be applied to the various operating divisions on an actual basis, but there are always certain expenses representing supervision costs which apply to the entire system. These expenses may be allocated on the same basis as the wages of trainmen.

Traffic expenses and general expenses present probably the most difficult problem of all and there are a number of sub-accounts included under these headings which must be prorated in full on an arbitrary basis. Most of these accounts might satisfactorily be apportioned on the basis of gross earnings, but others should be prorated on the ratio reflected by the property investments on the various divisions if these figures are available.

Included under the latter caption might be considered valuation expenses and taxes, excepting such taxes as are based upon gross receipts, which, of course, should follow the percentages shown by the gross earnings. Cost of insurance may be worked out on a more or less actual basis to some extent, but this depends upon conditions on individual properties and is not subject to any regular method. The insurance on rolling stock might be apportioned on the basis of individual car mileage if the equipment is not assigned to separate divisions. If any charges included in the general expense account are applicable to any one division or combination of divisions, it might be preferable to allocate each item as they are charged in the accounts.

Non-operating income, fixed charges and depreciation accretions must necessarily be apportioned arbitrarily, with the possible exception of interest on underlying bonds and interest on bonds issued for current construction. Interest on these securities may be considered applicable to the divisions represented by the investment. This will not necessarily include all of the fixed charges and there must of course be some items charged out arbitrarily. Possibly the best basis to use in connection with such charges would be the ratio of the property investment on each division to the total, if such figures can be arrived at either through property appraisals or analyses of book costs.

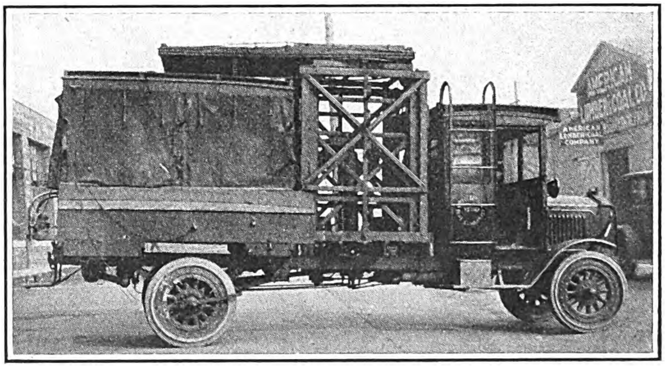
The divisional allocations of the profit and loss account are very valuable, not only for use in connection with current requirements but also in determining the return on various sections of the property. But if such figures are used, they should be used with the knowledge that they must necessarily contain a number of arbitrary items and are subject to such exceptions as might follow a situation of that kind if they are used for any specific purpose. While these suggestions may prove of some benefit to a company contemplating such allocation, it should be remembered that each company has its own operating conditions and problems to meet and this outline should be considered with that in mind.

Springs for Emergency Trucks

A SERIES of tests has recently been conducted by the Department of Street Railways, Detroit, on methods of spring supporting gasoline emergency motor trucks. The tests were conducted with two 2½-ton motor trucks equipped with Trenton towers, cabs and inclosed bodies. These trucks are used for overhead emergency work and new construction, but owing to the large amount of material carried they had become overloaded so that the rear leaf springs had lost their camber. It was necessary to install heavier leaf springs to carry the load.

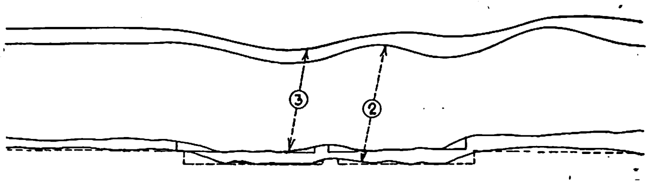
Consequently tests were made with Hiflex springs and also with cushioned wheels.

The trucks were loaded with forty bags of sand, and one of the trucks, which was equipped with artillery wheels and semi-pneumatic tires, weighed loaded 12,480 lb., while the other, with cushioned wheels, weighed 13,130 lb. The test was made at night by running the truck over a wooden framework at about 6 m.p.h., and the movement of the truck was shown by electric lights on the truck. The path of these lights was then recorded on the photographic plates of a camera. The dimensions of the wooden framework are given on one of the line illustrations. A number of records were

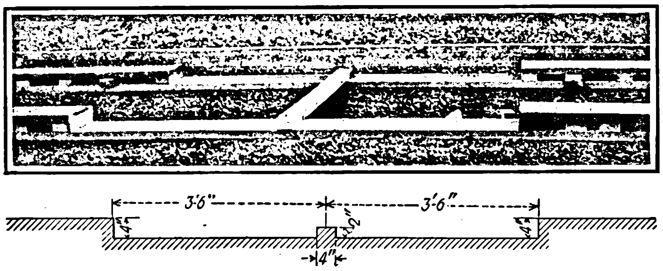


The Truck on Which the Tests Were Made

The two lights used in the test can be seen. One is mounted on the hub, the other just above, on the side frame of the car.



Comparison of the Movement of the Truck Body with the Two Kinds of Mounting



The Wooden Framework Over Which the Truck Was Run (the Drawing Shows the Dimensions)

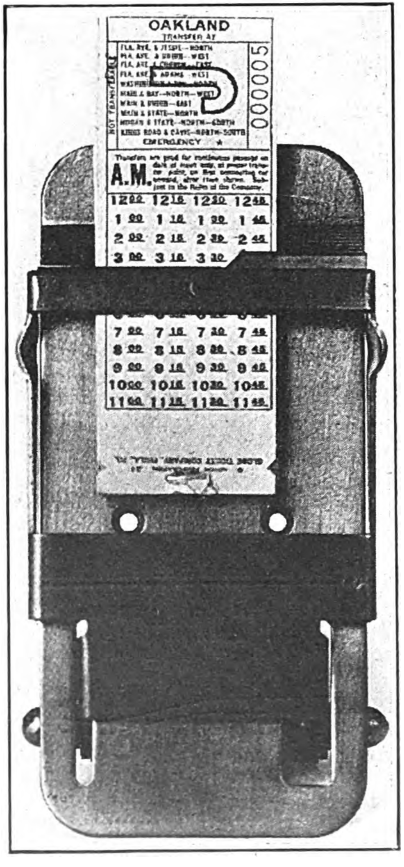
obtained, of which two are reproduced. In this drawing, "2" shows the hub line and body line when the truck was equipped with cushioned wheels and "3" when the plain wheels supported the load through Hiflex springs. In all the tests the body line was decidedly in favor of the use of springs rather than cushioned wheels. In fact, the unsprung weight of the latter has a tendency to give more of a bounding effect to the axle than the installation of plain wheels with springs.

A New Form of Tear-off Transfer

Only One Hand Is Used to Issue Transfer to Passenger and the Operation Does Not Require the Trainman's Attention

DURING the early part of 1923 a committee of transportation men from several of the Southeastern district properties of Stone & Webster was appointed to work out a simplified transfer that would be of particular value in the operation of one-man cars. It seemed highly desirable to supersede the usual form of transfer requiring punch marks by something that would require less labor, cause fewer errors, reduce abuse and permit the operator to concentrate on the safety of his passengers.

The committee decided that speed and simplicity were more important than cost. Furthermore, it was considered better to emphasize one outstanding marking than to try to have several prominent identification marks. Time was agreed to be the feature of greatest importance in the issue and acceptance of transfers. In the new type adopted the time limit cannot be extended after issuance because all succeeding hours of the day, which are printed on the transfer, are torn off and retained by the operator by means of a cutter, as shown in the accompanying illustration.



Type of Transfer Designed to Aid Operators of One-Man Cars

Other characteristic markings are less prominent. The name of the issuing line is printed in large type on the top of the transfer, and all the points at which the transfer can be used are listed. It makes no difference to the company at which point it is used, the time limit being depended on to prevent the transfer from being used for other than a continuous trip.

In order to emphasize the difference between a.m. and p.m. time, and to limit the size without reducing the size of the printing, it was decided to use transfers differing in color. Pink paper was selected for the a.m. and blue for the p.m. transfer. The tints not only distinguish the transfers but make them more difficult to counterfeit. Instead of the ordinary dates 1 to 31, ten identification skeleton letters are surprinted in red. These letters answer every purpose of the date numerals, are more flexible and reduce the number of pads of each kind of transfer carried in stock from 31 to 10. The committee selected the following ten letters as easy to distinguish: A, B, C, E, J, K, M, P, S and Z.

In service the pad is first adjusted under the knife. Transfers are issued by tearing them off. At the time of issue the use of only one hand is required and the operator does not even have to glance at the transfer in order to issue it correctly. On open cars, or at other times when a cutter is not available, the new transfer can be punched for time with an ordinary punch and issued in the old way.

Trial of this transfer at Jacksonville, Savannah and Tampa since early in 1924 has been so successful that a complete supply of transfers and cutters has been ordered for use by all of the Southeastern companies controlled by Stone & Webster.

Bristol Tramway Operates 200 Buses Profitably

THE local tramway undertaking in Bristol, England, a private company, is operating an extensive system of bus lines radiating out from the city in all directions over about a thousand miles of route. The service is provided by means of 200 single-deck buses, all equipped with solid tires. The company also engages in an extensive char-à-banc service. The bus operations of the company as a whole are making money, according to the manager.

Operating into the rural districts, this transportation serves people who are too poor to own private automobiles but who like to get into the city now and then if they can do it for a few pence. As there is practically no other service through many of the small towns touched by the bus lines, this service is a real godsend to the people. However, it is taking the trade away from the local merchants and bringing it to the larger stores in Bristol.

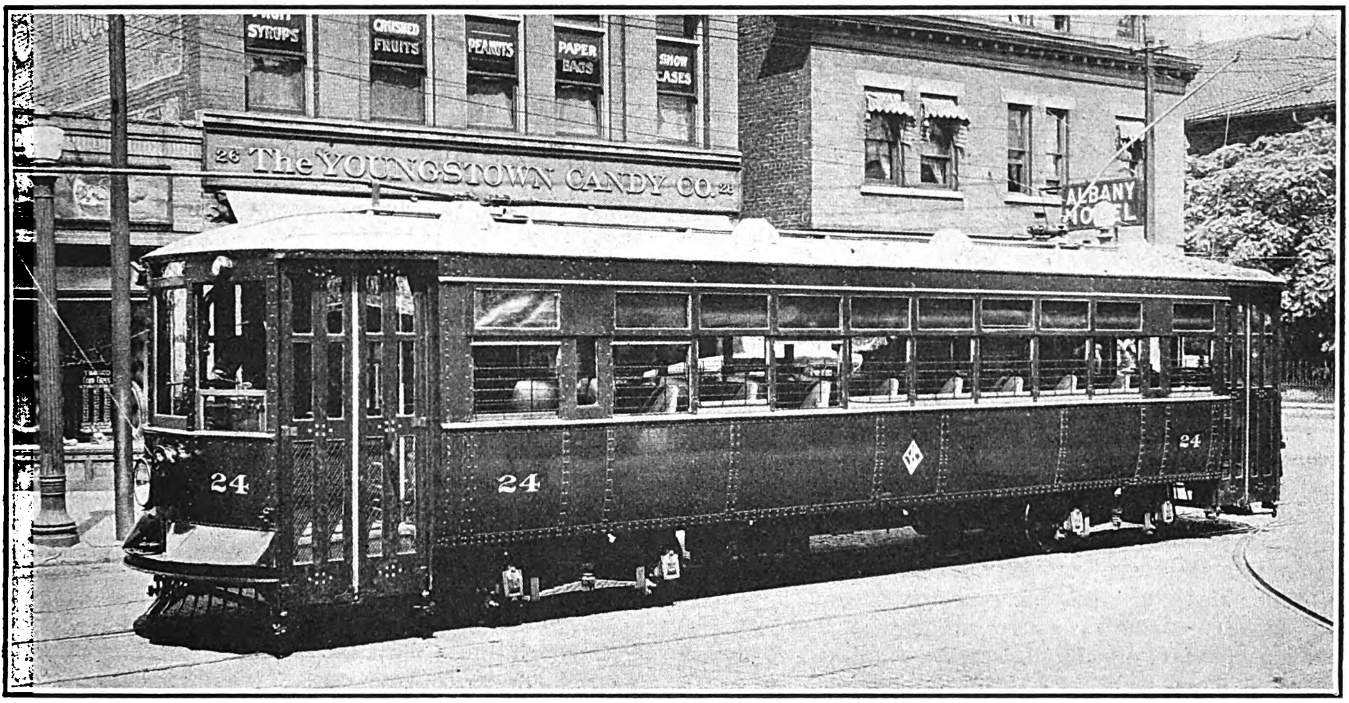
The minimum fare is 1d. and the amount paid varies, of course, according to the length of ride. The company is required to pay a tax of £60 a year per bus.

The local tramway is in a difficult position financially owing to the uncertainty about its future ownership. All British private tram systems are chartered by Parliamentary act for 21 years, and are subject then, or at the end of each 7-year period thereafter, to purchase by the city at the then physical value of the property. The Bristol company has passed the 21-year period and is unable to put more money into the property in the absence of definiteness as to its future.

New Materials in Car Body Construction

Development of Steel Covered Laminated Wood Panels Has Made Possible the Construction of a Type of Side Girder Which Has the Strength and Rigidity of Steel and at the Same Time Gives Better Insulation, Less Noise and Reduced Weight

By John A. Dewhurst
Day & Zimmermann, Inc., Engineers



The Steel-Covered Plywood Side Panels on Two Cars of This Type Built for the Youngstown & Suburban Railway Have Proved Satisfactory After Three Years of Service

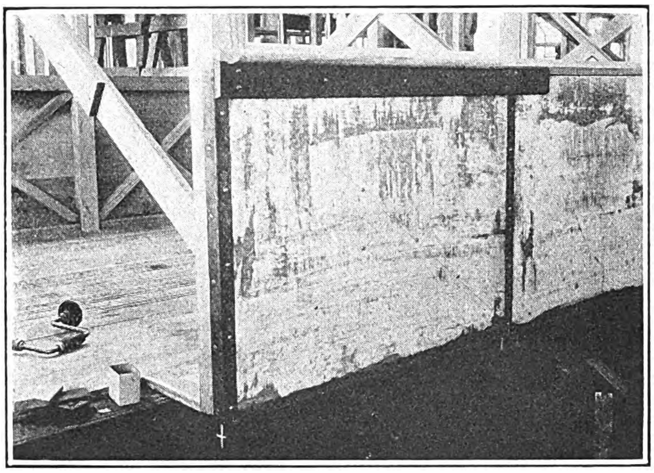
ANALYSIS of the construction employed in recent car bodies shows an increasing interest in the application of new materials looking toward increased strength and decreased weight. Undoubtedly the automobile, as an example of the results which can be accomplished through the application of special materials for specific purposes, is partially responsible for the awakened interest in the possibilities of improving street car body construction. Unlike the automobile body, however, which is regarded as satisfactory if it survives five years of hard wear, the street car body must last several times that long.

It is interesting to trace the gradual introduction of steel into the construction of street car bodies. In the course of this development, the original all-wood type of construction was in some cases eventually replaced with steel entirely. Within the past few years, however, there has been a reaction from the all-steel construction for surface cars toward the use of wood and steel in a composite structure which takes advantage of the most desirable characteristics of each.

STEEL SIDE PLATES HAVE DISADVANTAGES

During the progress of the change from wood to steel, the latter material became widely used for the side plates. This substitution of steel girder plates for the former type of wood panels gave considerably increased strength, stiffness and safety, while at the same time, in many cases, the weight was materially reduced. Introduction of steel side girders, however, also brought some disadvantages. Although the designer increased the strength, he lost the heat insulating value of the wood and the cars also became noisy. Defective insulation had to be overcome by adding cork or other insulation sheeting on the inside of the plate. In addition, from the standpoint of weight, even 1/16-in. steel plates were considerably heavier than 5/8-in. wood panels. Where weight reduction was accomplished, this was done through the simplification of the framing structure made possible by the use of the flat girder sides.

Three years' experience in the use of laminated wood panels having thin galvanized steel sheets cemented to the faces makes it possible to analyze some of the advantages obtained from this type of construction, and to point out the progress which has been made in devising methods of applying such material to car frames of either the steel or wood-post type. About three years ago Day & Zimmermann, Inc., arranged with the G. C. Kuhlman Car Company for the construction of two double-truck interurban cars for operation out of Youngstown, Ohio, in which this material, which is commonly known as "Plymetl," was used for the purpose of reducing the car weight to a minimum consistent with strength and safety. These cars were designed to seat 44 passengers comfortably—



Battens on the Outside Form the Best Method of Applying Panels to the Car Framing

with wide aisles and liberal spacing between seats. They were made 8 ft. 6 in. wide over all, and the seats were spaced on 32 in. centers. A curved side type of construction was adopted which gave the 8 ft. 6 in. width at the belt rail but pulled the top plates and side sills in 3 in., so as to make the width at these points 8 ft. For the side girder plates $\frac{5}{16}$-in. Plymetl was used, the panels being curved to correspond with the contour of the side framing. At the same time, the entire roof was made of $\frac{3}{8}$-in. plywood, which added strength and rigidity to the structure. The design of these cars was described in the Jan. 27, 1923, issue of ELECTRIC RAILWAY JOURNAL and was further analyzed in the Sept. 29, 1923, issue of that paper. The type of side construction employed showed the following advantages: (1) reduced weight, compared to a steel sheet of comparable strength; (2) marked increase in insulation against heat and cold; (3) ease of molding to the proper curvature desired; (4) reduction in noise and drumming effects produced by all-steel construction. Since these materials were first applied in the two cars for Youngstown, careful observation and inspection after three years of service have indicated the design to be so satisfactory that similar construction has been specified on 20 single-truck cars being built for the Columbus, Newark & Zanesville Electric Railway Company, Zanesville, Ohio, and also on five double-truck cars being built for the York Railways of York, Pa., both companies under the management of Day & Zimmermann, Inc.

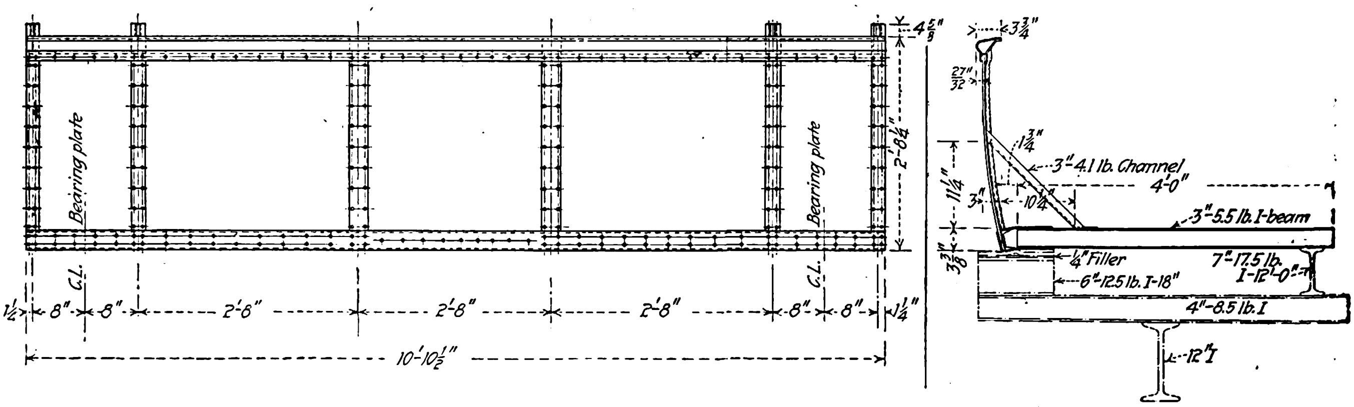
To obtain design data on the strength of girders made up with this laminated material, tests were conducted at the Case School of Applied Science, using a girder made up as shown in the accompanying sketch to duplicate as nearly as possible a section of the side of a street car. These tests were conducted under the direction of Prof. R. H. Danforth.

The load was applied through cross-beams supported on the girder. In the first test, angle braces were attached to these cross-beams, extending to about the center of the girder web, thus giving a structure comparable to the side frame of a car. In a second test, these braces were removed and the load applied directly to the girders so as to develop the riveting qualities of the Plymetl in a structure of this kind.

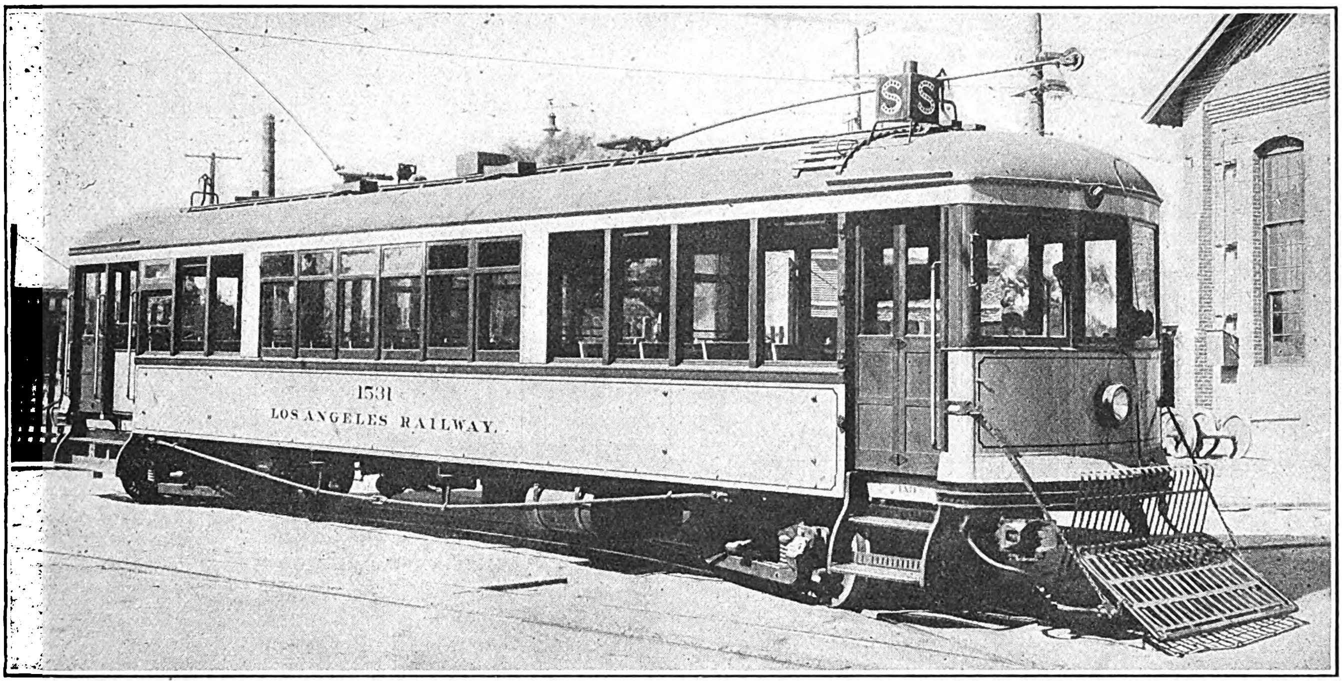
In both tests, the vertical deflection of the girder under load was measured by an Ames dial gage, placed under the center of the girder flange, and the twist of the Plymetl web was determined by two similar gages placed against the outer side of the girder, opposite the attachment of the angle braces. Even though the girder web was considerably distorted by twisting in the first test, due to the fact that the ends of the cross-bearers through which the load was applied were unsupported, the results of the second test, with the braces on the girder web removed, showed the action of the composite girder to be surprisingly like that of an all-steel structure. The permanent deflection of the girder from a load of more than 17,000 lb. was but 0.050 in., although this load distributed between two 3-in. I-beam cross-bearers caused a permanent set of about $\frac{3}{4}$ in. in these steel members.

RIVETS DRIVEN HOT

It has been found in practice that the composite material can be effectively fastened to steel framework by hot riveting, as would be done with all-steel plates. Tests made on this type of joint indicate that a $\frac{5}{16}$-in. rivet will support a load of more than 2,000 lb. before failure, and a $\frac{3}{8}$-in. rivet will support a load of more than 3,000 lb. To determine these figures, the joints were prepared with batten strips on the face of the Plymetl in order to distribute the pressure from the rivet head over a wide area of the material in accordance with the construction adopted in most cases where Plymetl has been used on steel frame cars. Tests were made on both double and single strap joints; namely, in the one case with straps on both sides of the panel, and in the other case with straps on one side only. With the double strap construction the rivets were in double shear and the joint failed when the material of the panel gave way due to the bearing pressure of the rivet. With the pull applied in the plane of the panel



Type of Girder on Which Tests Were Conducted



Steel-Faced Plywood Is Used for Side Panels on 60 Cars of This Type Built in the Shops of the Los Angeles Railway

for 5/16-in. thick material, the following results were obtained in tests conducted in the laboratories of the Case School of Applied Science, and in Northwestern University, by H. G. Bersie.

No.	Case School 5/16-In. Rivet Lb.	No.	Northwestern University Laboratory 3/8-In. Rivet Lb.
1	2,325	1	3,300
2	2,900	2	3,000
3	2,880	3	2,700
		4	3,800

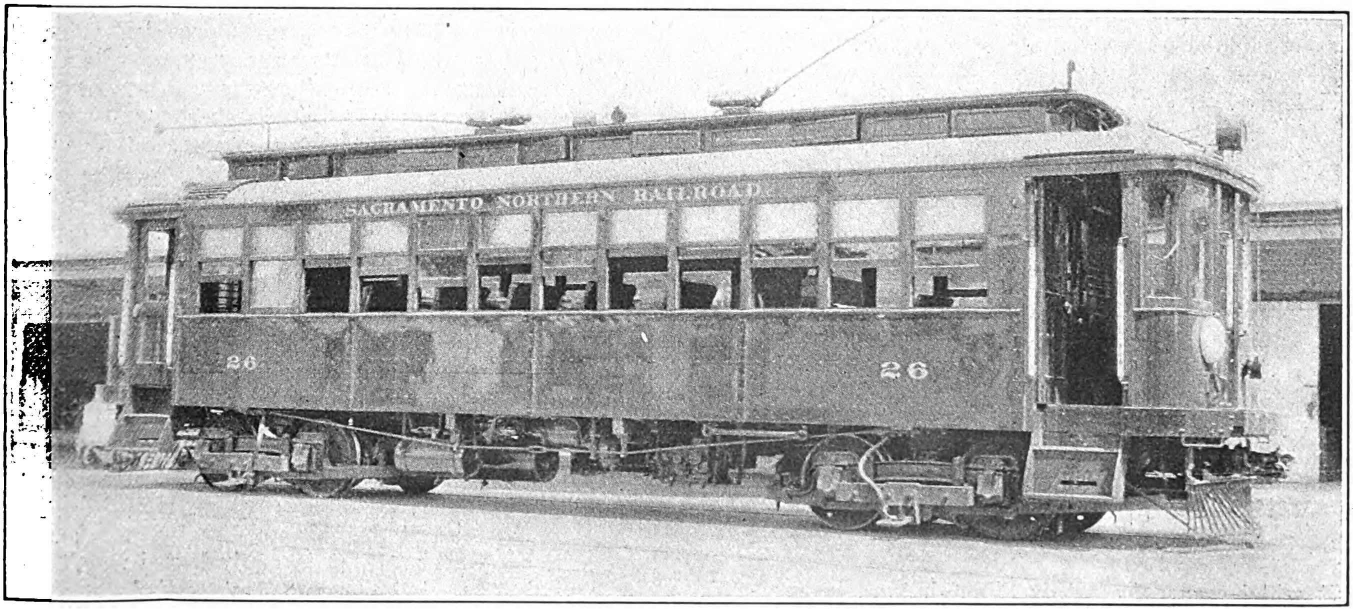
Tests made on joints having only one cover strap ⅛ in. thick and using ⅜-in. rivets driven hot gave the following results:

SHEAR TESTS ON RIVETED PLYMETL
5/16-in. Plymetl, ⅜-in. rivets in single shear.

No.	Maximum Load, Lb	No.	Maximum Load, Lb.
1	2,500	3	2,530
2	2,960	4	2,870

In each of these tests the panel was made of three-ply wood, 5/16 in. thick, covered with galvanized metal faces of 27-gage steel cemented to the surfaces of the wood. In each case, the ultimate strength exceeded 2,000 lb. per rivet, which is more than ample for the stresses obtained in street car body construction. Examination of a section of the riveted joints, to determine the effect of the hot rivet on the wood in the panel, showed that the rivet expands considerably in the wood upon driving, making an unusually tight fit. The wood does not burn, as no air can reach it. A slight charring occurs at the surface in contact with the shank of the hot rivet, but this does not seem to produce any weakening of the joint as the entire space is filled tight when the rivet is finally driven home.

To check up the nature of this type of joint and to determine whether any loosening or yielding occurs between the rivet and the panel, tests were conducted in which the displacement of the cover strap relative



Cars of This Type Were Rebuilt from Old California-Type Semi-Open Bodies. The Panels Are Fastened to Posts and Rails with Wood Screws to the face of the panel was carefully measured with precision instruments. The results of these tests are given in the accompanying table:

SHEAR TESTS ON HOT-RIVETED PLYMETL JOINT TO DETERMINE YIELD

Two ⅜-in. rivets in double shear 5/16-in. Plymetl.

Load in Lb.	—Displacement of Cover Strap Relative to Face of Plymetl.— No. 1 Face Grain of Three-Ply Core Perpendicular to Loading, In.	No. 2 Face Grain of Three-Ply Core Parallel to Loading, In.
100	0.000	0.000
300	0.001	0.000
500	0.001	0.000
700	0.002	0.001
1000	0.002	0.002
1500	0.002	0.003
2000	0.004	0.005
2500	0.004	0.006
3000	0.007	0.009
3500	0.009	0.012

Experience in the application of this composition wood and steel paneling in car construction has indicated the desirability of using the cover strap or battens to distribute the rivet-head pressure over the face of the thin steel sheet. Such straps may be from 1/16 to 3/16 in. in thickness, the thicker material being preferred if the rivet heads are to be countersunk into the coverstrap. When this material is riveted in this way, or even when it is firmly screwed to wood framing, using a metal cover strap under the head of the screw, the plywood core is slightly compressed under the squeezing action of the rivet or screw, and seems to have the same effect as that of a spring washer in holding the joint tight. The panels are found to remain firmly attached under severe working strains and no cracking of paint due to movement in the joints is obtained.

Unusual Stiffness Combined with Light Weight

In stiffness per unit of weight, this composition material shows its most interesting characteristic in comparison with steel. A 5/16-in. Plymetl panel 30 in. wide and 8 ft. long, when supported horizontally at the ends, will easily carry the weight of a man at the center. This property is highly important in the web of the girder, as such girders usually fail due to the buckling of the web when excessively loaded. In most cases where load tests have been made on structures simulating the construction of a street car body, failure has been found to occur due to the bulging or buckling of the side girder under the load. The resistance to buckling of any two panels or girder-webs is roughly proportional to the magnitude of their stiffness factors EI, in which E is the modulus of elasticity of the material and I the moment of inertia of the section per inch or width. In the following table, these factors for Plymetl and for various thicknesses of sheet steel are given:

STIFFNESS FACTORS

Plymetl

Thickness, Inch	Weight, Pounds per Square Foot	EI per Inch
5/16	2.4	24,000

Sheet Steel

Gage	Thickness, Inches	Weight, Pounds per Square Foot	EI per Inch
16	0.0615	2.50	580
14	0.0781	3.12	1,190
12	0.1094	4.37	3,250
10	0.1406	5.62	6,960
8	0.1719	6.87	12,600

It will be seen from this table that although 5/16-in. Plymetl weighs even less than 1/16-in. sheet steel, the stiffness is more than 40 times as great. Its weight is little more than half that of 12-gage steel and its stiffness is more than 7 times as great.

Many other railway properties have, during the past two or three years, been experimenting with the use of composition material of this type in car construction, both for new work and for remodeling older type cars. The Los Angeles Railway Company has been using this material on all the cars being built in its shops for the past three years. Forty cars are now in operation and twenty more are being built, which will make 60 cars of this type in operation by the end of the year. Plymetl is used on the sides, the upright panels and the letterboard. The work is being done under the direction of P. B. Harris, chief engineer.

J. B. Rowray, general manager of the Sacramento Northern Railroad, is using Plymetl in the reconstruction of older California type cars into closed combination passenger and smoking cars, for light interurban service. The steel-faced plywood is applied as a flat panel screwed to the belt rail, side posts and side sill, and also to an intermediate rail between the belt rail and the sill. The screws are spaced about 4 in. apart and the joints between panels are made on posts, the seam being covered with two rows of screws so that each row holds one end of the sheet. All edges of the Plymetl are leaded to keep out moisture.

This material is used in Barcelona, Spain, in the construction of new cars, for wainscoting lining panels, to give insulation, and strength. In other cases it has been used for vestibule linings and for floor insulation.

It is evident, from the results aaccomplished in the application of this type of material, that by continued research and experiment it will be possible to make still further progress in designing a type of light-weight structure suitable for the severe combination of conditions imposed upon a car body in electric railway service.

Electric Railway Postal Service

THE acting postmaster at Detroit, Mich., has arranged with the rapid railway line of the D. U. R. for a railway postal service between Detroit and Port Huron. A tentative schedule worked out by E. C. Jefferies of the railway mail service provides for the departure of this car at 4:50 each morning, arriving in Port Huron at noon. Returning, the car leaves Port Huron at 5 p.m., arriving in Detroit at 10 p.m.

The D. U. R. has provided a specially constructed car, one-half of the space being allotted to the mail service, while the other half will be utilized in handling express and baggage business.

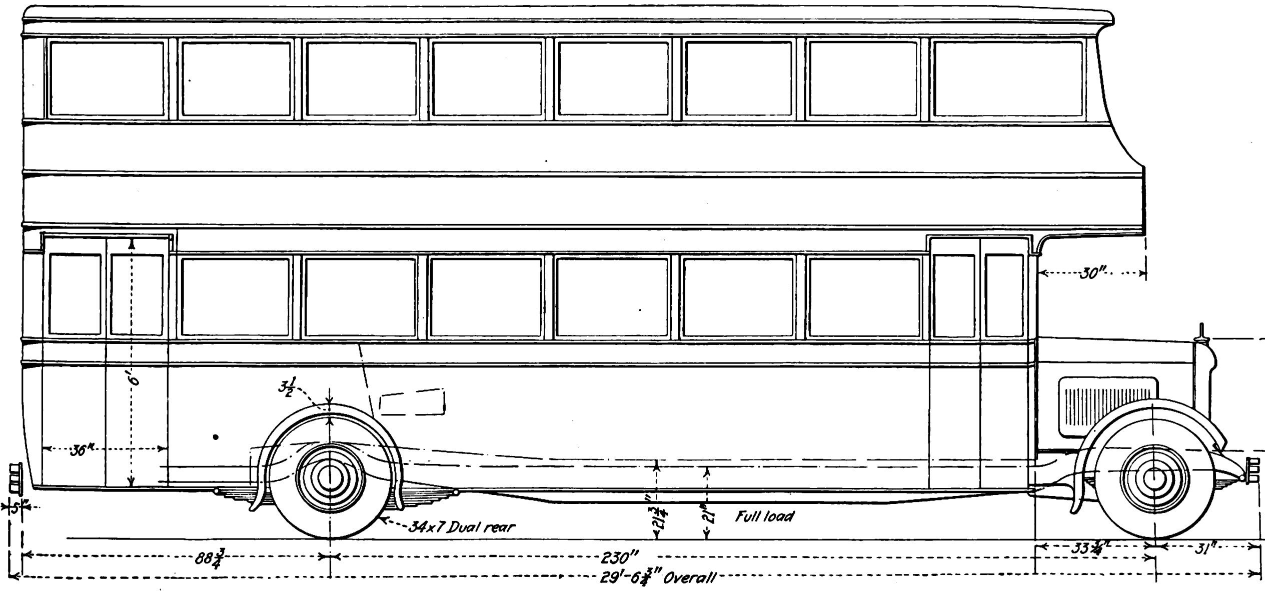
A railway postal clerk will be in charge of the car, effecting distribution of mail collected from all the cities along the route between the two points. This is the first railway postal car to operate along an electric line in Michigan and one of the few in the United States.

The stairs and passageways leading to stations of the London Underground Railways are illuminated in such a manner that the light is all projected in the direction of travel and there is no direct glare in the passengers' eyes. The effect is equivalent in softness to indirect lighting, but more efficient as it is actually direct.

Detroit Develops New Double-Deck Bus

Totally Inclosed Design Adopted by Department of Street Railways Is Featured by Low Over-All Height, Full Leather Seats and Luxurious Interiors—Ingenious Arrangement at Rear End of Body Provides Necessary Headroom

A NUMBER of interesting developments in double-deck bus design are incorporated in the specifications for 50 new vehicles of this type recently ordered by the Department of Street Railways of Detroit. This equipment will be characterized by low over-all height for a totally inclosed double-deck structure and the provision of luxurious interiors with full leather upholstered seats on both the upper and lower decks. The body design includes what is considered an improvement in the arrangement of a monitor between the two decks to increase the headroom in the aisle below, while at the same time the total over-all height is kept down. Although the monitor design has been used in buses recently constructed, the new Detroit buses will have a flush passage across the top deck, whereas other monitor designs interpose a step in the center of this passage.



Fifty of These Totally Inclosed Double-Deck Buses Will Be Put in Service by the Department of Street Railways of Detroit

Elimination of the step across the top deck is considered of considerable advantage from the standpoint of reducing the possibility of accident to passengers. At the same time this allows the over-all height for a vehicle with inclosed top deck to be still further reduced.

After deciding that the double-deck bus was the proper type for the kind of city service under consideration, the totally inclosed upper deck was specified, in order that passengers in both upper and lower compartments could be given an equal degree of seating comfort.

Overhead obstructions on some of the routes under consideration by the Department of Street Railways for the institution of bus service made it imperative to keep the over-all height of the buses at a minimum. It was found that a maximum clearance of 13 ft. could be obtained under 40 of the 47 obstructions encountered. The remaining seven structures were so low that it was impracticable to design inclosed double-deck vehicles to clear them. If bus service is ever installed on the routes where these latter obstructions are located, it will probably be necessary to depress the roadway to get adequate clearance.

Even a clearance height of 13 ft. presented a serious design problem. This was finally solved by recessing the end sill at the rear end of the body, so as to form a well, projecting into the body area far enough to allow a passenger to pass under the point where the upper monitor is cut off before he steps up to the body floor. In other words, this rectangular well in the rear end of the body floor is flush with the platform, and as a passenger does not step up into the body until his head has passed some distance beyond the rear end of the upper deck, the arrangement allows the rear end of the monitor to be cut off to form a flush passage across the upper deck and still leaves sufficient headroom below.

The construction is shown in the accompanying illustrations. As shown in the floor plan of the lower deck, longitudinal seats are placed at each side of the well just described, while the remainder of the lower deck seats are set crosswise. The upper deck seats are set back to back longitudinally, with a cross seat at each end. All of the seats are to be upholstered in full leather, and the longitudinal upper seats will be divided into two-seat sections by arm rests.

Only seven steps are required to reach the upper deck. This, of course, is accomplished because of the low deck height. The first step riser is at the center line of the body, leaving the platform clear between this point and the entrance door.

At the front end of the body there is a door under the control of the driver, so that the bus may be operated by one man, if desired, or so that loading or unloading may take place at both ends of the vehicle. Folding seats are placed adjacent to the front door so that they may be let down into position if it is not used. By this means a seating capacity for 61 passengers is obtained, 30 on the lower deck and 31 above.

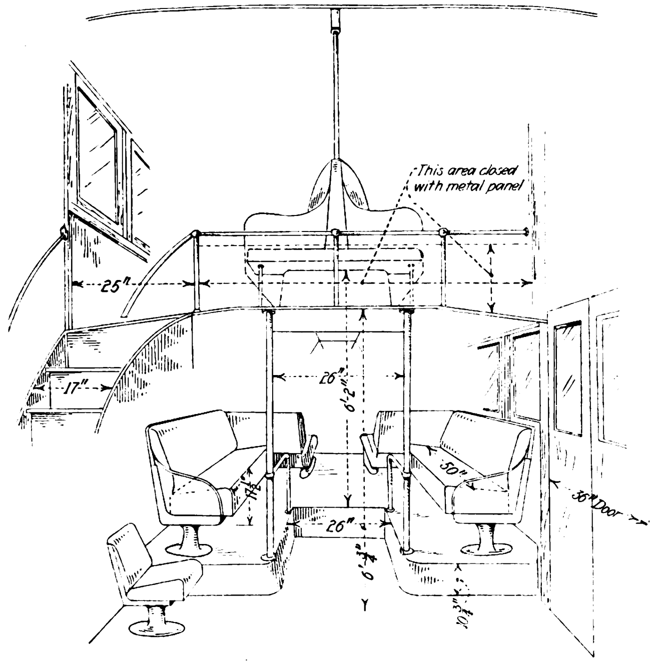
Some of the principal dimensions of the body and chassis are given in the accompanying table.

To improve riding qualities by carrying the passenger load as far as possible between axles, the wheel base is made 230 in. Even with this long wheel base, it was considered essential to hold the turning radius to a minimum, in order to enable the buses to be manipulated in city streets. The radius specified is 35 ft. 11 in. to the left and 32 ft. 11 in. to the right.

The deck between the lower and upper compartments will be made of steel with no carlines, and will be supported on vertical stanchions in the body. The roof of the top compartment will be of Haskelite. Outside panels of the body will be No. 14 gage aluminum, while the dash panels, rear panels and upper deck curved panels will be 20 gage body steel.

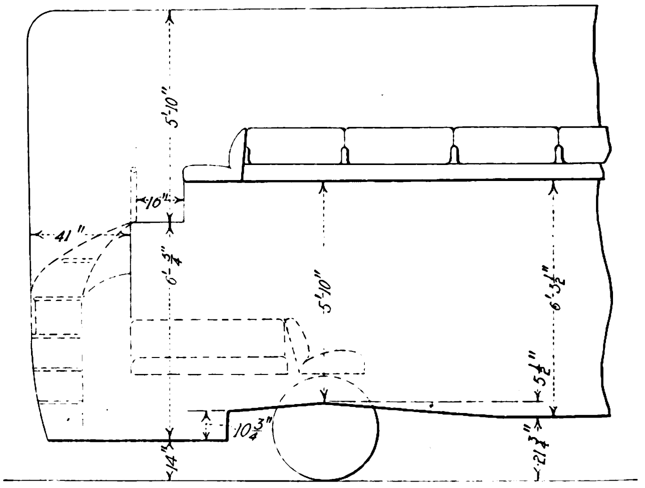
Inside finish of both the upper and lower compartments will be polished mahogany. At the front end of both the upper and lower decks full width plate glass windshields are provided, so as to give maximum visibility forward to passengers. The side sash are

Over-all length over bumpers	29 ft. 6¾ in.
Over-all length of body	23 ft. 9 in.
Over-all width	94 in.
Over-all height (loaded)	12 ft. 8 in.
Over-all height (light)	12 ft. 11 in.
Headroom inside body:	
Lower deck	6 ft. 3½ in.
Upper deck	5 ft. 10 in.
At entrance door	6 ft. 0¾ in.
Over ramp at rear axle	5 ft. 10 in.
Floor height from ground (loaded)	21¾ in.
Front entrance step from ground (loaded)	14 in.
Weight without load	14,000 lb. max.
Distribution of load:	
Front axle	42.4 per cent
Rear axle	57.6 per cent


This area closed with metal panel
25"
17"
26"
6'-2"
50"
36" Door
26"
6'-4¾"
10¾"

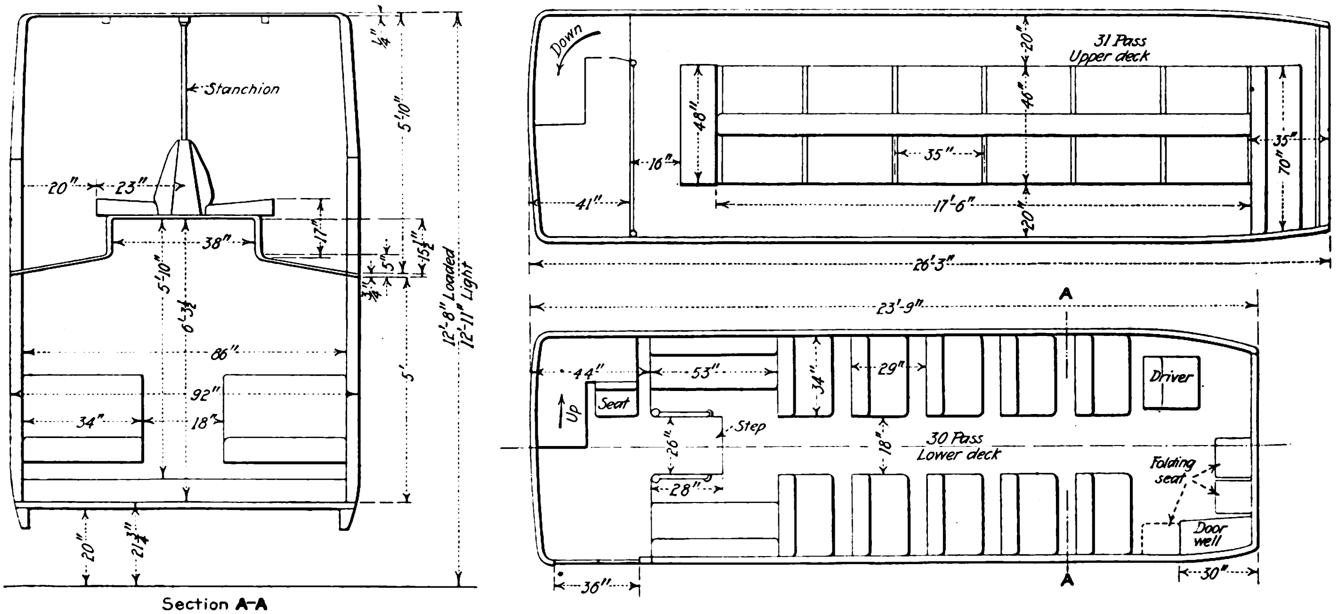
Perspective Section Through Rear Vestibule

A flush passageway across the top deck is made possible by the well immediately below in the body floor.


5'-10"
10"
41"
6'-3¼"
5'-10"
6'-3½"
5¼"
10¾"
14"
21¾"

Longitudinal Section at Rear End of Body

This shows how the monitor is cut off to form a 16-in. wide passage across the top deck while maintaining the necessary headroom below.


Stanchion
20"
23"
38"
17"
5'-10"
6'-3¼"
86"
92"
34"
18"
5'-10"
15¾"
5"
12'-8" Loaded
12'-11" Light
5'
20"
21¾"
Section A-A
Down
31 Pass Upper deck
20"
46"
48"
16"
35"
35"
70"
41"
17'-6"
20"
26'-3"
23'-9"
A
44"
53"
34"
29"
Driver
Up
Seat
Step
20"
18"
30 Pass Lower deck
Folding seat
28"
Door well
36"
30"
A

Floor Plans of Both Decks and Section Through Bus

Seating capacity for 61 passengers is provided. Both upper and lower deck seats are full upholstered in leather.

made large, so that when they are open in the summer the conditions will approximate an open deck.

Particular attention has been given to heating and illumination. Exhaust gas will be carried from a regulating valve through thin walled tubing around both sides of the lower deck. Registers in the top of the monitor will allow warm air from the lower compartment to pass up between the backs of the longitudinal seats above, so as to heat the upper deck.

Eight 15-cp. dome lights will be installed in both the upper and lower compartments. This, combined with white enamel ceiling finish, is expected to give ample illumination to insure passenger comfort.

The new buses are to be built by the Yellow Coach Manufacturing Company and will be mounted on that company's special Model Z chassis. The engines will be of the six-cylinder sleeve-valve type, 4¼-in. bore and 5½-in. stroke, developing 105 hp. at 2,000 r.p.m. Tires are to be 34x7-in. pneumatics, those on the rear wheels being duals.

Government Ownership Is Destruction[*]

The Proposition Is Stated and Then Its Meaning Analyzed in All Its Aspects—Effect Upon Our Democracy—It Would Mean Higher Rates for Utility Service, Higher Taxes Too, and Poorer Service —Employees Would Be Far Worse Off—Experience Elsewhere

By Herbert Hoover

Secretary of Commerce, Washington, D. C.

SENATOR LA FOLLETTE'S party proposes government ownership and operation of railway and other public utilities. The Senator emphasizes this: "I am for government ownership of railroads and every other public utility—every one." This means all railways, power, light, telephone and telegraph. The Republican party stands for private ownership, with the prevention of abuse through government regulation of service and rates or profits. Between them we must choose. Either we are to remain on the road of individual initiative, enterprise, and opportunity, regulated by law, on which American institutions have so far progressed, or we are to turn down the road which leads through nationalization of utilities to the ultimate absorption of all industry and labor.

What the Senator proposes is far more than a transitory experiment of government in business; it is a change in our social, economic, and political principles that will react to revolutionize our government itself.

THE PROPOSITION

In its immediate form this is a proposition that the government should buy and run the railways, electrical and other utilities, valued by official commissions at about $40,000,000,000, with 2,700,000 employees, requiring $2,000,000,000 annually for bond interest, with an operating budget of $10,000,000,000 per annum. To keep pace with natural growth these concerns must spend $2,000,000,000 of new capital yearly for extensions. This is a financial transaction and a venture into business of a magnitude never before undertaken by any man or by any government, democratic or otherwise—except in Russia. Surely before we embark on such a voyage we should look into the possibility of profit, examine the chart of the place where we are going, and consider the capacity of our vessel to carry the cargo.

It is for the American people to decide. If they are to decide rightly they should have the reasons set before them in terms of sober economic and social thought, not in vituperation and appeals to hate. I accredit the sincerity of the advocates of these propositions, and I believe they have the manhood to credit ours. There is but one consideration—public interest. If I believed for one moment that this adventure would reduce rates, that it would produce better service, that it would decrease taxes, that it would benefit the employees, that it would maintain discovery, initiative and advance in the development of these services, that it would not wreck our democracy, that it would strengthen the foundations of social and spiritual progress in America, or even that it would do a few of these things, I would unhesitatingly accept this proposal, stupendous as it is.

But I do not believe it. I am convinced not only from the experience of our own country, but from the attempts made abroad, that government operation is a step backward in every one of these propositions. It is the negation of progress. America has found the true road of advancement in these enterprises through sustained initiative and equality of opportunity to our people, with public control to prevent abuse. Our salvation consists in following this line with increasing intelligence and devotion.

OUR PRESENT SYSTEM OF UTILITY CONTROL

Much of the present agitation is based upon conditions not as they are today but as they were a generation ago. There were then great abuses that called for remedy. The Republican policy of public regulation and the historic moral upheaval to which Theodore Roosevelt contributed more than any one man cured the worst of these evils and created the machinery of government to meet the rest. Theodore Roosevelt was the enemy of government ownership and the advocate of public regulation.

There is scarcely a single utility today that is not under public control through some governmental commission, local or national. These commissions today fix the rates, the issues of stock, the time tables, the car service, the profits. Our great national water powers are reserved to the government through 50-year leases, under public control. And our commissions are not alone preventing abuse; they are maintaining initiative, enterprise and progress in our railway and other utilities, as witness their enormous growth and constantly improving efficiency and service.

Regulation has, through stabilizing rates, reduced the cost of capital by increasing the security for the savings of our people. From this security and within our generation there has come a new tide, and that is toward popular ownership as distinguished from government ownership. These enterprises are no longer owned or controlled by a few. One of our great service coporations has nearly 400,000 stockholders, another more than 200,000. The power companies have more than 700,000, their bonds are directly and indirectly, through our mutual insurance companies and savings banks, in the hands of literally tens of millions of owners.

A silent revolution is transferring ownership to the public. Moreover, the new generation of administrators of these enterprises has firmly grasped its responsibility to the public. Indeed, there are deep and promising currents originating in our economic life driving toward a mutualization of public and private interest, employer and employee interest, with promise of a new period in industrial development. There has been a genuine growth of business conscience and service, and this growth is far more precious than any amount of legislation. Of those occasional individuals who fail to manifest this sense of public responsibility I could speak with bitterness, for they are the real stimulators of socialism. Such men give the cause for the despair that government ownership is the only relief from their actions. But we do not put the whole people in jail because of occasional murders.

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[*] Radio address delivered from Washington, Sept. 29, 1924, and broadcast over nationally interconnected stations.

And from it all we have by and large evolved the best actual service to the people from utilities that there is in the world. It may not be perfect, but no one who has tried a European government railway or a telephone needs conviction of our superior service. Moreover, there is a diffusion of service and use among our people double and treble the proportions to the population of any other country. A larger proportion of our homes have electric lamps, a larger proportion have telephones. More of our people travel by rail and more miles. We ship more goods per person, and our workmen have more power at their elbow than any other workmen in the world. The wages in our utilities give the highest standard of living and comfort on the earth. If our utilities were dominated by the malignity that some contend, these things would never have come about.

To whatever extent we have failed in control, whether it be through overcontrol or through insufficient control, it is a challenge to us to perfect our system. There have been mistakes and will be others. But I may say at once that if the American people have not the intelligence, if they have not the character, if they have not the political mechanism by which private competition can be maintained and yet abuse can be prevented, then they do not possess the character or the political mechanism by which they can undertake the gigantic operation of these enterprises.

EFFECT OF THIS UNDERTAKING UPON OUR DEMOCRACY

Neither our national nor our state governments are planned or equipped for the task of government operation of utilities. Nobody ever tried it on our stupendous scale of a continent, but there are governments which, in their smaller scope, do operate in some fashion some of their utilities. Since it is always in worse fashion than ours, their example is no temptation to imitation, but it does illustrate that some governments, on some scale, in some fashion. can operate some of them. But none of them has ever attempted to operate all the utilities, nor does any one of them possess 15 per cent of our railway mileage, or 6 per cent of our power, or 15 per cent of our telephones, and so on.

I would also have you observe that these governments all have much more concentrated power and responsibility than we have ever been willing to grant to our government. The fathers purposely made our government to a different model, for a different task. They divided power and responsibility, where business must concentrate them. They thought liberty and individual rights worth safeguarding even at some cost of efficiency. But this very fact necessarily leaves to private enterprise many things which other nations can, if they prefer, do through government after a fashion. On the governmental side, the result has been one of which we are as proud as other peoples are envious. On the business side, the accomplishment far surpasses anything they know. Through the one, we have liberty; through the other, enterprise and decisiveness. Our form of government, which we have developed over 150 years, has assured us a measure of freedom and progress hitherto unparalleled in political history. The more we cherish it the less ready we should be to load it with a burden for which it was not built. To bear this load the Constitution would need to be rewritten in a score of places, until it was no longer our democracy. Above all, it would change the major thought and purpose of our government into the making of money instead of devotion to the preservation of basic human liberties—a big enough job in these times.

The very first and fundamental difficulty that our form of government presents is the relation of the states to the federal government. For in our plan we conceive that liberty requires a great measure of decentralization in authority. If these public utilities are to be operated by the federal government we at once deprive the states of their measure of authority and control over railway, power, light and communication companies—we make the service in these states dependent upon the will of Washington, thousands of miles away. It is an impossible conception that we give the states the power to regulate the business of the federal government as they now regulate these services. Or are we going to divide the railways and power and communications into 48 systems, each ending at the boundary of its own state? Whichever we do will crack the timbers of our government.

If we pile these $40,000,000,000 of business and 2,700,000 employees upon the government, one of two things happens. Either the 530 members of Congress or the hundreds of members of state legislatures become their real boards of directors, or, as it has been claimed, these great businesses could be placed in the hands of non-partisan commissions or government corporations, somehow free from politics and the dead hand of bureaucracy. Neither alternatives will work. If we were to set up such agencies, so free from restraint of the Congress and legislatures as to accomplish these objects, we would have created gigantic despotisms controlling the well-being of our whole people—and incidentally, controlling the very election of our officials.

As a matter of fact, we can do nothing of this kind if we are to maintain a democracy. We cannot have a democracy and deprive our elected representatives of their control of government investment, their power to fix salaries and wages, their independence in the investigation of the conduct of public officials. The reservation of any or all of these powers renders any kind of a commission subservient to the members of legislative bodies, no matter what the theory is. When they are subservient to elected officials, politics will be their daily need. Above all, the members of our legislative bodies represent districts, states, parties, and groups of opinion. Each member is expected by his constituents to look out for their local or group interests first. They have to be elected upon the results they obtain. Partisanship, "log rolling," and politics would be the inseparable accompaniments of administration. No great business can be efficiently administered by such a board or such a basis of choice. We shall convert business into politics, and surrender efficiency for spoils. If we distributed railway extensions as we distribute public buildings; if we located electric power plants as we locate reclamation projects; if we divided up public industries generally as we share river and harbor improvements and army and navy stations—then as surely as night follows the day facilities will be wastefully provided for those districts or groups which are politically strong, and they will not be adequately provided for the districts or groups that are politically weak.

Also these legislative bodies would have to deal with group pressures striving for favors in rates. The relative rates will affect the prosperity of every city and every section, every group and every industry. States, counties, farmers, town dwellers, every group of manufacturers will press their representatives to secure an advantage, and legislators will inevitably honestly favor their constituents. Every experience to date indicates that the taxpayer will pay for the resulting concessions. Because the government had not the courage to increase railway rates during the war the taxpayer made up a $1,600,000,000 operation deficit. A neighboring government yielded last year to the demand for lower rates on the government railways; it is paying the deficit from taxes today.

By this vast venture that is proposed to us we would at once increase the total of national and local officeholders up to about 6,000,000. The rightful interest of this group is in higher pay, constantly better conditions of service, and better standards of living. The rightful public interest will be to hold down rates and taxes. These interests will clash, and their clash must fight itself out, not on grounds of economic bargaining between labor and employer, but in the political arena. The voting strength of this mass of officeholders, their wives and dependents, will be more than 25 per cent of the whole. It is the balance of political power between parties in every district. Either every member of the legislative bodies will be elected to do the bidding of this bureaucracy or will be elected by a public in rebellion against it.

No commission or any body of administrators can carry on these vast operations efficiently in this political maelstrom. We shall lose most of our democracy in the storm.

HIGHER RATES TO THE PUBLIC

Unless the federal or local governments can give the public lower rates, there is no use undertaking the gamble.

If the government is to reduce rates it must do so either by the saving of private profits or by reducing operating expenses or lumping them on the taxpayer During the past four years the railways have on the average earned less than 4 per cent on the I. C. C. valuation. Even if this value were reduced by 25 per cent, they would have earned only 5 per cent. Our electrical utilities are regulated at earnings between 6 and 8 per cent upon their invested capital. The government could not borrow the huge sums necessary at less than 5 per cent.

In a sale to the government the constitutional requirements would, for various legal reasons, probably result in a much larger sum than the $40,000,000,000 of present valuations by commissions and others.

Moreover, the wasteful distribution of the $150,000,000 of capital invested annually in the Post Office, Reclamation Service, Shipping Board, rivers and harbors and roads would not be a patch on the waste in appropriations when our legislative bodies get a chance to handle $2,000,000,000 per annum of new capital outlay. For all these reasons I am convinced that interest charges alone to the government would be larger than the present utility profits, and no economy lies there. Rather the way of the prodigal.

Nor can the government operate as economically as private enterprise. If we take over nearly 3,000,000 new employees into public service we must put them under an airtight civil service, to be hired by a separate commission and promoted by seniority, and at once we have created a bureaucracy. Otherwise, we would have nearly 3,000,000 jobs to be given out and a political debauchery unparalleled in all history. There are certain inherent qualities of bureaucracy in its deliberative action, the necessity to maintain joint responsibility, its enlargement of "red tape" designed to prevent error in judgment and conduct, all of which are perhaps an advantage in purely governing functions, but they become disaster when applied to the rapidity of movement vital to business and service. Numbers increase for every task. The alternative is political favoritism. And at the top, where exceptional talent and genius must be had, neither seniority, nor competitive examination, nor politics will secure or find it. It is one thing to choose a postmaster but another to choose a railway president. These things are the actual and daily experiences of our public life? and if a hundred years of this experience is not proof that the efficiency of government operation must always be below the efficiency of private enterprise, then the public is incapable of conviction.

We can get some experience of this loading of employees from government operated railways in the countries during the last ten years as to the results of these forces. For instance, the number of employees of Italian railways has increased 50 per cent against an increase in traffic of 18 per cent. German employees increased 20 per cent against 5 per cent increase in traffic. Danish employees increased 48 per cent with 20 per cent increase in traffic. Swedish employees increased 10 per cent with a 25 per cent decrease in traffic. Norwegian employees increased 62 per cent with an increase in traffic of 37 per cent. Compare these figures with American railways, where the number of employees is about the same today as ten years ago against a 10 per cent increase in traffic. American railways are the only railways on earth showing increased efficiency in the last ten years. If we had increased our employees by such percentages it would cost $600,000,000 per annum or an increase of 10 per cent in rates. For the rates today are in the long view based upon costs.

With all these forces in action our cost of operation would increase. If we make rates to equal costs our rates will rise—not fall. Unless, of course, the taxpayer pays the deficit.

POORER SERVICE

Nor will the public secure better or more impartial service under government ownership. The action of all government officials must be limited by a vast amount of regulation and "red tape." Therefore, government employees never can yield that spirit of accommodation that employees of private enterprise must furnish in order to maintain the repute of their competitive enterprise and its standing in the community.

A much larger issue lies in the inequality with which facilities will be provided over this continent 3 000 miles wide. It is mighty important to have cars and kilowatts when they are needed. The economic life of somebody is stifled every time they are not available. Every fit of national economy will cause them to fall behind future need. Every district and group of the politically weak will have to do without some measure of their need. Today there is remedy for failure in service; there is no remedy against the government.

INCREASED TAXES

Another question worth examining is the direct and indirect tax burdens which will be imposed upon the public, assuming always that rates pay operating expenses and interest. The addition of $40,000 000,000 to the national debt differs much from the debts of many thousand of private enterprises now comprised in these public utilities. The failure of a single private enterprise is a loss to its owners only, but with this entire investment transferred to the government every citizen would pay every loss of capital, directly or indirectly, from taxes or rates, whether he liked it or not. When individuals enter upon a foolish project they pay for it, but if the government does the same thing both the foolish and the wise must pay for it.

Today the combined utilities contribute about $600,000,000 in taxes to the federal and local governments. It is unlikely that in government operation our federal government will pay taxes to the states or the states to counties out of utility rates. Thus the local governments would need to find other sources of revenue. If the customers of these utilities and the taxpayers were identical in their participation it would not matter, but it happens that utilities have a larger ratio of investment and taxes in the farming districts than they have in the big cities. It would damage the farmer of Massachusetts but 3 or 4 per cent to denude the state of utility taxes, but it would increase taxes 40 per cent in many agricultural counties in other states.

And above all, if the history of other governments operating utilities counts, the inefficiency in government would not be taken up in rate increases, by which the actual user pays, but by lumping it onto the taxpayer.

EMPLOYEES WORSE OFF

The next question to examine is whether the employees would benefit by being incorporated into the government service. The first and foremost result of such an operation would be a dispute over the right to strike. It is by no means certain that a government can continue as a government and admit the right of government employees in vital services to strike against it. Nor can legislative bodies delegate the right to settle wages and salaries to any commission or they will have delegated their control over expenditures, which is one basis of democracy. In any event, under government ownership employees must in final analysis bargain with legislative bodies, and bargaining will rest not upon economic need or economic strength, but on political potency. The present federal employees, denying themselves the right to strike, have just now, after eight years, succeeded in getting some of their deserved increase in pay. The public utility employees have had them already for years. Their wages are today the highest real wage in the world. Some have assumed that the political strength of this great mass of employees will enable them to dictate the election of legislative members and thus secure their desires. This means the creation of another bloc, the arraying of class against class, perhaps the most dangerous tendency in our politics today.

It substitutes internal pull and external politics for individual endeavor. It puts a damper on achievement, a premium upon wire-pulling. It penalizes whole-hearted devotion to work.

But there lies even a broader issue of the ultimate results to the freedom of labor. Upon it I can do no better than to quote from Mr. Gompers in a speech at Montreal in June, 1920:

"I believe there is no man to whom I would take second position in my loyalty to the Republic of the United States, and yet I would not give it more power over the individual citizenship of our country. . . .

"It is a question of whether it shall be government ownership or private ownership under control. . . . If I were in the minority of one in this convention, I would want to cast my vote so that the men of labor shall not willingly enslave themselves to government authority in their industrial effort for freedom. . . . Let the future tell the story who is right or who is wrong, who has stood for freedom and who has been willing to submit their fate industrially to the government."

INVENTION WILL DECLINE

The essence of progress is that we shall have new mechanical invention, new ideas in administration, new developments in service. The proposal that we are examining here would destroy all competition. By the same operation we destroy the competitive market for new invention and new ideas, for their value is determined by competitive bidding. "A" must sell his invention to the highest bidder. If "B" demonstrates unusual administrative ability he has an enlarged market for his services with competitors. The "C" railway experiments on a new improvement to attract customers. Neither Congress nor administrators can appraise the value of these things. The notion that men would give from a sense of public service will never be realized until we reach that dubious millennium when desire for individual distinction and reward hath passed away. America has made the most marvelous advance in the history of man in the technology and administration of transportation and applied electricity. Can any one believe that this invention, this courage, this application, this stimulation to genius that our nation has brought forth would ever have been developed under a board of directors of 530 members of Congress and hundreds of members of state legislatures? Government utilities in other parts of the world get their technology from use. So far as I am aware no single vital invention has ever come out of government-owned utilities. If we are to assume that there will be no more need for else than routine operation we may abandon this argument. But science is only at the threshold of its house of wonders. It may even solve methods of transportation that would cause the abandonment of railways to the taxpayer as it would have done to a nationalization of the stage coach.

EXPERIENCE ELSEWHERE

The classic domestic argument against all this is the postal service. There are, of course, conclusive reasons why that service must remain a public function. And it does carry the mails well, at a cost probably 25 per cent higher than private enterprise could do it. But remember that the postal service pays no interest upon the vast sum of capital invested in its equipment and buildings. It pays no taxes on these structures. And how is that capital investment in public buildings distributed? Notoriously on the reverse of business principles. How are the rates allocated to different classes of service? By the pressures of organized groups. Postal employees are always in difficulties with their board of directors—that is Congress—as to pay adjustments. We are here proposing to amplify the shortcomings inherent in the postal service in the direct ratio of the post office budget of $600,000,000 to an annual budget of $10,000,000,000 in the utilities, not with 300,000 employees but with 2,750,000 and a business of infinitely greater technology.

Our national shipping is a daily sample of all the arguments I have given, and more. We paid $3,000,000,000 of the taxpayer's money for a fleet—some part of it was truly for war purposes—but we have written it down 90 per cent in six years to $300,000,000; and if the accounts were based upon true costs with interest and depreciation, we should find that we are losing over $100,000,000 of the taxpayers' money a year in operating it. Yet private shipping is earning profits. Nor is this the fault of the Shipping Board; it is inherent in the system.

Our government has some necessary power interests of its own. The building by the government of great control dams, as on the Colorado, the St. Lawrence, and elsewhere, whose primary functions are water supply, or control of flood, or irrigation, or navigation, and where power is a by-product, is a far different thing from the government's going into power production and distribution as a business. Some of our municipalities are faced with these problems and sometimes they also have a desire for business adventure, but the withdrawal of more than 400 municipalities from efforts to run utilities is itself an indication that even under local concentration of authority the results are doubtful enough.

I could at great length enter upon a discussion of the costs and failures of government ownership and operation in our own and in other countries. I could display more facts and figures with regard to the Canadian, German, French, Italian, and Australian government of railways. I could discuss the inability of the Italian government to find any buyer for its railways when it tried to get from under their intolerable burden. I could name states where government ownership has been brought about by owners and creditors to get rid of bad investments. I could compare the real accounts of foreign government adventures into power with those of our private enterprise. I could enter upon the tendency to disguise real results by accounting methods. I would show by example not alone the economic effect of government ownership but the effect upon government itself—and upon politics. I could even enter upon comparison with the complete nationalization of industry in Russia. But as grievous as all these failures have been, there is still the fact that it is our government and institutions and our people that we are dealing with and not those of foreign countries—and our institutions, designed more for liberty and less for business, would fare far worse.

We have constructed our government upon the theme that its major purpose is to preserve human liberty amid the changing social and economic scene. If we divert it to the changing of money we shall have lost sadly for the future.

And paralleling and strengthening every argument against government operation is one insistent note. That is the preservation of the vital initiative and enterprise of our people. This is the mainspring of progress. Bureaucracy is the dead hand on initiative. Government can correct abuse without entry into business. If it cannot, then democracy shall have failed.

We are asked to abandon all that we have builded as a land of opportunity by injecting into it an economic patent medicine from Europe. Socialism may have a place with some of the nations of Europe because of their failures to provide freedom, opportunity, and service. It has no place with us. We are building here a form of social organization of our own. We differed with European ideals 300 years. We have today in America the widest extended and most efficient utility services in the world. We have developed an effective method of controlling abuses. We contribute more to invention and improvement than all other peoples combined. We are asked to abandon all this and embrace new social ideas, increase our cost of service, decrease our national efficiency, undermine our democracy, destroy the fundamentals upon which our nation has become great. This is not progressive, for it is not progress. It is destruction.

American Association News

Big Crowd at Metropolitan Meeting

New Section of the A.E.R.A. Formed in New York—Co-operation the Keynote of Several Short Talks—Organization Perfected and Officers Elected

UNDER the direction of C. E. Morgan, chairman committee on community sections, American Electric Railway Association, a new local organization was formed in New York City on Sept. 23. Feeling has been growing for some time, according to Mr. Morgan, that the men engaged in the electric railway industry in New York City and its environs did not know each other well enough. Experience had shown that specialists connected with one railway seldom knew personally the men doing the same kind of work on the other properties in the same city. With a view to changing this condition it had been suggested that a metropolitan section of the American Electric Railway Association be formed. The enthusiastic response of the railway men in the metropolitan district to this idea was shown by the attendance of approximately 300 at the meeting.

After a brief discussion concerning the relative merits of the names "New York Section" and "Metropolitan Section," it was decided to adopt the latter name so as to include within the scope of the organization those railways outside of New York City but lying within a 25-mile circle. The opinion of the meeting favored having six directors for the section, two to be elected each year and holding office for three years. The constitution and by-laws adopted followed closely along the lines of those suggested by the community section committee of the A.E.R.A.

Three ways in which public utilities can profitably co-operate were explained by William L. Ransom, formerly counsel for the Public Service Commission of New York and now general counsel for the Consolidated Gas Company, New York City, and other utilities. There is need for local organization to encourage team work between the companies that constitute the industry. An unfortunate stand taken in court by one company today may lead to the embarrassment of the entire industry at some future date. The individual companies should not take short-sighted views and think only of their own immediate gain, but should rather work with their fellow companies toward the goal of the eventual greatest good for the greatest number.

Commission regulation, Mr. Ransom said, is not the final ideal solution of the public utility question. However, it is far ahead of anything heretofore tried and is certainly the best method in sight at present. Public utility managements should therefore try to co-operate with the commissions rather than to fight them and put obstacles in the way of their investigations.

A third valuable form of co-operation is that between the utility and the investors so that they have a better understanding of its problems and difficulties.

Too many secrets, in the opinion of R. P. Stevens, president Republic Railway & Light Company, has been the cause of many of the difficulties of the industry. Mr. Stevens said that the time had passed for secret methods and that frankness and openness concerning the details of the business should be the keynote of present-day policy. James W. Welsh, secretary American Electric Railway Association, read a letter from Britton I. Budd, president of the association, in which Mr. Budd enthusiastically indorsed the formation of the Metropolitan Section.

"Pick the bugs off" was the theme of a lively talk by Labert St. Clair, director of publicity A.E.R.A. He told how the farmers in his home state of Indiana had once been much troubled by a plague of potato bugs. They first sought advice from their lawyers as to what could be done, but the lawyers could not solve the problem. Then they sought advice from agricultural experts, but the bugs continued. At last some one suggested that they try picking the bugs off the plants. The thing for the utilities to do, Mr. St. Clair said, was to begin to "pick the bugs" off the service and not to rely too much upon lawyers and experts to get them out of their difficulties. A suggestion made by the same speaker was that the watchword of the Metropolitan Section should be "dig" rather than "co-operate," a word with so many round letters in it that it rolled right out of the mind of the average railway man.

Brief talks were given also by F. G Daniell, engineer New York Transit Commission, who was one of the originators of the idea of forming a metropolitan section, and by C. R. Ellicott, Westinghouse Traction Brake Company.

Officers elected by the section were: President, William E. Thompson, superintendent of transportation Third Avenue Railway; first vice-president, C. S. Klumpp, general superintendent Hudson & Manhattan Railroad; second vice-president, J. F. Eagan, superintendent rapid transit lines B.-M. T.; third vice-president, C. H. Greenidge, J. G. White Company; secretary, A. L. Hodges, assistant secretary Brooklyn City Railroad and treasurer G. N. Ord, secretary Ellcon Company.

Directors elected for one year were C. H. Beck and M. R. Boylan; for two years, F. G. Daniell and C. E. Morgan; for three years J. A. McCartney and P. W. J. Smith. The members of the program committee, of which Mr. Klumpp is ex officio chairman, are R. F. Carbutt, A. J. Manson, James Waldron, J. W. Colton and A. H. Sisson. On the membership committee with Mr. Eagan as chairman are J. W. Hulme. J. J. Jordan, F. J. McMurrer, L. T. Carter, C. W. Gillespie, George Siebert and William B. Wheeler. The finance committee, of which Mr. Greenidge is chairman, will have also the following members: W. H. Gibson, H. Vanderveer and Ross S. Hayes.

Association News & Discussions

Careful Selection of Men Is First Essential of Safe Operation

Many Railway Men Participate in National Safety Congress—Hazards of the Bus Are Discussed—Precautions Taken to Prevent Accidents in Substations Are Described

SUCCESS far beyond the hopes of the officials of the National Safety Council attended the thirteenth annual meeting, held at Louisville, Ky., Sept. 29 to Oct. 3. Large exhibits of safety equipment of various kinds, including street traffic signals, etc., added to the interest of the occasion.

The sessions of the public utilities section and of the electric railway section, including a joint session on Wednesday, proved particularly interesting and beneficial. It was evident at the railway sessions that street railway and bus men are much interested in this work, and it was stated that the safety movement has materially reduced accidents in spite of a considerable increase in use of motor vehicles.

Throughout the sessions the statement was frequently reiterated that the right place to start safety work is in the employment department, by choosing only capable men. Then the company must get behind the safety movement, push it, organize its departments, recognize the work, give credit to the men, listen to suggestions, work to improve conditions, and take the attitude that accidents are serious, and not treat them as incidentals.

The amount of discussion following the various papers, and the many questions asked, indicated the interest which superintendents, managers, and safety council managers have in this subject. At every railway session there were a hundred or more present, some coming from as far west as California to attend the meeting.

James P. Barnes, president Louisville Railway, presiding as chairman of the meeting, answered a question as to whether or not a town of 25,000 was large enough for a safety council by saying that there are a lot of utility companies in towns of that size which would not be "in the red" if they had councils.

The opening session on Tuesday was largely given over to a discussion of the hazards of motor bus operation. A paper on this subject was presented by R. N. Graham, manager of railways Pennsylvania-Ohio Electric Company. An abstract of his paper appears elsewhere in this issue. This was discussed by Guy R. Radley, safety engineer the Milwaukee Electric Railway & Light Company, and by G. B. Powell, secretary of the Kentucky Carriers, Inc. All of the speakers advocated getting the right class of operators at the start, careful examination of many men in selecting a few, schooling these men before allowing them to operate buses, and constant safety training thereafter.

Reports indicated that in bus operation as well as in street car operation accidents have been showing material reduction since safety movements were started. It was pointed out that the bulk of accidents happen to children under the ages of ten years, and to persons over sixty, showing that youth and old age create two hazards that have to be watched at all times. G. B. Powell of the Louisville Railway told how a rather poor accident record for the Kentucky Carriers, Inc., prior to December 28, 1923, had been improved by energetic work. Between that date and August 25, 1924, the company operated 345,008 bus-miles over congested city streets without a single preventable accident, or one in which the driver was at fault. Such accidents as did occur came from autos running into the rear end. With a good man on the front, a strong bumper and a "stop light" on the rear accidents for which the company is responsible have been reduced to a minimum.

Mr. Noonan, supervisor of accident prevention Chicago Surface Lines, explained how in a demoralized town, where at the outset even the union was opposed to safety work, accidents to trainmen have been greatly reduced. J. H. Handlon, claim agent Market Street Railway, San Francisco, described results of safety work in reduction of accidents. Similar reports were given for Providence, St. Louis, Nashville, Youngstown, and other cities. At the joint utility and railway conference on Wednesday, L. H. Palmer, vice-president and general manager United Railways & Electric Co., Baltimore, talked on "The Place of the Electric Railway in Community Safety Extension." He told why the street railway should develop the movement, and what it means to the company that does so.

Safety in the substation was the subject of a paper by Homer Niesz, manager industrial relations Commonwealth Edison Co., Chicago. An abstract of the paper appears elsewhere in this issue. R. O. Mason, Philadelphia Electric Company, made the last address of the session, dealing with highway traffic problems.

Award Systems Favored

The report of the committee on award systems was presented by R. R. Hadsell, general superintendent of transportation New York State Railways, Rochester. Eighty-three railway companies out of 120 to which the committee had sent a questionnaire responded. Of these 44 companies had no experience with safety bonus or award systems. Thirteen companies actually had in operation such a system, 6 had adopted the practice of giving dinners to groups of their employees, and 15 expressed themselves as decidedly opposed to the bonus. Several companies previously had a bonus scheme but had discarded it.

The contention of the group opposing any bonus system is that it is just as illogical to pay a man a bonus for operating without accidents as it is to offer him a prize for being honest. Another objection advanced is the tendency to increase the number of "no report" or "blind" accident cases. Equitable distribution of the awards is given by some companies as a difficulty connected with giving a bonus.

The companies which favor the bonus contend that it has resulted in a reduction of accident costs, due to fewer accidents and less severe ones. Their experience would seem to indicate that "no report" cases are not more numerous under the bonus system. However, the committee is not prepared to go on record as asserting this to be an undeniable fact.

The methods of distributing the bonus are so varied that they can hardly be summarized. However, it appears that many companies consider a cash bonus to be the most effective. Some companies believe that in order to maintain the interest of their men the bonus must be paid at short intervals. The opinion of the committee is that the form of award is not so vital to its success as is the manner of its administration. The bonus must be so distributed that there can be no feeling of discrimination. The foundation of success of any award system depends upon the bond of good faith that has been established between the company and its employees.

On Thursday morning a paper on "Interesting School Children in Safety on the Streets" was delivered by Isaiah Gordon, Bureau of Safety, Chicago. An abstract of this paper will appear in a future issue. The discussion on this subject was led by J. W. Oliver, safety engineer Chicago, North Shore & Milwaukee Railroad.

Safety Rules in Substation Operation[*]

By Homer E. Niesz

Manager of Industrial Relations Commonwealth Edison Company, Chicago, Ill.

HAZARDS met with in substation operation are limited by the character of the work that operators are called upon to perform. The repair work performed by our operators is confined to minor repairs or adjustments on low-tension or on non-electrical apparatus. Operators are not required or permitted to clean high-tension equipment except the dusting of outside surfaces of inclosed apparatus, this work being done by a separate trained cleaning crew. Operators are also forbidden to go upon traveling cranes for any purpose or to clean or change lamps or fixtures more than 16 ft. from the floor.

The most serious hazards incident to substation operation and the ones to which exposure is most frequent are those electrical hazards met with in the operation of high-tension equipment. Our experience indicates that the following are the most common: Opening of disconnecting clips while oil switch in series therewith is closed and under load; accidental contact on live line or bus terminals with test circuits or ground connectors; closing of hand-operated oil switches.

The opening of disconnecting clips carrying load is usually the result of failure properly to identify the switch before proceeding with the operation. It may be due, also, to failure of the operator to determine that the oil switch is closed. In determining the open or closed condition of oil switches our operators are instructed to place no confidence in the indication of pilot lamps or on the position of operating clips of oil switches. In our training of operators we emphasize very strongly the importance of thorough familiarity with the mechanism of each type of oil switch they are required to operate, to the end that they may unfailingly recognize, from the position of the switch mechanism, its open or closed condition.

Accidental contact against live high-tension terminals is also frequently due to the operator's failure properly to identify the apparatus. The hazard is greatest where bare live high-tension conductors are in close proximity to that portion of the apparatus which is dead for test or grounding. Such conditions exist frequently in obsolete or poorly designed construction, and in dealing with it we insist that all live conductors be killed before proceeding with the work. The hazard to the operator of applying ground connectors to live lines and buses has been greatly reduced where the grounding is done through the oil switch and the final operation in grounding consists of closing the oil switch by remote control.

Closing of hand-operated oil switches is a very serious hazard where there exists the possibility of closing the switch into a ground or other short circuit. In our industrial substations where a number of hand-operated oil switch installations still exist the closing of such switches is forbidden until the condition of the circuit is known to be safe.

Other electrical hazards than those incident to the high-tension equipment are: Opening low-tension switches carrying heavy load or short circuits (our operators are instructed to employ a length of rope or strap to avoid too close proximity to the switches); short circuits caused by screwdrivers, pliers, etc. (these result from using such tools where opposite polarities are adjacent; our safety rules instruct that opposite polarities must be insulated before work is done with tools); adjusting or removing brushes from machines in operation; proximity of person to railway circuit breakers when opening under shorts or railway machines when flash-overs occur.

Serious hazards of non-electrical nature include: Contact with revolving armatures or fans; slipping or falling from machines or other apparatus.

Accidental contact with moving machinery is a hazard that has been greatly reduced in recent years due to the systematic installation of various forms of guards. It is important that the clothing worn around moving machinery be such that loose ends cannot be caught and drawn in. The danger of slipping and falling from apparatus is minimized by providing steps and ladders for the various types of apparatus. Rubber mats securely fastened with metal binders are secured to steps and base of machines. Stepladders of standard construction are provided which have no top platform to stand on or on which tools may be left.

Safety Equipment

Safety clothing and tools which are provided by our company for use in substations consist of the following: Electroscope, for detection of high voltages; insulated stool, and heavy rubber mat (for use where insulated stool cannot be easily used); leather gauntlets (we no longer use rubber gloves in substations on account of the danger of the rubber being burned into the flesh); protective leather coats for all high-tension operations and low-tension operations where heavy circuits may be broken; clip pullers, poles and tongs with insulated handles for opening disconnective clips and switches and removing potential transformer fuses; gas masks are provided in substations for use in entering rooms filled with smoke from burning insulation.

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[*] Abstract of a paper presented at the thirteenth annual Safety Congress, Louisville, Ky., Oct. 1, 1924.

Improvements Needed in Bus Design

S.A.E. Discusses Advantages to Be Obtained from More Specialized and Simplified Design—Bus Man Predicts End of Railway

PRESENT shortcomings in bus design and ways in which these vehicles could be made more comfortable and attractive were discussed by the Society of Automotive Engineers at two motorbus sessions of its Transportation Meeting, on Thursday, Sept. 18, at the Hotel Pennsylvania, New York City. Lively discussions took place concerning the future possibilities of the bus and the electric railway, and also concerning the proper location of emergency exits in buses.

The first speaker, V. E. Keenan, superintendent bus division United Electric Railway Company, Providence, R. I., said it was the intention of his company to abandon within the next few weeks 59 of its 350 miles of track and to substitute buses. Electric railway service on these lines recently has not been a paying proposition and by substituting buses, which he states can be operated at 24.49 cents per mile in place of cars costing 32.09 cents, the railway expects to effect an important economy.

For the first 18 months of their operation buses were run by this company at a loss. More recently, however, the revenue has increased to a point where it is slightly in excess of the cost. In spite of the fact that bus operation on this property costs less than 25 cents per mile it is felt that very little has been done by the manufacturers to develop economical bus design. The transportation industry needs larger vehicles, to operate which will give an opportunity to earn larger profits, and simpler vehicles, to maintain which will reduce the cost of operation.

The advantages to be obtained by designing buses to meet specific operating conditions were outlined by J. B. Stewart, Jr., general superintendent Youngstown Municipal Railway. Mr. Stewart said that the entire effort of the automotive industry thus far has been concentrated on the actual sale of buses by salesmen and little or no effort has been put forth to study the conditions under which these buses would operate. Buses with a 7½ to 1 rear axle ratio have been sold for intercity service where a speed of 30 m.p.h. had to be maintained for several hours. No mechanism could long survive under the vibration resulting from such an engine speed. On the other hand, bus operators sometimes make unreasonable demands of the manufacturer. It is practically impossible to build a chassis to meet every sort of operating condition. Whenever an electric railway desires to purchase new cars or equipment it asks for quotations from several manufacturers furnishing such equipment. The latter, before they will make quotations, send either engineers to the prospective purchaser or obtain tabulated data in order to secure complete information about the conditions under which the apparatus will operate. It is practically impossible for a purchaser to secure equipment unless he has furnished this information. The manufacturers take the position that unless they know the kind of service in which the equipment is to be used, and unless it is designed to operate under these conditions, it is not fair to ask them to stand back of the equipment and make good any failures. Somewhat the same reasoning might be applied to the automotive industry.

Mr. Stewart also drew attention to the inadequacy of many of the present bus braking systems. He spoke of the advertising value of good lighting arrangements in buses. Narrower tires are used by this company in winter and special reinforced chains are used in bad weather. This, however, is not considered an ideal solution of the skidding problem.

The importance of making buses attractive in appearance and comfortable to ride in was emphasized by H. G. Bersie, engineer Haskelite Manufacturing Company. Attractive appearance, low steps and floors, wide entrance doors and aisles, ample headroom and kneeroom, comfortable seats, good riding qualities, effective ventilation and adequate heating and lighting impress favorably the prospective passenger and encourage him to ride. Efforts toward making the bus floor more nearly gastight are worth while, he said. One method of doing this is to lay paper felt on the floor and cover this with cotton duck and a layer of linoleum. Another method is to pack asbestos around the heater openings to insure gastight joints. Although there exists a need for differing types of bus bodies in various sections of the country, certain basic features of design, shapes and measurements might well be standardized. Economy of construction, easy replacement of parts and cheaper bus maintenance would result from this practice.

The need for better brakes was mentioned also in a paper by F. D. Howell, vice-president Motor Transit Company, Los Angeles. The need for standardization of casings, tubes, and chassis was emphasized by Mr. Howell. One of the harassing expenses of the bus business in the past has been due to obsolesence of body types. It is important for the industry that it have manufacturers who will standardize on such features of design and stay in business long enough so that an operator who purchases buses of a particular type will not after a few years find himself an orphan with no source of supply for repair parts.

The maintenance system of the Fifth Avenue Coach Company was described by R. E. Fielder, chief engineer. He emphasized particularly the need of delay and fuel records. With this company the system of delay reports begins with the driver, who must note every involuntary stop of a minute or greater duration. At the garage note is made of every emergency call coming from a driver on the road. Monthly summaries show the particular part, engine, axle, transmission, or the like, causing delays. Fuel consumption is carefully figured out on this system, and every day the rate for the previous day is posted on a bulletin board. When the average drops below 5 miles to the gallon the notation is made in red.

Belief that a six-wheel chassis is the coming thing in bus design was expressed by A. F. Masury, chief engineer International Motors Company, New York.

A spirited argument took place when Mr. Masury expressed the opinion that the trolley car, as it is known today, will not exist in five years. This statement was challenged by L. H. Palmer, general manager United Railways & Electric Company, Baltimore. Speaking as a member of the American Electric Railway Association, Mr. Palmer said that statements on such a subject should be exact and should be clearly presented. He objected particularly to comparisons made of passengers carried in short-haul bus service and the number carried annually on longer hauls in suburban service by electric railways. The suggestion that the manufacturers had established a system of service stations simply out of the goodness of their hearts, Mr. Palmer thought misleading, because, as a matter of fact, they were forced to it by competition.

There was considerable discussion at the meeting concerning the best way to get out of a bus after it had upset. Emergency doors at the left rear end of the vehicle were objected to by several. One engineer favored an emergency door at the center of the rear, while another advocated a position on the left-hand side opposite the driver. Passengers must break the windows and get out by that means anyhow if the vehicle turns over, it was contended, as the present-day bus framing is not stiff enough to permit the use of doors in an emergency. For that reason it was held desirable to make the windows large enough so that they could be used as emergency exits, otherwise it might be necessary to break one of the window posts.

New York Electric Railway Association

AT A MEETING of the executive committee of the New York Electric Railway Association, held last week, it was decided to hold the regular winter meeting of the association on Jan. 22 at the Commodore Hotel, New York.

Overcoming Hazards of Bus Operation*

Care in Selecting Drivers Is Better than Education After Employment—Young Married Men Preferred—Boarding Accidents Do Not Occur if Chauffeur Alights When Making Stops to Discharge Passengers

By R. N. Graham
Manager of Railways Pennsylvania-Ohio Electric Company

OUR company inaugurated the operation of intercity buses in August, 1922, and the operation of a city bus line in July, 1923. Up to Aug. 1 of this year our total mileage was 1,826,729. During this period no person has lost his life, neither passenger, pedestrian, occupant of other vehicle nor employee. Nor has any person received a major injury of any kind.

The accidents reported, including broken windows and occurrences of such nature, have averaged 25 per 100,000 miles of operation. There has been no case settled in which the cost of settlement has been in excess of $1,000; only one case in excess of $500, and thirteen in excess of $100. We have six reports where persons were struck by buses, mainly in city streets, but in no case was the injury serious and $384 was the greatest amount of money paid in the most serious case.

The first step to be taken in safeguarding bus operation is in the selection of a driver. It is far easier to avoid accidents through care in the choice of a driver than to educate an ill-equipped driver after he has been selected. The ability of a man to operate a motor vehicle depends upon age, physical health, freedom from outside worries and cares, and temperament.

In selecting drivers we confine ourselves to the age limits embraced between the years 25 and 35. Our experience has indicated to us that the man younger than 25 is not inclined to take his position seriously, is more inclined to recklessness and speed, and age and experience have not mellowed his egotism to the point where he will be patient in any and all circumstances in his treatment of passengers. Beyond the age of 35, particularly if he has spent years at other vocations than driving, he is apt to have lost that close co-ordination between mind, vision and muscle necessary to meet the critical situations that are almost certain to arise at some time in his driving career on a busy thoroughfare. There may be exceptions to both limits, but it is far better to be arbitrary than to make experiments in individual cases, which experiments are all too apt to result disastrously.

Our second qualification is that the prospective employee shall be married. I will not enter into a discussion of the reasons why a married man makes a better bus operator than a single one. I will simply say that in our experience our results have been so much uniformly better with married men that we now enforce the rule that the applicant must be married.

In the third place, the applicant must be free from defects of vision and physique. We do not enter into any splitting of hairs as to whether the defects would interfere with his usefulness as a driver. In our experience, we have had a waiting list of applicants for our positions and feel that we should have a whole man physically for this job.

An applicant being between the ages of 25 and 35, married and sound in eyesight and physique, the choice is governed by his general physical appearance, manner and bearing. A surly looking man is apt to be surly in action. A nervous, irritable man betrays the fact in being interviewed for a position, and is not suitable for bus operation. A man that is careless in his apparel and person will not appeal to passengers and is apt to be careless in his operation. These things can only be developed by a personal interview.

Operation is inaugurated with safety as the most prominent factor in the mind of the prospective employee as he takes his coach for his first trip upon the street. The word "accident" by its derivation indicates an occurrence out of ordinary or routine. If accidents are to be treated as inevitable or routine matters, then they are no longer accidents but incidents to regular operation. Notice must be taken of every accident reported. It is our practice to interview the driver regardless of the trivial nature of the accident or lack of responsibility on his part. If investigation develops the fact that no care on the part of the driver would have avoided the occurrence, the atmosphere surrounding the investigation should be that it is still a deplorable occurrence, and one showing the necessity of constant care on the part of the driver.

There is no excuse in our operation for failure to stop at a grade crossing. The penalty is discharge. This penalty is enforced regardless of previous service, freedom from accidents or general reputation. As the rule is enforced, it becomes a mechanical operation on the part of the driver, so that it never occurs to the driver not to make the stop.

In our experience we have had only two passengers who have fallen getting on or off a moving coach, yet by far the larger part of our operation is with sedan type body in which there are three doors that can be used by a passenger at the sides of the coach. The design seems well calculated to permit this type of accident. The situation has again been met by fixing attention upon the chauffeur. In our operation, the chauffeur alights when making a stop to discharge passengers or to permit a passenger to board, and opens the door in either case and closes the same. This requires the chauffeur in every case to leave his seat and the coach and go to the door involved and personally perform the act of opening and closing the door. We believe that this personal attention by the chauffeur is better than any safety device that can be secured in the way of door mechanism.

It seems like considerable work to place upon the chauffeur. The answer to this criticism is that it has been done in our operation for a period of two years and not only results in freedom from this type of accident, but is treated by the passenger as an act of courtesy on the part of the chauffeur and the company, and results in appreciation of our personnel by the traveling public, and therefore results in maintaining the patronage of the public.

In our operation we have enjoyed comparative freedom from collision accidents. Our schedules are arranged with time points covering the whole route and with a little leeway in time between each time point. This results in eliminating from the driver the strain of traveling behind time. The actual speed at which the coach must travel is approximately 35 miles per hour, on territory outside of the cities. This is slightly higher than the average speed of vehicles in such territories. I believe it is safer to have a speed higher than the general average so that the schedules do not force the coach to become a part of the numerous processions of vehicles which are always found on main traveled roads on holidays, Saturdays and Sundays.

Coaches in public utility business must be operated at night and special attention must be given to adequate lighting of the vehicle, outside and inside. Headlights must be adequate in size, provided with lenses that will present a minimum interference with light rays, and at the same time not disturb opposing traffic. A first-class spotlight should be used to define the curb when dimmers are used. Furthermore, I believe that markers should be used that all traffic, both opposing and in the same direction, shall be made aware that the vehicle is a coach used in public transportation service. This is important because the average coach is wider than the average passenger car. Moreover, slow-moving vehicles proceeding in the same direction are much more inclined to turn out of the way for a public transportation vehicle than they would for a passenger car. The lighting should be so distinctive that a prospective passenger can identify the coach a long distance away.

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*Abstract of a paper presented at the thirteenth annual Safety Congress, Louisville, Ky., Sept. 30.

Fall Meeting of American Welding Society

THE fall meeting of the American Welding Society will be held at the Hotel Winton, Cleveland, Ohio, Oct. 30 and 31. The morning of the first day will be devoted to registration with an inspection trip in the afternoon. The technical sessions will be held the second day. There will also be meetings of the board of directors and of the meetings and papers committee.

Berlin Railroad Congress

(By radiogram from Berlin, Germany)

THE exhibition of railway material in Berlin, which began Sept. 21 and was to have closed Sept. 27, has been extended to Oct. 19. This convention is being held under the auspices of the Verein Deutscher Ingenieure.

Maintenance of Equipment

Traveling Carrier for Rivet Squeezer

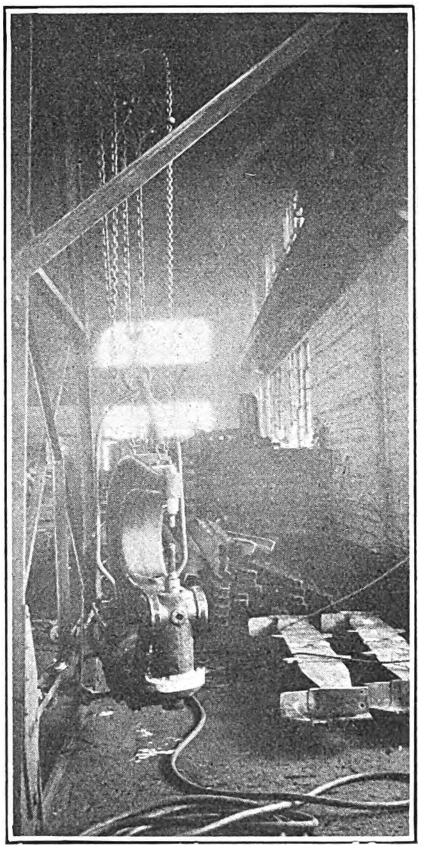
RIVET squeezers are used whenever possible for steel fabrication work by the mechanical department of the Twin City Rapid Transit Company. The utility of this equipment, however, has been found to depend largely on the provision of a suitable mounting which will enable it to be readily moved about from point to point on a fabrication job, without loss of time.

A movable structural framework, which is so arranged on a floor and wall track that it can be readily moved along for a distance of several hundred feet at one side of the structural steel shop, has proved to be a very satisfactory arrangement in the Snelling Avenue shops. Between the supporting leg of the frame and the wall, a transverse track is arranged on the carrier. This supports a chain block from which the squeezer is suspended, and thus enables the squeezer to be readily moved to any point in a large section of the shop.

Three sizes of squeezer heads are in use. The smallest of these takes rivets up to ½ in. in diameter; the second size handles rivets up to ⅞ in. in diameter, and the largest head will handle rivets up to 1¼ in. All of these heads are pneumatically operated, and a flexible air hose allows the head to be moved about to various points on the job which is in process.

Several advantages are claimed for the squeezing method of driving rivets, in comparison with the use of pneumatic hammers, particularly for car work. In the first place, it is felt that the squeezer produces more uniformly formed heads, and as rivet heads are particularly conspicuous on the side frames of cars, this is held to be of more importance in car work than in ordinary steel structures.

In addition to these advantages, the squeezer method is held to make it easier to drive the rivets without denting the plates near the rivet heads, as sometimes occurs in the hammer method when either the riveting hammer or the "bucking-up" tool is not held exactly square to the surface. The squeezer has also been found to give tight rivets that completely fill the hole in the steel members. Reduction of noise in the shop tends to reduce the nervous strain on employees, and as a result, leads to general increased efficiency.



A Structural Steel Movable Carrier for the Pneumatic Rivet Squeezer in the Snelling Avenue Shops of the Twin City Rapid Transit Company Greatly Increases the Utility of This Device for Structural Work

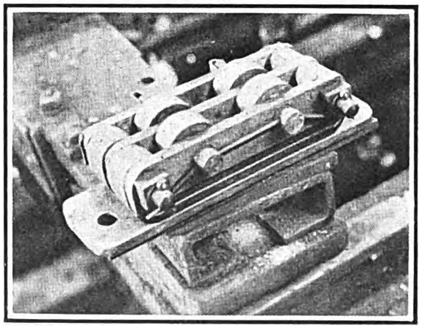
In some shops where squeezers are used, makeshift methods of mounting greatly limit their utility. Sometimes the squeezer is mounted on a permanent stand, so constructed that the work itself must be moved along as successive holes are to be riveted.

When the part under construction is a large member, as for instance the side frame of a car, this method becomes very awkward. The flexibility of the movable frame mounting used in the Snelling Avenue shops has been found greatly to increase the range of work to which the squeezer method can be efficiently applied.

Novel Roller Side Bearing

A NOVEL roller side bearing which has proved efficient both in operation and replacement is constructed in the Wheaton shop of the Chicago, Aurora & Elgin Railroad, and is used on all of this company's high-speed equipment. The bearing consists of four small rollers, mounted in pairs, so as to give the effect of a long continuous roller.

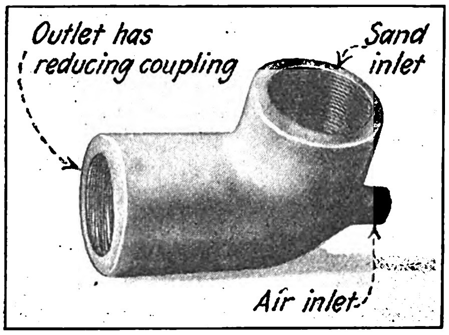
As shown in the picture, the base of the bearing consists of a piece of 4-in. x ½-in. forged steel plate of sufficient length to accommodate the fastening bolt of the bolster. To this base is riveted a plate of the same section slotted and rolled up at the ends to form eyes for holding the assembling bolts. At each side and down the center are ½-in. x 2-in. steel bars. These serve to support the roller shafts, which are of 1-in. case-hardened steel. These shafts are held in position at each end and kept from turning by means of ¼-in. steel rods. The four case-hardened rollers are mounted as shown in the illustration. These rollers are of 2½ in. diameter and 1¼ in. wide. They have sufficient clearance to rotate freely. The assembly is completed by means of ¾-in. bolts at the end. This arrangement lends itself readily to replacement of either rollers or shafts. This type of bearing has been in use for two years and has proved satisfactory in every detail.



Dual Roller Side Bearing Used on Interurban Equipment of Chicago, Aurora & Elgin Railroad

Home-made Sand Trap Proves Satisfactory

BRASS sand traps made in the Decatur shops and used on interurban cars of the Illinois Traction System have proved satisfactory. The trap is an elbow of the sand pipe line and is of brass construction. When in position the vertical leg connects with the pipe line from the sand box on the car. The horizontal end is connected by means of a reducing coupling to the flexible hose which leads to the discharge outlet over the rail. At the corner of the elbow is a quarter-inch hole, drilled in the same direction and on the same center line as the horizontal opening of the elbow. A partition in the elbow just above this small hole obstructs the passageway, reducing the opening to about 50 per cent of the inlet and outlet openings. These two main openings are threaded on the inside, the upper one to receive the pipe from the sand box and the lower one to receive the reducing coupling. The reducing coupling is inserted in the pipe line in order that it may take the wear, due to the sand blast, and may be easily replaced at a small cost. If the sand trap was connected directly to the outlet pipe, the pipe would be worn away and the replacement would be more difficult and costly.



Sand Trap Used on the Cars of the Illinois Traction System Was Designed and Built in Its Shops at Decatur, Ill.

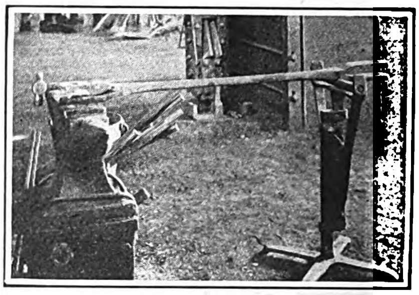
Forge Shop Rest

By J. L. Rogers

Forge Shop Foreman, Kanas City Railways

THE accompanying illustration shows a type of adjustable stand which has proved particularly useful in the forge shop of the Kansas City Railways for supporting the ends of long pieces during forging or heating operations. With the adjustable feature it is possible to support the piece at the exact angle desired.

Simple but rugged construction is desirable in this kind of shop equipment, and this consideration dictated the design of the stand, which is constructed entirely from forged parts securely welded or riveted together. The adjustment latch is very simple and rugged. To raise the stand it is necessary only to pull up on the top rest, until the latch engages the proper notch in the rack on the vertical center leg. To lower the rest, it is lifted up slightly so as to relieve the latch, which is then held away from the rack with one hand while the rest is lowered to the desired position with the other. No thumb screws or bolts are used.



A Useful Adjustable Rest in the Forge Shop of the Kansas City Railways for Supporting the Ends of Long Pieces of Work

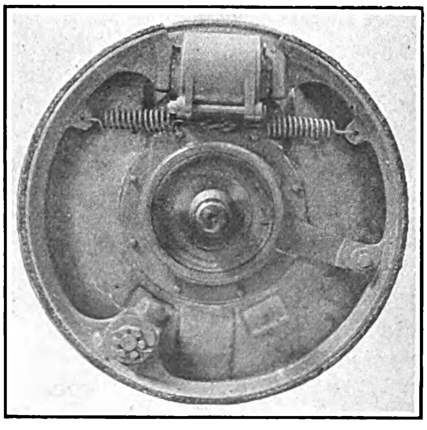
A roller between the two vertical members on the sides of the rest makes it easy to move work back and forth on the rest and anvil.

New Equipment Available

Engine and Differential Off Center

New Design of the Yellow Coach Manufacturing Company Gives Clearance for a Low Floor by Making Differential Housing Come Under Seat Rather than Under Aisle

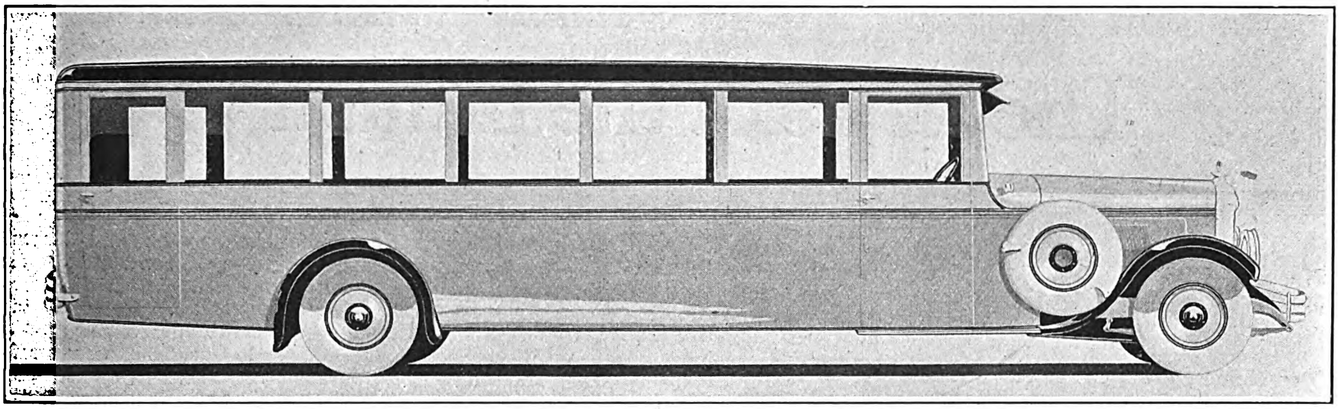
INTERESTING departures from conventional practice are incorporated in the new Y-type chassis which was recently placed on the market by the Yellow Coach Manufacturing Company. The decided tendency toward specialized design to meet the specific requirements of bus operation is shown by a number of novel features in this new chassis. The entire power unit, with transmission, drive shaft and differential, is set to the left of the center line of the chassis. The new model "Y" sleeve valve engine is a six-cylinder unit developing more than 100 hp. maximum output. A specially designed, complete airbrake system, which is optional equipment, is designed as an integral part of the chassis. In addition to these features the elements of convenience, safety and appearance of the completed vehicles are reflected in low frame height, careful attention to road clearances, turning radius and spring suspension.



An Optional Air-Brake System Is Designed as an Integral Part of the Chassis. Air Lines Lead Direct to Cylinders Mounted Inside the Four Wheels. These Are Entirely Inclosed for Protection Against Mud

Although several advantages are claimed for the offset construction employed in this chassis, the primary reason for the arrangement is to allow the use of a low floor height without ramping the floor over the rear axle. The axle pot and bevel wheel are set over to the left 13½ in. from the center line. This allows the bevel-gear housing to come up under a seat when the load springs are deflected. By the arrangement employed, good road clearance is also obtained under the center of the axle, when driving on a sharply crowned road.

At the front end, the engine is set over 7½ in. to the left of the center line of the chassis. This is claimed to give a number of important advantages. In the first place, the hand-brake and gear-shift levers are brought over close to the driver, thus giving maximum seating space alongside the driver in sedan-type bodies and increasing the available space near the doorway on both the parlor car and city service types.

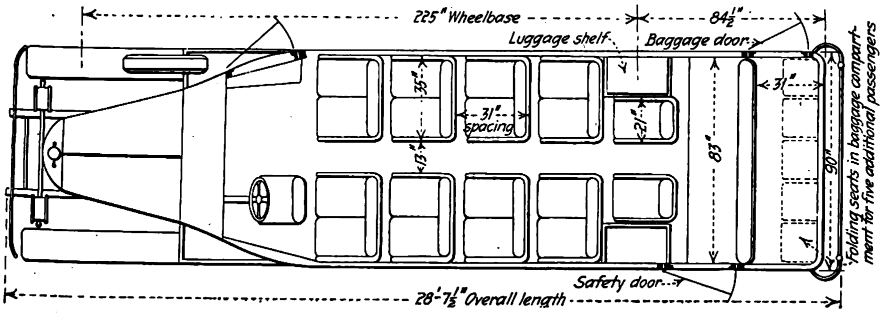


"Automobile" Appearance Is the Objective in the Design of Bodies for the New Yellow Coach Model Y Chassis. These Are Furnished in Parlor Car, Sedan and Pay-Enter Types

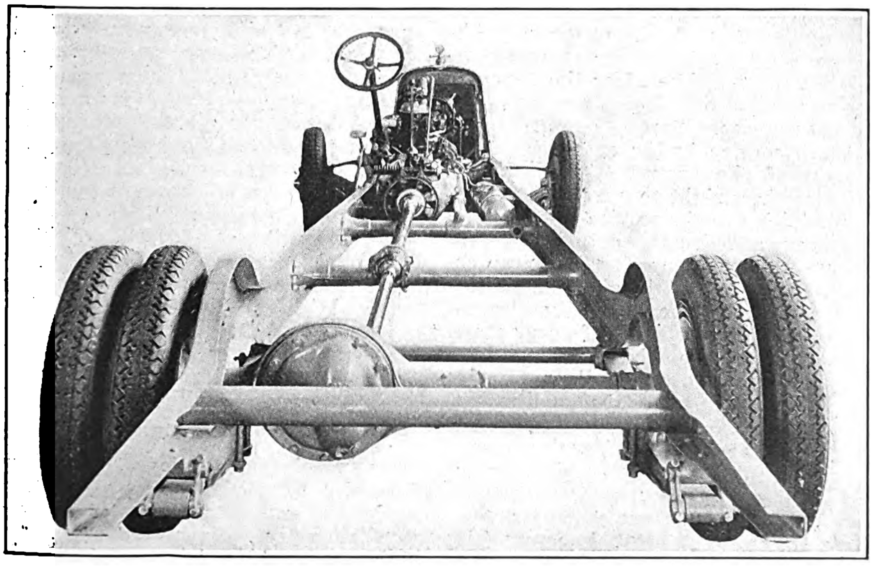
Since considerable space is available at the right-hand side of the engine, this is utilized to mount the storage battery above the chassis frame inside the hood. The ignition distributor is mounted on the right-hand side of the engine and the electrical fuses are located on the outside of the dash on the same side of the engine. As a result of this arrangement, the storage battery is connected to the generators and motors by short leads, and at the same time the entire electrical system is readily accessible for inspection and is all concentrated at one point on the chassis.

Since the propeller shaft is also off center, this leaves room for introducing a longitudinal beam under the body floor at the center line above the cross-members, so as to reduce the vibration of the floor. It is pointed out that on wide chassis frames such as this, an additional sill of this kind is very desirable.

Such auxiliaries as the gas tank, air tank, spare wheel, storage battery are all mounted on the right-hand side of the chassis, to balance the offset power plant transmission and differential. As the result of exhaustive road tests, it is claimed that this mounting toward the left-hand side of the chassis actually tends to improve tire performance and steering, because the effect of operating on crowned roads gives an improved distribution of load on the tires in comparison with a centrally mounted power plant and driveshaft.



In the Parlor Car Body a Baggage Compartment Is Provided at the Rear and Baggage Shelves Are Built Over the Wheel Housings



By Offsetting the Power Plant, Driveshaft and Differential, the Frame Height Is Decreased and Additional Space Is Obtained at the Entrance Door. Top of Chassis Is 20 In. Above Ground

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Coping Attachment for Shear or Punch

THE Buffalo Forge Company, Buffalo, N. Y., has placed on the market a combination flange and web coping attachment for use with any Buffalo punch, shear or combination machine with a high throat. Machines with low throat will not take this new coping attachment. The new design will cope or notch channels, I beams, Z bars, tees, plates and angles.

A distinguishing feature of the new attachment is the self-aligning arrangement of the knives. The upper knife holder has a machined extension which slides in a corresponding guide in the lower one. In addition two vertical guide pins rigidly fastened to the lower knife holder extend upward to machined openings in the upper knife holder. These pins hold the knives in alignment by preventing any shifting or turning of either knife in relation to the other. For gaging the depth of cut to be taken, or for gaging the depth of notching in flanges, adjusting screws are provided. Machined pockets into which the knives fit insure correct relative positions of the shearing edges without adjustment.

The News of the Industry

Eight Cents in Des Moines

Fare for Car Riders to Go to Nine Cents—The Stabilizing Fund Is Wiped Out

Des Moines, Iowa, car riders will begin paying a 9-cent fare on Nov. 1. This was indicated by F. C. Chambers, president of the Des Moines City Railway, in a letter notifying the City Council that a straight 8-cent fare will be put into effect on Oct. 1, and that, "in all probability, in order to secure the required revenue, it will be necessary to establish a 9-cent cash fare with a ticket fare of 8½ cents after the rate just referred to has been in effect for a period of thirty days. A trial for thirty days is prescribed by the franchise ordinance."

The new fare does away with the purchase of ten tickets for 75 cents. Few riders availed themselves of the ticket provision. Children will continue to ride at the old rate. Under the 9-cent fare patrons will be able to purchase ten tickets for 85 cents.

Results in July and August this year showed a decrease in revenue over similar months in 1923 of $30,004, while, under the latest arbitration award, labor, pensions and employee insurance expenses increased $14,956.

The 7-cent fare was put into effect on Dec. 27, 1923, when the stabilizing fund went above $150,000. The railway broke even the first month of operation at the reduced fare, but from that time on each succeeding month showed a larger deficit, until the fare was again raised to 8 cents in June, 1924. However, with the back pay provision of the Noonan arbitration award and the new pension and employees' group insurance, put into effect at that time, the 8-cent fare failed to stop the inroads on the stabilizing fund, with the result that the fund was reduced to about $5,600 in July and was completely exhausted in August.

Month	Revenue Passengers	Deficit
February.....	2,781,846	$10,997
March........	2,953,924	6,037
April.........	2,647,908	32,265
May..........	2,577,124	29,852
June..........	2,306,270	41,693
July...........	2,237,684	25,025
August.......	2,403,430	12,435

The accompanying report of the city railway shows how, since January of this year, the monthly deficits have rapidly eaten away the stabilizing fund upon which carfare rates are determined.

Increased Rates in Oregon Cities

Seven-cent fares went into effect on the lines of the Salem Street Railway recently, representing an increase of 1 cent. A similar increase has been placed in effect on the lines of the Eugene Street Railway. Both lines are owned by the Southern Pacific Railway. The application of the company to the Department of Public Works for permission to increase rates stated that in both cities the lines had been operated at a loss for several years. The City Council at Salem only a short time ago had passed an ordinance permitting the Southern Pacific Company to remove its car tracks and to establish bus lines on Seventeenth Street between D and Center, on Seventeenth between D and Market and on Sumner Street between Market and Chemekta.

For some time Salem and Eugene have been centers of controversy over the question of increased railway fares and bus replacements. Early in the present year the Public Service Commission suspended proposed new tariffs for operation in these two cities and since that time the Southern Pacific Company operating the lines in both cities has been insisting upon its inability to continue serving its patrons unless relief were promised. The developments in both cities have been followed from time to time in the ELECTRIC RAILWAY JOURNAL.

New Franchise Terms

Detroit United Railway Granted Service-at-Cost Franchise on the Wyandotte Division—$300,000 for Improvements —Bus Service to Start Soon

BY THE largest special election vote ever cast in any of the affected communities, the cities of River Rouge and Wyandotte and the villages of Ecorse, Riverview, Sibley and Trenton have entered into a new agreement with the Detroit United Railway. The action taken marks the final settlement of the ten-year controversy over the franchise rights of the railway through these communities on its Wyandotte and Trenton interurban division. Active negotiations, which finally resulted in the adoption of the new agreement, have been under way since the last interruption in service on this division about a year ago, and were handled for the railway by W. G. Fitzpatrick and A. D. B. Van Zandt.

The agreement provides a ten-year service-at-cost franchise, with a day-to-day extension from the date of expiration. This extension arrangement gives the several communities the right to purchase or lease their portion of the line at any time after the ten-year period, but also includes provisions to safeguard continuous operation of through service in the event that only certain of the communities decide to exercise their right to purchase.

In addition to the service-at-cost plan, the new agreement contains a very unique arrangement for insuring coordinated action by the six communities in carrying out the authority granted them for the regulation of service and fares. It sets up what is virtually a board of directors with full power over fares and service under the conditions of the agreement. A majority of the legislative representatives of each community constitutes a quorum which can act for and bind the community to its action, and representatives of not less than three of the six interested communities are made to constitute a quorum to transact business to which all of the six communities are severally and collectively bound. In this transaction of business affecting railway matters by the representatives of the communities, the several communities vote in units in accordance with a predetermined voting power based on population.

To carry out the provisions of the service-at-cost arrangement, the valuation of the railway property was fixed at $800,000 and a stabilizing fund of $50,000 set up. The rate of fare must be sufficient to pay all costs of operation as defined in the agreement, and to give a return of 6½ per cent on the total invested capital. When the fund drops to $35,000 it is mandatory upon the communities to vote a fare increase. When the fund reached $65,000 the fares are to be reduced.

The company has agreed to make extensions, additions and betterments to the amount of approximately $300,000. These improvements are to be started immediately, and certain portions of the work will be completed during the current year, while the remainder is contingent on the carrying out of certain highway changes through some of the communities. Most of the work to be done consists of relaying and paving certain sections of the route so as to complete a double track line.

The valuation of $800,000 which was fixed and became a part of the new agreement represents the value found by the Michigan Public Utilities Commission as of Dec. 31, 1922, corrected for new passenger cars, depreciation, additions and betterments to June 1, 1924.

BUS SERVICE TO BE STARTED

During the negotiations for the new franchise agreement, the railway also made an oral agreement to start a paralleling but de luxe bus service at a higher rate of fare between the several communities on the Wyandotte Division and the city of Detroit. Plans for this service have been pushed forward with the expectation of starting the bus operations on Oct. 1. During the early period of this new operation both the frequency of service and the rate of fare will be largely experimental, until the actual requirements can be determined by experience.

SINGLE-DECK COACHES TO BE USED

For the time being single-deck Model Z Yellow Coaches will be operated on an hourly schedule in through service between the business districts of Detroit and Trenton, a distance of 10.44 miles outside the city limits of Detroit. In addition to this a local service between Detroit and Wyandotte will be given with a 20-minute headway.

Fares on the buses will be based on a unit rate between any two of the adjoining communities, rather than on a flat mileage rate as is the practice for railway fares. The minimum fare on the buses will be 10 cents, and this will apply for a local ride between any two adjoining communities, except between River Rouge and Detroit. In other words a ride for 10 cents will be furnished within the limits of any single community, or between two adjoining communities except between Detroit and River Rouge, where the fare will be 15 cents. In through service between Detroit and the various cities and villages on the division the fare will be 15 cents to River Rouge, and will then increase in steps of 5 cents as the limits of each next adjoining city or village are reached. This will make the total bus fare from Detroit to Trenton 40 cents in comparison with the present railway fare of 27 cents, which is computed on a flat 2-cent per mile basis. Bus service will also be given between Detroit and Grosse Isle for a 50-cent fare.

TEN VEHICLES AT START

The new service will be started with ten vehicles, eight of which will be required to fill the initial schedules, with two held in reserve as extras. The railway has agreed to credit to the railway fund any surplus from bus operation above costs and a reasonable return on the investment.

Another Delay for Bus Hearing in New York

The Board of Estimate of the city of New York, sitting in committee of the whole on Sept. 29, again deferred setting a date for a public hearing on the several bus franchise applications.

In the opinion of a majority of the board it would be desirable to hold the hearing after a report is received from the Board of Transportation, which is now inquiring into the matter. It is expected Commissioner Delaney and his associates will be ready to report within a week or two and soon thereafter the Board of Estimate will name a date for a public hearing. Mayor Hylan made it clear that while the Transportation Board's report doubtless would afford a basis for intelligent discussion he would not consider himself bound to any particular course of action by its recommendations, but would reserve judgment.

Scranton Men Receive One Cent an Hour

An increase of 1 cent an hour has been granted to the employees of the Scranton Railway, Scranton, Pa., as a result of the award handed down recently by Bishop M. J. Hoban. This award terminates a controversy that has been waging since April when the old contract expired. Prior to the expiration of that contract the employees demanded a new contract calling for an increase of 17 cents an hour. This the company was unwilling to grant but was willing to submit to arbitration both the wage question and the rush hour tripper service, which was also up for discussion. The men demanded that only the wage be arbitrated and the question of tripper service be dropped.

As a result of this there was a strike which lasted 4½ days. This was followed by an agreement between the employees and the management whereby the men accepted the rush-hour run with modifications, and consented to the matter of wages going to arbitration. The arbitration proceedings commenced on May 19. Attorney John McCourt was selected for the company and L. F. Hart for the carmen, with Bishop Hoban to act as third arbiter. The points at issue leading up to the strike and the subsequent settlement were reviewed in the issues of this paper for April 5 and April 12.

Railway Would Establish Six Bus Routes in Yonkers

Eight applications for consent to operate buses within the limits of Yonkers, N. Y., have been received by the Common Council of that city. One of these petitioners is the Third Avenue Railroad. That company proposes to establish six bus routes in Yonkers, in place of some of its existing trolley lines, and to issue transfers to or from the buses to trolleys.

What action the Common Council will take on the various applications has not been determined. The Aldermen have decided to meet in committee of the whole in order to permit each petitioner to state his case, but no date has been set for this meeting.

Applications for consent have been submitted as follows: Westchester Motor Transfer Company to establish a line from White Plains to Yonkers; Third Avenue Railroad, six bus routes within the city and a seventh to White Plains; Westchester County Bus System, to operate numerous lines in Yonkers at a flat fare of 10 cents; Hudson Valley Tourists, Albany, N. Y., to run buses through Yonkers on its New York to Albany route; Robert Tostanoski and Harry A. Berrenrath, Yonkers, for one bus route in Yonkers, and Sound Bus Company, to operate two lines in Yonkers.

Recently the Sound Bus Company started a route from the center of Yonkers south to the New York City boundary, notwithstanding that no formal consent had been received from the city of Yonkers to establish the line and that the buses were run within 1,000 ft. of a trolley line. Two buses were allotted to this route, and the fare charged was 5 cents, the same as that of the railway for a similar distance. On Sept. 22 the Third Avenue Railroad secured a temporary injunction against further operation. This injunction was made returnable on Sept. 25.

On Sept. 23 the Third Avenue Railroad, which controls the Yonkers Street Railroad, applied for permission to discontinue five of its lines in Yonkers.

Tax Relief in Omaha Sought

The Omaha & Council Bluffs Street Railway served an ultimatum on the City Council of Omaha, Neb., on Sept. 17 declaring that unless the present city occupational tax and the city's paving requirements were lifted it would immediately apply for a higher fare. In a letter to the City Council R. A. Leussler, second vice-president and general manager, said that the revenues of the company had become so seriously impaired that an early readjustment was imperative. The net income from operation in Nebraska had fallen off more than $1,000,000 below the amount which the Nebraska Railway Commission had found the company was entitled to earn for the years 1920 to 1922 inclusive. He said the company fell short considerably more than $300,000 in 1923 of the amount it should have earned and that at the present time the receipts showed a decrease of approximately $1,000 a day compared with corresponding days of last year.

According to Mr. Leussler the company knew of no material savings in operating expenses which could be effected. He said there were only two alternatives, namely, the release of the occupational tax and paving requirements. He suggested a joint conference with members of the City Council, the commission and representatives of the company to consider the situation and decide what course to take. The occupational tax is 3 per cent on the gross revenue of the company and amounts to about $100,000. The paving requirements are about $100,000 additional.

Detroit United Extending Use of Buses

In line with its general policy of utilizing the bus in co-ordination with its rail lines wherever such service is thought to be advisable, the Detroit United Railway has purchased the principal bus lines in the city of Flint and is operating the best of the old buses together with new vehicles which have been put into service. The bus routes are operated in conjunction with the electric cars to give a complete transportation service. New buses will be added at this point as fast as they are required.

Another major step in the application of buses is being considered in connection with the Detroit terminal situation. Due to the fact that the Detroit United Railway has no permanent rights for its cars to enter the city of Detroit, and the further fact that trackage charges now made by the city for the operation of these cars over the tracks of the municipal railway are heavy, plans are being considered for cutting off the railway's routes at the limits of the city and transporting through passengers by bus between terminals to be constructed at these points and the present railway terminal near the center of the city. These plans are being pushed forward rapidly, and the new arrangement, if finally decided upon, will probably be started soon.

Jacksonville Can Have Buses Whenever It Wants Them

The Jacksonville Traction Company, Jacksonville, Fla., is ready to install buses in Jacksonville whenever the City Council will permit. The buses would be used in connection with the present railway system.

The company some time ago petitioned the City Council to allow buses to be placed on the Oakland line and that they be run beyond the terminus of this line to Talleyrand Avenue to serve the large industrial plants there. The Council, however, refused to allow the company to take this step.

Tendency to Go Slow with Bus Permits at Worcester

Several of the towns which are threatened with loss of their traction lines to Worcester, Mass., are debating the question of granting licenses to bus proprietors. Recently the Worcester Consolidated Street Railway discontinued service to Spencer and a number of other places, and it is coming to be realized that the railways are in earnest about the competition of buses leaving them without sufficient revenue to continue.

The Selectmen of Northboro have decided to put the question up to the voters. Buses running between Westboro and Marlboro will not be permitted to stop and take on or leave passengers until Northboro voters settle the question.

Interest in the bus question in Southbridge is increasing daily and the decision of the Selectmen of that town in regard to granting the Spring and Providence bus lines permission to take Southbridge passengers for Putnam, Conn., and Providence is awaited with interest. The town counsel believes the buses can stop in Southbridge to take passengers if they want to.

Millbury Selectmen have received an informal request for a bus license for a line to operate between the town and Worcester, a distance of about 5 miles. They have discouraged the applicant on the ground that the railway should be protected for the taxes it pays if nothing else.

Mr. Kurtz Silent on Reported Purchase

According to the report of which longer mention is made elsewhere in this issue the Columbus Railway, Power & Light Company, Columbus, Ohio, will be included in the merger that also contemplates the plan to take over the Continental Gas & Electric Company and other properties. The basis of the sale of the common stock at Columbus is reported at $115 a share. Charles L. Kurtz, president of the local company at Columbus since 1919, has refused to comment on the latest developments. He says that the directors will meet again on Oct. 6 and that he believed they were the proper ones to make any statement.

Eight Cents in Philadelphia—Governor Chides Commission

Governor Pinchot of Pennsylvania in a letter delivered to W. D. B. Ainey, chairman of the Public Service Commission, on Sept. 24 charged that body with "unseemly haste" in granting a temporary increase in fares to the Philadelphia Rapid Transit Company. That company is now charging an 8-cent cash fare with two tokens for 15 cents and not a 10-cent cash fare, as was inadvertently published in the issue of the JOURNAL for Sept. 27. He declared that the "rise in the stock of the P. R. T. before the commission had rendered its decision" in allowing a temporary increase had resulted in "a complete and most unfortunate loss of confidence in the existing regulation of public utilities in the Commonwealth."

In his letter Mr. Pinchot recommended that Milo R. Maltbie be retained to investigate the 8-cent fare and to look into the matter of rentals to the underlying companies and the $200,000,000 valuation placed by the commission on the company's property, upon which the 7-cent fare was based. He said that the duty of a commission was not limited merely to hearing the company's testimony but was to act as the militant defender of the public's right. He said that it was essential that the commission should itself undertake actively to protect the public rights, should plan and conduct its own thorough investigation and should hold itself fully responsible that nothing which would strengthen the case of the public might be overlooked. An answer to that communication has been sent to Governor Pinchot in the form of a resignation by Samuel M. Clement, Jr., denying the Governor's accusation and characterizing the letter as abounding in "false information."

Special Service for Atlanta's High School Students

The Georgia Railway & Power Company, Atlanta, Ga., has just started a train service to and from the new boys' high school in Atlanta.

When the city school board several years ago voted to replace the old school buildings with a new and modern structure, it was compelled to select the site for the new building at the south end of Piedmont Park, to which there was not adequate railway service. Only one line—and that a single track line—ran anywhere near the new school building and the power company was faced with the problem of how to get boys to and from that school.

When the new building was opened this fall, the company established a concentration point and a special train service for high school boys that is now working well. The concentration point is located where most of the car lines in the city intersect, and where there are sidings capable of holding the high school trains. The trains are composed of several cars each, and three of them are being operated by the company during the school rush hours. These special trains give the high school boys a better service than can be obtained by any other commuters, as they are non-stop trains running straight through to their destinations at specified school hours.

Flat Seven-Cent Fare Refused at Holyoke

A petition of the committee on public service of the Board of Aldermen of the city of Holyoke, Mass., relative to fares and fare zones of the Holyoke Street Railway has been dismissed by the Massachusetts Department of Public Utilities. The department did not feel warranted in granting the petition, particularly in view of the fact that it appeared that if the plan were put into effect the fares of 8 per cent of the car riders would be increased.

At the hearing the petitioners requested that the Holyoke Street Railway be permitted to abolish the existing 6-cent fare zones, return to a flat fare system similar to that in effect prior to 1917, but charge 7 cents instead of 5 cents. It was pointed out that under the present system a passenger paid several 6-cent fares to ride between various points within the same city, but that probably some 80 per cent of all passengers now reach their destination by the payment of a 6-cent fare.

The commission concluded, principally from this fact, that the proposed change would result in an increase of fares for a very large majority of the car riders, which, in the absence of proof that such increase was needed in order to render service and secure a fair return, would quite naturally be resented by them. On this account it saw no reason to impose this extra burden.

The present 6-cent fare plan was put into effect in 1918, after many hearings, exhaustive study of the riding on various lines and the trial of different fares and fare zones. None of those produced the revenue which the company needed and substantially the present system has been in effect since 1918. The commission said:

> Under this plan the company has been able to render service and to earn its operating expenses, fixed charges and a 5 per cent return upon its capital stock, but a somewhat less percentage of return on the money actually paid in by the stockholders. It appeared in evidence that the company has no serious objection to the request of the petitioners provided the public will be satisfied and the company is assured of an income sufficient to meet operating expenses, fixed charges and depreciation and to pay a reasonable return upon the investment. The company, however, took the attitude that its previous experience did not warrant such expectation.

Wages Settled on Interurban

An agreement is reported to have been reached between the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, and its trainmen whereby interurban motormen and conductors will receive 47 cents an hour for the first three months in service, 49½ cents for the succeeding nine months and 53 cents thereafter. Platform men on the Findlay city lines will receive 41, 45 and 50 cents an hour. They operate one-man cars. The new wages and working conditions will be effective until Aug. 15, 1925.

Railway Wants Bus Line Restrained

The International Railway, Buffalo, N. Y. has secured a Supreme Court injunction restraining the Iroquois Indian Trails Motor Coach Lines, Inc., of Buffalo from operating its buses between Buffalo and Lockport. It is claimed the bus line is being operated in competition with the Buffalo-Lockport interurban division of the International Railway. The company has a permit from the Lockport City Council to operate buses through the streets of the city en route between Buffalo and Olcott. Two drivers of the Iroquois Indian Trails buses were arrested by detectives employed by the International Railway charged with carrying passengers between Lockport and the Niagara county fair grounds at a 15-cent fare in violation of the state transportation laws. The railway contends that under the state law the lowest fare which could be charged for the trip is 16 cents. The railway has no local trolley lines running to the fair grounds and independent bus lines were carrying passengers during the fall fair at 15 cents each way.

Special Excursion Fare on Key System Refused

The California Railroad Commission denied on Sept. 12 the application of the Key System Transit Company for authority to publish an excursion round trip rate of 36 cents from San Francisco to Oakland, including admission to Idora Park. The commission held that it had no jurisdiction over amusement companies and that the granting of this special excursion fare, including admission to the part, would be discriminatory to other East Bay communities where the single fare to Oakland on the Key system is now 18 cents.

In its decision the commission points out that the importance of Idora Park as an attraction on the rails of the Key System Transit Company is established, and that it yields applicant revenue it otherwise would not receive, but this does not justify the sale of transportation from San Francisco, including admission to the park, and contributing from the transportation collection to a selected group of patrons accommodations furnished by a corporation not under jurisdiction of this commission.

Railway Purchases Bus Right.—The Southern Michigan Railway, South Bend, Ind., is now operating a bus line from Buchanan and Niles, Mich., to South Bend, the Gray Bus Lines having disposed of this inter-city and interstate route to the railway. The Gray Bus Lines retains its city route at Niles.

More One-Man Cars in Connecticut.—Because of continued losses in the operation of cars between North Grosvenordale and Central Village, the Connecticut Company is going to place one-man cars in use on the local line. The same cars that have been in use on the line from North Grosvenordale to Central Village, for sometime past, will continue to be used. They have been remodeled and made ready for conversion into one-man cars so the usual seating capacity will be provided. The hourly service will not be changed under the new plan.

First New Bus Operation in Kansas City.—The Kansas City Motor Coach Company planned to establish two bus lines there on Oct. 1, the first system of its kind in Greater Kansas City. One line will link the north and south sections of the city and another will connect the west city limits with the Union Station in Kansas City, Mo. The Kansas City Railways protested to the City Commissioners with the result that an ordinance was introduced and passed whereby the buses were prohibited from using streets parallel to railway tracks. Later the ordinance was amended to the extent that the buses are allowed to operate over the intercity viaduc's parallel to the tracks, but it must seek a new route on the Kansas side.

Will Vote on Nov. 4.—The City Council of Akron, Ohio, recently authorized a vote by the people on Nov. 4 on a four-year franchise proposal of the Northern Ohio Traction & Light Company. The provisions of the franchise have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Six-Cent Fare Extended.—By a vote of six to two the streets committee of the city Council of Richmond, Va., recommended the 6-cent fare privilege granted the Virginia Railway & Power Company be continued for a period of six months, beginning Oct. 12. P. Justin Moore represented the company. In a brief statement he said that if the reasons were plain for the extension upon other occasions they were more apparent now, when opposition of buses and jitneys was more pronounced. He said that he hoped, before the proposed period of extension elapsed, the city and the company would come to some agreement on the proposed blanket franchise.

Decision on Increases in Fare Deferred.—The Maine Public Utilities Commission, following a hearing on Sept. 5, withheld decision on the application of the Bangor Railway & Electric Company, Bangor, Me., to increase its fare from 7 cents to 10 cents. Figures were presented to show the dropping off in income owing to the large increase in the use of automobiles and trucks.

Franchise in Sioux City Defeated.—The twenty-five year franchise for the Sioux City Service Company, Sioux City, Iowa, was defeated at the recent special election. It is estimated that the election will cost the city between $7,000 and $8,000. W. J. Bertke, vice-president and general manager, in referring to the new franchise sought, said that there was a real demand for railway extensions and the railway as a public utility should be encouraged to place itself upon a financial basis to meet the demand. Prior to the election there was a disagreement over certain provisions of the franchise, Mayor Gilman stating that there were four or five matters which had not been covered by the franchise which should be included. One was the question of the 2 per cent tax on the gross earnings when the city had reached a population of 75,000. There was also a question, the Mayor said, as to how soon the city could take over the property of the company in case of failure to carry out the provisions of the franchise.

Practice vs. Profession in New York City

COMMISSIONER WILLIAM WIRT MILLS, head of the Department of Plant and Structures, New York City, announced on Oct. 1 that he had raised the fare on the Williamsburg Bridge shuttle cars, which are now operated by the city.

Under the new order the ticket system, which had provided three rides across the bridge for a nickel, is eliminated and a straight 2-cent fare for each trip is established. Commissioner Mills gave as his reason for the change the inability of the city to prevent some of its employees from pilfering the odd cent left over when three customers paid cash fares for their rides. Many of the employees, he said, almost invariably dropped into the box the three-for-a-nickel tickets and then pocketed the odd cent.

In this manner, Commissioner Mills said, the city has been losing $75,000 a year in income which it should have had. The change, however, he added, was prompted not so much by that consideration as by a desire to remove temptation from the collectors, a large number of whom doubtless were scrupulously honest.

The new order was posted at midnight on Sept. 30.

This announcement provoked comment in part as follows from Transit Commissioner Harkness:

> The city administration took over the shuttle service and thereby forced the companies off the bridge. This meant that thousands of passengers every day had to change at the Brooklyn Bridge Plaza instead of having a through ride. Instead of having a single 5-cent fare, they had to pay additionally to the city at the rate of three rides for a nickel. Now, not satisfied with the disturbance of service and the additional fare, it is putting on an additional burden by discontinuing the three tickets for a nickel and charging a flat 2-cent fare.

This is equivalent to a 20 per cent increase. Therefore the sum total of the city's mistaken activities is to break up a through service, compel thousands of passengers to transfer from one set of cars to another, and make them pay 7 cents instead of 5.

Ten-Cent Rate in Lincoln.—The Lincoln Traction Company, Lincoln, Neb., has been operating in Lincoln for some time now on a 10-cent cash fare with four tickets for 30 cents and an additional 2-cent zone fare on four long lines. School children's tickets sell at the rate of ten for 50 cents. Some time ago this company applied to the commission to increase its cash fare from 8 cents to 10 cents.

Increased Rates Filed.—Commutation rates on the Rochester & Eastern and Rochester & Sodus Bay Railways will be increased. The boost ranges from 2 cents a mile to more than 100 per cent increase over the present rate. The raise will affect commuters to and from Pittsford, Canandaigua and Geneva on the Rochester & Eastern and from Webster, Geneva, Union Hill and Sodus Point on the Rochester & Sodus Bay lines. The new schedules have been filed with the Public Service Commission and are expected to go into effect within a few days.

McKeesport Puts on the Pass.—Four weekly passes became effective on Sept. 15 on the lines of the Pittsburgh Railways in the McKeesport district. Three of these are good on a single zone of as many different lines entering McKeesport. They are sold at $1.25, as against a token fare of 8⅓ cents or a cash fare of 10 cents. The fourth pass, sold for $1.70, is good for one zone on the Wilmerding route plus the Evans Avenue route in McKeesport, the latter route having a cash fare of 5 cents and ticket fares of eight for 25 cents or thirty-three for $1. On May 19, 1924, the Pittsburgh Railways installed the weekly pass on its Washington city lines at $1, against a cash fare of 6 cents. It later received the approval of the Traction Conference Board to install passes in the McKeesport district.

Wage Scale Continued.—An agreement has been reached between the Springfield Railways, Springfield, Ohio, and its trainmen whereby the present wage scale will continue for another year. This scale is 45, 47 and 49 cents an hour.

Applies for Ten-Cent Fare. — An emergency application including a 10-cent cash fare was recently filed with the Oklahoma Corporation Commissioner by J. W. Shartel, president of the Oklahoma Railway, Oklahoma City. The company asks that it be permitted to sell three car checks for 25 cents instead of four as at present and agrees to sell weekly passes for $1.25. The present rate of fare is 7 cents. The company has been in financial difficulties for some time now. At the present time there is a foreclosure suit in the Federal Court against the company filed by the Missouri Valley Trust Company of St. Louis, attempting to force the company into the hands of a receiver. This receivership suit has been referred to previously in the ELECTRIC RAILWAY JOURNAL. Early this year an appointed committee requested the Chamber of Commerce to ask the City Commissioners to authorize a higher fare as a temporary relief measure and to revise traffic ordinances. Nothing has been done to help the railway to "carry on."

Foreign News

New Construction Work in Paris

The Paris Transports en Commun has begun extensive improvements, providing for the expenditure of 210,052,161 francs for new undertakings and 145,496,750 francs for general repairs. The new work includes extension and double tracking of certain suburban lines and the construction of a culvert contact system to replace the overhead wiring on the quays along the Seine in the vicinity of the Hotel de Ville. A new substation costing 1,250,000 francs is being built at Vitry-Choisy and another at Saint Denis-Gonesse with its cable installation will cost 1,000,000 francs.

Expenditure for new rolling stock will be approximately 71,110.000 francs, covering 42 reservoir cars, 50 new light-weight motor cars, 130 trailers, 475 motors and 2 self-propelled cars using gasoline fuel. The latter are for a suburban feeder line where the expense of an electric installation is not now justified and where it is not desired to establish a motor bus line.

The auto-bus section is to spend 16,256,500 francs in the construction of six-wheeled vehicles and others of a light type to be known as express buses. These will have single entrance and exit forward, but will be operated by two men.

Building construction provides for new and enlarged workshops, garages, car-sheds, etc., at an expenditure of 36,031,100 francs.

Paris Suppresses the Belleville Funicular

The funicular railway, which has hitherto served the population of the Belleville Heights in the north of Paris has been replaced by a motor bus of the Transporte en Commun. The grade of the Rue de Belleville is something like 7 per cent for the most part. Fares remain the same—15 centimes before 7 o'clock in the morning and 20 centimes after that hour. The route is covered in 7 minutes as compared with 3 minutes for the funicular. The bus, however, as a feeder for the tramway at the Place de la Republique accommodates a far greater number of people by reason of its accessibility to dwellers on side streets and along the route.

Six Prague Railways to Electrify

Electrification of six railway lines within the city of Prague is the intention of the Ministry of Railroads of the Czechoslovak Republic. The order for this work will include construction work and delivery of overhead, substation and electric locomotives. The direct-current system of 1,500 volts with overhead trolley wire will be used.

One substation will be erected at Wilson station for the entire system. For operation there will be required 6 passenger locomotives, 6 locomotives for freight and switching service and 5 heavy freight locomotives.

The electrification bureau of the Ministry of Railroads, Prague, Masaryk Station, will furnish blanks and information concerning the filing of bids. The bids will be closed at noon October 21, 1924.

Railway to Carry Mail in London.—To facilitate the transport of mail in London between postal centers and main line railway termini, the Post Office Tube Railway is going to operate a tube line electric railway about 6 miles long. Owing to small tunnels the trains will carry neither driver nor conductor but will be controlled from various stations and can be started and stopped as required. A contract for cars and electric equipment has been awarded the English Electric Company.

Progress of Southern Railway Electrification.—Electrification work on the the southeastern section of the Southern Railway, which is a combination of the suburban lines radiating out from London, is proceeding rapidly. Conductor rails have been laid, track rails have been bonded and new fishplates fixed on about 140 miles of track. Cables have been laid over 26 miles and the erection of substation buildings is well advanced.

Glasgow Tramways Seeks New Rating.—Glasgow Tramways Committee proposes application to Parliament for a reduction of the assessed valuation on the tramway lines within the city. They are now assessed at full valuation and the committee is seeking a reduction to one-fourth of the assessed valuation. This would mean a saving to the tramway company of about £20,000, which would have to be made up by the general Glasgow taxpayers.

Subway Being Considered for Brussels.—Surveys are now being made for a subway to link the three principal railway stations of the Belgian capital. According to Burgomaster Max it is proposed to erect the central station in the Putterie quarter on the site originally intended for a union railway station, and from this point three lines would be constructed to the stations Gare du Nord, Gare du Luxemburg and Gare du Midi, the principal railroad stations in the city.

New Subway for Paris.—Right of way for a new underground subway has been granted the Metropolitan Subway Company by the city of Paris, provisional on it being declared a public utility by the departmental government. This line will run from the Hôtel de Ville to the Place de la République and is an extension of a line now under construction from the Hotel de Ville to the Porte des Lilas. The platforms of the old lines, which are too narrow and too short to handle increasing traffic comfortably, are to be done away with as far as possible in these new lines.

Financial and Corporate

Milwaukee Contract Terms

Service at Cost in All Departments of Railway and Light Company with Purchase Option to City

Eventual ownership of the property of the Milwaukee Electric Railway & Light Company in the city of Milwaukee by the city is the aim of a new contract between the company and the city the terms of which were made public on Sept. 30. The measure, as noted in previous issues, has been in preparation over a long period of time by a committee of which Fred S. Hunt has been chairman. The next move is the submission of the contract to the Council. If the way can be paved there, the measure will probably be submitted to the voters in April and, if approved by them, may become effective on July 1, 1925.

The document in which the terms of the ordinance are described is a pamphlet of sixty-five pages. The terms are, of course, subject to change, just how much is a matter of speculation. Principally on this account the need does not appear to exist to do more at this time than merely to sketch some of the principal provisions of the grant. The principal end sought to be accomplished by the new grant is to provide service at cost in all departments of the company with an option to the city to purchase the undertaking, management of the property meanwhile to remain in private hands, with the earning power to remain unimpaired. The measure is described as an attempt to define better the rights of the citizens of Milwaukee and the company with respect to all of these utilities. "Its object," says a summary, "is to assure good service at the lowest possible cost. It endeavors to do this by placing a definite value, equal to actual investment, regardless of the amount of stock outstanding on the property of the company."

Among other provisions of the new grant are the following:

Contract to run in successive periods of ten years with an option by the city to purchase by giving six months' written notice.

Fare to remain the same—7 cents cash or eight tickets for 50 cents—until "stabilizing reserve" fund shall be effected.

Company for first year given a return of 7.7 per cent a year on its railway investment and 8 per cent upon the electric light and heating utility excess to go to the city. Return thereafter to be changed according to the index interest rate providing for 7.7 per cent to the company on a 5.7 per cent index and varying with the changes in the index.

City to pile up an interest in the company through the so-called "city equity account," built up by loans to the company; through excess earnings which accrue to the city and through taking "municipal mortgage bonds" on the company property.

City to have control over service and over extensions of service during the period of the contract, with certain restrictions.

Option to purchase to include the company's heating, lighting and railway property in the entire metropolitan district, including Milwaukee, Cudahy, North Milwaukee, South Milwaukee, Wauwatosa, West Allis and villages of Shorewood, West Milwaukee and Whitefish Bay and intervening territory.

On the important matter of value the ordinance may be said to provide for the allowance of a figure of about $51,500,000. To be a little more specific, the report says that while a definite value of the company's property must necessarily be related to a certain date, since the value is constantly changing, the value of the fixed property of the company in the contract area, or metropolitan district, was $39,435,334, as of Jan. 1, 1921, as audited. To this figure, of course, must be added additions and improvements in the contract area since that date. These amount to $12,027,640 to Jan. 1, 1924, according to the books of the company. The audit on these additions has not been completed. The property referred to constitutes all the holdings of the company in the contract area with the exception of materials and supplies, cash and accounts receivable.

Merger Includes Columbus (Ohio) Properties

Announcement has just been made of the largest recent consolidations of electric light and power companies. The merger takes in the United Light & Power Company, with its headquarters in Grand Rapids, Mich.; the Columbus (Ohio) Railway, Power & Light Company, and the Continental Gas & Electric Corporation with its subsidiaries, chief among which are the Kansas City Power & Light Company and the Lincoln Gas & Electric Light Company, Lincoln, Neb.

These newly consolidated companies own public utilities in eight Central West States and serve a total population of about 1,750,000 and have a combined normal generating capacity of 340,000 kw. Their total gross revenues are put at about $34,000,000 annually.

The officers of the consolidated company will be C. S. Eaton of Cleveland, chairman of the board; Frank T. Hulswit of Chicago, president; Richard Schaddelee of Grand Rapids, Rufus E. Lee of Omaha, J. Denman of Davenport, William Chamberlain of Cedar Rapids and L. H. Heinke of Grand Rapids, vice-presidents. Joseph F. Porter, president and general manager of the Kansas City Power & Light Company, will be a director with Landon K. Thorne, of Bonbright & Company, investment bankers of New York; Burton A. Howe and Warren H. Snow of Grand Rapids, William Butterworth of Moline, Glenn M. Averill of Cedar Rapids, Charles H. McNider of Mason City and Thomas Jones of Cleveland. Present operating personnel will remain in charge of the individual companies. Headquarters will be in Cleveland.

The announcement revealed that the United Light & Power Company has recently acquired more than 75 per cent of the outstanding common capital stock of the Continental company. The United in the near future will offer to acquire, in exchange for its own securities, all of the remaining outstanding common stock of the Continental.

Canadian Undertaking Changes Hands

The stock holdings of the Barnsdall Corporation, New York, in the Moncton Tramways, Electricity & Gas Company, Ltd., Moncton, N. B., Canada, have been disposed of for approximately $500,000. This stock was carried on the company's balance sheet at $105,780. These properties are located 80 miles from St. John, New Brunswick, and do not link up with other properties of the company or with future development plans. The Barnsdall company further explains that the proceeds of the sale of this stock will be used to reduce the company's outstanding bonds from $7,099,000 to $6,600,000. Only 2.5 miles of electric railway are involved.

The sale was made to a financial syndicate which is expected in turn to place the securities privately. Officials of the Barnsdall Corporation explained that announcement might be expected to be made more fully from the bankers, but that they could not do more at this time than to confirm the report of the success of the purchase negotiations.

Youngstown Deficit Increases

The deficit of the Youngstown Municipal Railway, Youngstown, Ohio, has continued to increase. During July the cost of service exceeded income by $38,998, bringing the deficit of the stabilizing fund to $1,169,399, compared with $1,039,794 on Dec. 31, 1923. Figures for July follow from the report by Harry Engle, Street Railway Commissioner.

Gross revenue was $142,061. The amount allowed for operation was $109,520, but the actual outgo for operation was $105,675, leaving a balance of $3,845 in the operating fund at the end of the month. On the other hand, maintenance expense was $39,561. This figure produced a deficit of $3,830 in the maintenance fund for the month. The number of passengers carried was 2,297,139 and the car-miles and bus-miles operated 456,576. The earnings per vehicle-mile from a cash fare of 8 cents, seven tickets for 50 cents and 1-cent transfers were $0.311 and the actual cost per vehicle-mile $0.396.

Common Dividends Commenced by Holding Company. — The Interstate Railways, Camden, N. J., has declared an initial dividend of 1 per cent on the common, payable on Nov. 1 to stock of record Oct. 15. All but 4,000 shares of preferred stock were recently retired, clearing the way for dividends on the common. The income of the Interstate Railways is derived mostly from dividends on the stock of the United Power & Transportation Company, which it owns. The properties of the United Power & Transportation are nearly all leased out to others and its income is derived principally from rentals.

Providence Road Does Better.—The United Electric Railways, Providence, R. I., in August showed a deficit of $24,209 after payment of taxes, interest and miscellaneous charges, against a loss of $28,800 in July, $42,794 in June, $37,891 in May, and $45,451 in April.

Additional Chicago Issue Offered.—The National City Company and Halsey, Stuart & Company, Inc., New York, offered on Oct. 1 an issue of $2,500,000 Chicago Rapid Transit Company first and refunding mortgage 6½ per cent gold bonds, 1944. This is an additional issue by the company that operates Chicago's elevated lines.

Stock Sold to Employees.—More than $500,000 of cumulative preferred stock of the New Orleans Public Service, Inc., New Orleans, La., has been subscribed by employees of the company in the course of the campaign which began a few weeks ago. The stock is not a new issue, but is part of the regular issue made on the reorganization of the company, of which there is more than $4,200,000 outstanding. Up to Sept. 21 3,200 of the 3,400 permanent employees had invested in the stock.

Minority Interest in Kansas City Light Sold.—Announcement has been made that the Continental Gas & Electric Corporation has purchased from the Illinois Power & Light Company the minority stock of the Kansas City Power Securities Corporation, which owns all the common stock of the Kansas City Power & Light Company. This gives Continental the ownership of 98.7 per cent of the outstanding Kansas City Power Securities Corporation stock. It has also purchased from the treasurer of the company its remaining authorized common stock, amounting to 25,000 shares, including an additional 15,000 shares authorized at a stockholders' meeting on Sept. 15.

Will Cease Operation.—Judge Carroll in the Supreme Court of Massachusetts has given permission to the Milford, Attleboro & Woonsocket Street Railway, Milford, Mass., to cease operation permanently on Oct. 3. The road has been losing money at the rate of $1,000 a month, according to the report of Clark V. Wood, who was made receiver in the summer of the current year. The railway operates 29 miles of line.

Eastern Massachusetts Paying Off Bonds.—It was arranged to pay off an issue of $689,000 of 5 per cent bonds of the Brockton Street Railway, part of the Eastern Massachusetts system, at maturity on Oct. 1. The company had the privilege if it so desired of extending the bonds to Oct. 1, 1929. Another subsidiary issue of $371,000 of Lynn & Boston 5s matures and will be paid off Dec. 1 next.

Seeks Foreclosure Sale.—The Harris Trust & Savings Bank, Chicago, and the St. Louis Union Trust Company filed petitions on Sept. 17 requesting the foreclosure sale of the property of the Joplin & Pittsburgh Railway, Kansas City, Mo. The railway is now in the hands of receivers. Murdock H. McLean, Chicago, has been appointed receiver, to succeed Karl D. Klemm. The concerns just referred to are the trustees under a mortgage drawn in the sum of $1,750,000. The interest due March 1, 1924, amounting to $43,750, has not been paid. The sale of the property will not be consummated for about three months, Mr. McLean said. The road operates from Joplin, Mo., and Pittsburgh, Mulberry, Cherokee and Gerard, Kan.

Legal Notes

ALABAMA.—*Responsibility for Parked Automobiles at Pleasure Resort.*

A railway company owned a pleasure park and permitted automobiles to park in a certain space for 15 cents each. In the check given for this sum a notice was printed that the company assumed no responsibility for lost, stolen or damaged property while parked in that space. The owner of a parked car which was stolen brought suit on the ground that a bailee cannot contract against his own negligence. The court held, however, that in the circumstances no duty of the company to guarantee the stealing of cars so parked was implied. (Thompson vs. Mobile Light & Railroad Co., 101 Southern Rep., 175-177 (two cases).)

CALIFORNIA.—*Duty at Railroad Crossing.*

Where a steam railroad and a street railway have an agreement as to the precedence of cars at a grade crossing, the question is not what this agreement calls for, but what custom or practice has been followed. The case was one of injury to a passenger on a street car struck by a railway train at such crossing. (Clarkson vs. United Railroad of San Francisco, 227 Pacific Rep., 710.)

CALIFORNIA.—*Backing of Car Without Adequate Warning Held Negligible.*

Where a car was being operated backwards without any audible signal to indicate the fact and without any lookout or warning by flagging, and collided with an automobile, the company was held negligent, despite the fact that the automobile driver drove closer to the street car track than was required under traffic conditions. (Adamson vs. City and County of San Francisco, 225 Pacific Rep., 875.)

CONNECTICUT.—*Cost of Maintenance of Planking on Bridge.*

A railway in 1906 agreed with a city to maintain its track on a highway bridge under the duties and obligations imposed by a certain section of the general statute, which called for the maintenance of the flooring of the bridge between the track and for 2 ft. each side. Subsequently this statute was repealed and a substitute statute required railway companies to maintain only 8 in. of the bridge on each side of its track. The court held that the contract first mentioned with the city was correspondingly modified, and the company's obligations under it were reduced to the 8 in. specified. (United States Trust Co. vs. Shore Line Electric Railway, 125 Atlantic Rep., 265.)

LOUISIANA.—*Control of Parking Privileges.*

The railway company maintained a park and parking area for automobiles with no charge for use of parking area, but excluded a former jitney driver, former secretary of the jitney association from the use of this area. The court decided that it was within its rights to exclude as it thought proper to do so, but awarded damages of $500 because the manner in which this exclusion was made tended to humiliate the former jitney driver, who was a woman. [Malczewski vs. New Orleans Railway & Light Co., 101 Southern Rep., 213.]

MICHIGAN.—*Injury to Stalled Automobile on Track.*

An automobile became stalled while crossing the electric railway track on Woodward Avenue some distance out from the city, but where the street was paved 18 ft. across, and when an electric car was about 300 ft. away. The motorman whistled, but did not slacken speed until the car was within 30 or 40 ft. of the stalled automobile. He was then unable to stop it. It was held that the question of negligence should be decided by a jury. (Golob vs. Detroit United Railway, 199 Northwest Rep., 639.)

MISSOURI.—*Interurban Electric Railway Not Bound to Operate Unprofitable Local Track.*

An interurban electric railway, which was operating under a permissive grant, was not bound to continue the operation of a short local line, when such operation for twenty years had resulted in loss and when there is no reasonable ground to expect improvement and the entire system was losing money to the extent that it was not able to pay a fair return on the capital employed. In consequence, the Public Service Commission was justified in authorizing the company to abandon the local line. (State ex rel. City of Carthage vs. Public Service Commission, 260 Southwestern Rep., 973.)

NEW JERSEY.—*Damages for Death by Negligence Limited to Pecuniary Injury to Widow, Surviving Husband or Next of Kin.*

Under the New Jersey law, where a person is injured through the wrongful act of another and such injury causes death, any suit brought therefor must be for the exclusive benefit of the widow or surviving husband or next of kin, and the damages recoverable are limited to the pecuniary injury resulting from such death to such widow or surviving husband or next of kin. (Soden vs. Trenton & Mercer County Traction Co., 124 Atlantic Rep., 710.)

NEW YORK.—*Railway Entitled to Construct Sidings Necessary Under Changed Conditions.*

A franchise to operate a railway in the streets of a city is a franchise to operate it with such sidings and connections as are reasonably necessary to the enjoyment of the grant. Hence, where changed conditions have made necessary the construction of a siding for the benefit of the public, the company can enjoin the city from removing a siding which has been built. (Union Railway vs. City of New York, 144 Northeast Rep., 585.)

Personal Items

W. E. Thompson Heads Metropolitan Section

Superintendent of Transportation of the Third Avenue Railway Made President of American Electric Railway Association Section

William E. Thompson, superintendent of transportation of the Third Avenue Railway, New York, N. Y., was elected president of the Metropolitan section of the American Electric Railway Association at the organization meeting on Sept. 24. At this meeting about 300 were present. Mr. Thompson was installed amid their acclaim. It was a great tribute of esteem, particularly as Mr. Thompson was selected to assume the mantle of responsibility at the organization of the section. In other words, Mr. Thompson's election was an expression in tangible form of the evidence which Shakespeare has so happily expressed as "golden opinions from all sorts of people."

W. E. Thompson

There is no need to expatiate at length on the career of Mr. Thompson. His courage has long been screwed up to the sticking point. When he had been clothed with the mantle of authority at the meeting in New York Mr. Thompson quickly showed how versatile he is, although no intimation had reached him that he would be called upon to preside.

As for his railway career, the superintendent of transportation of the Third Avenue Railway and president of the Metropolitan Section started with the Virginia Power & Light Company in 1903. Mr. Thompson had then just graduated from high school and he entered electric railway service as a platform employee. He was at the time a captain of one of the Virginia militia companies.

It was not long before he attracted the attention of the management at Richmond by his effective handling of his job and a series of promotions followed, which finally resulted in the offer to him to become superintendent of transportation for the Coney Island & Brooklyn Railroad, made by Slaughter W. Huff, then president of that company, under whom Mr. Thompson had served at Richmond. A few years after this the Coney Island & Brooklyn Railroad was taken over by the Brooklyn Rapid Transit Company and Mr. Thompson was made superintendent of the Brooklyn & North River Railroad, owned jointly by the Brooklyn Rapid Transit, the New York Railways and the Third Avenue Railway and operated over one of the bridges to carry local passengers.

Mr. Thompson remained with that company until 1919. He then became connected with the Third Avenue Railway in his present capacity, in which office he returned to service under Mr. Huff, who meantime had become president of that company.

Mr. Thompson knows the problems of the men who are under him and has met with unusual success in inducing the employees to work harmoniously with him and among themselves. He has a happy faculty of expressing himself tersely and his communications to the employees have attracted the attention of the newspapers and been reproduced by them on several occasions as feature stories, purely on the basis of their human interest appeal.

George D. Wilcox Automotive Engineer in Detroit

George D. Wilcox has joined the staff of the Department of Street Railways of Detroit and has been designated as automotive engineer. In that capacity he will have charge of the bus equipment which will soon be put in service by the department.

Mr. Wilcox, who has been identified with the automotive industry since 1903, was recently with the White organization. For nine years previous to that he was general manager of the Commerce Motor Car Company, manufacturer of trucks and buses. During the war he held the rank of major of ordnance in the motors and vehicle division and was in charge of the central district, which included eight states. He was responsible for all engineering inspection, traffic and storage in connection with ordnance contracts in his district for automotive equipment.

Samuel M. Clement, Commissioner, Resigns

Samuel M. Clement, Jr., has tendered his resignation as a member of the Pennsylvania Public Service Commission. Mr. Clement celebrated his fiftieth birthday on March 24, 1923, and on that day he intimated his intention of retiring from public life. At that time he still had seven years to serve as a member of the commission. His first job was in the Wanamaker store. After five years in this field he began the study of law at the University of Pennsylvania and was graduated in 1897. A year later he was appointed assistant district attorney, remaining in that office for three years. His political career began before that time and as a leader he was in the limelight for many years. It was on Feb. 11, 1919, that Governor Sproul named Mr. Clement a member of the Public Service Commission, succeeding in that capacity William A. Magee, formerly Mayor of Pittsburgh. Later Mr. Clement was reappointed for a full term of ten years.

Virgil R. Powell—General Manager at Dayton

Virgil R. Powell has replaced W. E. Boileau as general manager of the Peoples Railway in Dayton, Ohio. This property is a subsidiary of the American Electric Power Company, Philadelphia, Pa. The new general manager at the age of 18 was a country school teacher and followed that calling until his entrance into the electric railway field in Dayton. At the time this work was intended to be only temporary so as to provide Mr. Powell with funds to complete his classical education.

V. R. Powell

But, as often happens, fate and circumstances shaped his destiny along different lines from his preconceived notions. At once he saw the possibilities which the industry offered at that time and accordingly he remained in the service. He completed an electrical engineering course in his spare time during his early years of association as a conductor of the Peoples Railway. Since that time he has worked through the various positions of timekeeper and office manager in the track and overhead line construction department, storekeeper, inspector, assistant superintendent of transportation, superintendent and claim adjuster in the operating department.

In April, 1904, he was transferred to the Chicago & Joliet Electric Railway, another subsidiary of the American Electric Power Company. Here he served as assistant superintendent of transportation. In May, 1906, he was returned to Dayton, Ohio, to assume the position of superintendent and claim adjuster of the Peoples Railway, filling the vacancy caused by the death of

Superintendent Michael Kelly. He served in this position until his recent advancement.

He was born in Clark County, Ohio, in 1879. His early education was obtained under great stress and difficulty owing to the fact that farm returns during his early days were very meager for those who did not possess many acres of land.

Julian C. Smith Made President at Montreal

At a meeting of the directors of the Montreal Tramways & Power Company, A. E. Beauvais resigned as president and was succeeded by Julian C. Smith, vice-president and general manager of the Shawinigan Water & Power Company. Directors Fortier, Timmins and Ledieu were succeeded by J. L. Perron, Gordon McDougall and Howard Murray.

S. Roseveare has resigned as electrical engineer of the Toronto Suburban District of the Canadian National Railways.

Lawrence Palk, formerly assistant to Vice-President A. W. McLimont of the Winnipeg Electric Railway, Winnipeg, Man., has been appointed secretary of the company.

S. A. Wingard has been appointed vice-president of the Boise Street Car Company, Boise, Idaho. He will continue also in the capacity of general manager. Mr. Wingard has been in the employ of the Boise company for the last four years. He entered the service of the company as superintendent.

T. W. Brackinreid has been made manager of the Public Utilities Commission of Port Arthur, Ont., which operates the Civic Railway. In this capacity he succeeds M. M. Inglis, appointed to an office under H. H. Couzens, vice-president of the Brazilian Traction, Light & Power Company, at Rio de Janeiro. Mr. Brackinreid formerly was engineering and business representative of the Canadian General Electric Company.

Sir Thomas Tait, who recently became vice-president of the Detroit United Railway, is fast arranging his other interests so as to give the most of his time to the Detroit United Railway from now on. It is understood that he was induced to accept appointment to the company only on the understanding that he would have complete control over operations and expenditures, and the interests which induced him to take over the work anticipate that extensive economies will be effected under his régime. The new vice-president has arranged for one-man cars to be installed on the company's lines, both on the slower interurban lines and on the city systems in Ann Arbor, Pontiac, Mount Clemens and other centers now served by the company outside of its strictly interurban service. Sir Thomas is an experienced railroad man. He was at one time chairman of the Victorian Australian State Railways. This is his first venture into electric traction operation. Sir Thomas was born in Melbourne, Quebec.

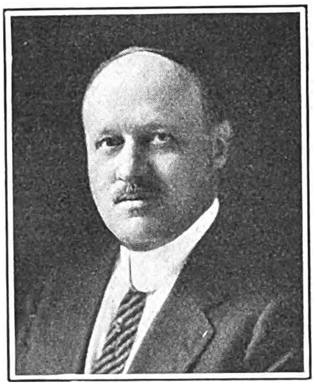
H. M. Gould Advanced

Electrical Engineer Made Assistant General Manager of the Detroit Municipal Railway

H. M. Gould has been made assistant general manager Department of Street Railways, city of Detroit. The appointment of Mr. Gould to this position is a fine recognition of the fact that Mr. Gould's grasp of electric railway problems goes far beyond his technical training as an electrical engineer. To handle the host of operating problems that came with the purchase and rehabilitation of the street railways in Detroit there were needed men who could see beyond their specialist noses, so to speak.

Not Strictly a Technician

Mr. Gould soon showed his wider vision in connection with the Detroit United track rental arbitration. More recently, by helping to put the choice of trackless trolley or motor-bus up to a plebiscite of the public affected, he has shown that he sets the users' preference before any personal bias as a technician.



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H. M. Gould

As an electrical engineer Mr. Gould is well known for his leadership, particularly in track welding and the use of drop-forged instead of malleable-iron line fittings. In such pioneering, he is an indefatigable student and experimenter before venturing positive opinions—a characteristic that is partly inborn and partly the result of thorough study at Sheffield Scientific School, from which he was graduated in the year 1907.

In Heavy Electric Traction for a Time

The first two years out of the classroom were spent by Mr. Gould in the then extra-busy electrical department of the Long Island Railroad. Next he saw the electrical side of city operation with the Metropolitan Street Railway, New York. During most of 1912, he was in the office of the city engineer, Bridgeport, Conn., where he came into contact with the Connecticut Company and its work. The Connecticut Company, which operates more than 500 miles of track, soon took him into its overhead line department, of which he was superintendent at the time of his change in August, 1920, to become electrical engineer of the Department of Street Railways, then engaged in the work of building the first of the municipal lines in that city.

Earl E. Starbard has been elected vice-president of the Interborough Rapid Transit Company, New York, and made assistant to President Frank Hedley. Mr. Starbard has long been connected with the company. He joined the organization under the presidency of the late Theodore P. Shonts and more recently has been assistant to W. L. Pepperman, vice-president and treasurer.

Herbert Mueller has been appointed cost keeper in the engineering department of the United Railways, St. Louis, Mo., to succeed Walter F. Barrett, deceased. Mr. Mueller has been with the company for nine years consecutively, beginning his service as an outside man and just completing seven years in the office.

F. K. Woodring, formerly vice-president and general manager of the Northwestern Ohio Railway & Power Company, Oak Harbor, recently acquired by the Doherty interests, has assumed new duties in Columbia, S. C., where he is associated with the General Gas & Electric Company.

A. R. Myers is the president of the new corporation known as the Erie Railways, which on Oct. 1 took over operation of all local Erie lines formerly a part of the Buffalo & Lake Erie Traction Company. Mr. Myers became associated with the old Erie property in 1906 as an electrical engineer. In 1914 he became manager of the Buffalo & Lake Erie Traction Company and has continued in that capacity ever since.

Obituary

Robert L. Corbin, former assistant superintendent of the Michigan Electric Railway, Kalamazoo, Mich., died recently, after a short illness. Mr. Corbin was born in Owen County, Kentucky, in November, 1882.

D. H. Siggins, president of the Union Traction Company, Coffeyville, Kan., and former president of the Warren Street Railway and the Warren & Jamestown Street Railway, Warren, Pa., died recently at his home in Coffeyville, Kan., after a long illness.

Alonzo C. Clarkson died recently, with a record of 16 years service on the cars of the San Diego Electric Railway, San Diego, Cal. He went to San Diego County in 1901, working in El Cajon for the San Diego & Southeastern Railway. He then moved to Pacific Beach, where he was employed by the Los Angeles & San Diego Beach Railway. Later he was employed by the San Diego & Southeastern as track foreman. In 1908 he became track foreman for the San Diego Electric Railway, with which company he remained until his death.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Trade Statistics Discussed

Federal Officials Asked to Study Trade Association Data—Congress May Be Urged to Legislate

In an effort to secure an official ruling to define clearly the legal rights of trade associations in collecting and distributing statistics and other activities, a committee representing the Chamber of Commerce of the United States visited Attorney-General Stone, Secretary of Commerce Hoover and members of the Federal Trade Commission in Washington on Sept. 22. The results of a referendum undertaken by the national chamber last year on trade association functions, together with supporting and explanatory data, were laid before the federal officials. No effort was made to secure an expression of opinion from the officials at this meeting, but they were asked to study the data presented them and to meet the chamber's committee again late in October, at which time it is hoped by the committee that there may be obtained an opinion which may be made public in order to settle uncertainties which now exist.

Each of eight proposals defining in rather general terms the proper scope of trade association functions laid before its membership by the Chamber of Commerce of the United States last year was given overwhelming approval, and thus these propositions became the policy of the national organization. According to Richard F. Grant of Cleveland, newly elected president of the Chamber of Commerce of the United States, it is the belief of officials of that organization that a trade association functioning along the lines laid down in the chamber's policy is clearly within the law. So much has been said recently, however, regarding the "twilight zone" of association activities in regard to the Sherman anti-trust law, and there being no clear-cut judicial decision marking the line between legal and illegal activities, conferences with the federal officials were sought in order to obtain, if possible, an official opinion which would form the basis of procedure.

If such an opinion is not obtained at the conference to be held in October, it is expected that the national chamber will proceed to draft suggested legislation which Congress will be asked to enact. President Grant of the national chamber appears to think that it will be possible to secure an opinion upon which trade associations may act. He does not believe that a test lawsuit, which has been suggested to clear the uncertainties existing regarding association work in statistics especially, is feasible, because of the time element involved, probably several years being required to secure a final decision from the Supreme Court, and also because he does not believe that it would be easy to induce an association to offer itself for such a test, owing to the apprehension of individual members that they might thereby come into personal conflict with the Department of Justice.

Staten Island Substation Order to Westinghouse Company

The Westinghouse Electric & Manufacturing Company has received orders totaling approximately $1,000,000 for apparatus to be used in connection with the $10,000,000 improvements which the Baltimore & Ohio Railroad is carrying out on Staten Island in electrifying the Tottenville and South Beach branches of its subsidiary, the Staten Island Rapid Transit Company.

The contracts cover five automatic substations with supervisory control for the Staten Island Rapid Transit Company, and high-voltage equipment for the Staten Island Edison Corporation, which will supply the power for operating the railways.

Four of these will be entirely automatic substations and the fifth will be the central control station for the whole system. Each of four of the substations will contain two 1,000-kw. rotary converters with the necessary auxiliary apparatus, and the fifth will contain a single converter of the same size.

Yellow Coach Awarded Fifty Detroit Buses

The Board of Street Railway Commissioners of Detroit has recommended the purchase of 50 totally inclosed double-deck buses from the Yellow Coach Manufacturing Company. These will be operated in the city as auxiliaries to the present rail lines. The action taken is the result of careful studies which have been under way for some time by the Department of Street Railways to determine the possibilities of the bus for improvement of the transportation facilities in the city.

Subsequent to the receipt of bids from four manufacturers, as published in the Sept. 20 issue of the ELECTRIC RAILWAY JOURNAL, changes were made in the original specifications and new bids were requested. These were opened on Sept. 27 and included the following quotations per bus in lots of 50:

Yellow Coach Manufacturing Company, $11,250; Fageol Motor Company, $11,656; Gotfredson Truck Corporation, 10,500; Garford Truck Company, $10,500, and the Standard Motor Truck Company, $9,500.

Although the routes for the new vehicles have not been definitely selected, a complete survey of the entire situation has been made. The double-deck inclosed type of bus described elsewhere in this issue was selected as most suitable for the service contemplated.

ELECTRIC RAILWAY MATERIAL PRICES—OCT. 1, 1924

Metals—New York

Copper, electrolytic, cents per lb	12.875
Lead, cents per lb	8.00
Nickel, cents per lb	29.00
Zinc, cents per lb	6.50
Tin, Straits, cents per lb	48.50
Aluminum, 98 to 99 per cent, cents per lb	27.00
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b vessel, Hampton Roads	$4.275
Somerset mine run, Boston	2.125
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	1.375
Central, Ill., screenings, Chicago	1.175
Kansas screenings, Kansas City	2.35

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb	2.80
Tie plates (flat type), cents per lb	2.45
Angle bars, cents per lb	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb	3.75
Steel bars, cents per lb	2.00
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.75
Sheet iron (28 gage), cents per lb	3.50
Sheet iron, galvanized (28 gage), cents per lb.	4.60
Galvanized barbed wire, cents per lb	3.45
Galvanized wire, ordinary, cents per lb	2.50

Waste—New York

Waste, wool, cents per lb	15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal	$1.01
White lead (100 lb. keg), cents per lb	11.75
Turpentine (bbl. lots), per gal	$0.87
Car window glass (single strength), first three brackets, A quality, discount*	84.0%
Car window glass (single strength), first three brackets, B quality, discount*	86.0%
Car window glass (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb	15.125
Rubber-covered wire, No. 14, per 1,000 ft	$6.55
Weatherproof wire base, cents per lb	18.25

Paving Materials

Paving stone, granite, 4x8x4, f.o.b.	
Chicago, dressed, per sq.yd	$3.60
Common, per sq.yd	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.67
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots f o b.	$51.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb	10.375
Light copper, cents per lb	8.875
Heavy brass, cents per lb	6.25
Zinc, old scrap, cents per lb	3.875
Light brass, cents per lb	5.125
Lead, cents per lb. (heavy)	6.875
Steel car axles, Chicago, net ton	$18.75
Cast iron car wheels, Chicago, gross ton	18.25
Rails (short), Chicago, gross ton	18.25
Rails (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	10.25

Cost of Selling Industrial Products Topic of Chicago Meeting

To bring together the best experience of manufacturers who sell to industry, the National Industrial Advertisers' Association will hold a two-day meeting in Chicago, Oct. 13 and 14.

Among the papers thus far scheduled are: "Problems in Technical Research," by P. C. Gunion, Hyatt Roller Bearing Company; "Relations Between Advertising and Sales Department," by Julius S. Holl, Link Belt Company; "Building a Large Industrial Business with Advertising," by R. C. Beadle, Combustion Engineering Corporation; "What Our Company Is Doing in Intensive Sales Work," a group of five-minute talks; "What Manufacturers Can Do Through United Effort to Secure Better Industrial Advertising," by P. L. Thomson, Western Electric Company.

The meetings will be held at the Edgewater Beach Hotel, Chicago. Further information can be secured by addressing H. L. Delander, acting secretary National Industrial Advertisers' Association, 836 South Michigan Avenue.

Rolling Stock

United Railways & Electric Company, Baltimore, Md., is giving a trial to a new type of articulated car which has been constructed in the company's shops. The car is the result of long study on the part of officials of the company. If it proves successful it probably will be used to replace trailers on many of the lines in the city. The car was built from two standard-sized cars joined by a truck with a flexible vestibule connecting them.

Binghamton Railway, Binghamton, N. Y., has purchased one 25-passenger Mack bus of the street car type.

Toledo & Indiana Railroad, Toledo, Ohio, has asked the Ohio Public Utilities Commission for authority to issue $94,337 in equipment securities to pay for four new cars of light suburban type to operate between Toledo and Bryan, Ohio.

Jacksonville Traction Company, Jacksonville, Fla., is remodeling 30 of its double-truck cars, 15 of which have been turned out by the shop forces since the work was started the latter part of last year. Of this number 8 are of the one-man type and 7 are of the two-man type. In addition to the 8 one-man cars in operation 6 more cars of this type are in different stages of construction in the shops of the company. When the work is completed the equipment of the company will include 30 rebuilt cars and 53 of the Birney type of safety cars.

Public Service Railway, Newark, N. J., is converting 260 cars into the one-man type. They are being changed at the Plank Road shops of the company.

Interborough Rapid Transit Company, New York, N. Y., has recently received bids for 150 motor cars, similar in type to the 100 cars ordered some time ago on which delivery is now being made. The bids on the new lot of cars are under consideration and it is expected that announcement of the award of the contract will be made very soon.

Union Traction Company of Indiana, Anderson, Ind., has purchased a bus for service at Fort Benjamin Harrison, as a feeder to regular interurban cars. The company contemplates the purchase of other buses to feed its terminal points.

Track and Line

Alabama Power Company, Gadsden, Ala., is replacing its old tracks with International twin steel crossties and 85-lb. rails.

Peoples Railway, Dayton, Ohio, is reconstructing 2 miles of track on East First Street in Dayton with Dayton mechanical ties.

Illinois Traction System, Peoria, Ill., will make improvements of a temporary nature to the McKinley Bridge, between St. Louis, Mo., and Venice, Ill., at a cost of $100,000. The temporary improvements will result in the removal of the narrow south side roadway, while the car tracks in the center will be boarded over to permit their use by automobiles and wagons. The changes will serve until the bridge can be enlarged permanently.

Wheeling Traction Company, Wheeling, W. Va., will lay new ties and rails on Main Street. All of the old rails over the entire system are being replaced with new 90-lb. rails. The contract has been let for this work to Cass & Otto.

City Railway, Dayton, Ohio, is reconstructing 4 miles of track on West Fifth Street in Dayton with Dayton mechanical ties.

Key System Transit Company, Oakland, Cal., will soon install a double track branch-off from Oxford Street into Hearst Avenue in Berkeley. The branch-off will be of the Key System standard 7-in. girder rail construction and will cost $8,000.

Northern Texas Traction Company, Fort Worth, Tex., has been petitioned by the city Park Board to extend its Rosen Heights line about 3 miles west to the new proposed bathing beach for the city. The petition has been referred to the directors for discussion.

Miami Beach Electric Company, Miami Beach, Fla., will construct nearly 4 miles of track in Miami Beach, extending to La Gorce Island. The improvement will represent an expenditure of $170,000.

Manhattan & Queens Traction Company, New York, N. Y., will repair the tracks along Queens Boulevard. The contract for the work has been placed with Reynolds & Driscoll.

Virginia Railway & Power Company, Richmond, Va., has been authorized by its directors to spend $274,352 in necessary improvements and extensions. Nearly one-half of the amount will be spent in Richmond. The construction program includes a power station in South Richmond of 1,000 kw. capacity and the erection of a substation.

Trade Notes

Automatic Reclosing Circuit Breaker Company, Columbus, Ohio, has brought suit in the United States District Court for the Western District of Pennsylvania against the Westinghouse Electric & Manufacturing Company. In its bill of complaint, the Automatic Reclosing Circuit Breaker Company alleges that the defendant has infringed basic claims of its patents 13856, 1312454, 1363814 by wrongfully and without license manufacturing, using and selling devices embodying the inventions shown in the said patents relating to automatic reclosing circuit breakers. It asks the court to enjoin the Westinghouse Electric & Manufacturing Company from further infringement.

The National Railway Appliance Company, New York, N. Y., and the Hegeman-Castle Corporation, Chicago, have been appointed general sales agents of the Walter Tractor Snow-Plow, which is standard equipment of the Fifth Avenue Coach Company, New York; Detroit Motor Bus Company, Chicago Motor Coach Company and of companies in other cities where bus systems are being operated.

Economy Fuse & Manufacturing Company, Chicago, Ill., announced that on Sept. 8 its Minneapolis district sales office was removed to 1008 Marquette Avenue, Minneapolis, Minn.

New Advertising Literature

Brass Tacks.—Stealing a little of General Dawes' thunder, the Bridgeport Brass Company is distributing a small emblem in the form of a brass tack. Those who wear the emblem believe, at least in theory, in getting down to business—now. This tack is made from Bridgeport "electric furnace brass" and has a brass pin by which it may be fastened to the clothing.

Detroit Electric Furnace Company, Detroit, Mich., has had issued a catalog describing in detail the advantages, performances and results obtained with its electric brass furnaces in the brass melting field. The outstanding features of economy, mechanical control and speed of production are all clearly enumerated and described. This booklet is known as the "Speedier Production—Better Brass."

International Motor Company, New York, N. Y., has issued catalog No. 91, containing 56 pages of detailed descriptions and specifications of the latest type of Mack buses. Many illustrations showing characteristics and features of the Mack buses are included in the catalog. The company will supply it upon receipt of request.

Celite Products Company, New York, N. Y., has issued a 30-page pamphlet on economic value of admixtures, describing the use of celite as an admixture in concrete. It is a reprint of two papers included in the copyrighted proceedings Vol. 20, 1924, of the American Concrete Institute.

New York, Saturday, October 11, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 15

President Budd Has Set a New Pace

THE administration of Britton I. Budd, a year of outstanding accomplishment and advancement in the American Electric Railway Association work, has come to a fitting close in the greatest convention yet held. Mr. Budd has set a new pace and a new standard for the association's activities. He has injected into them the full energy of his conviction and experience that the industry will profit by modernizing its physical plant and its thinking, by selling its services and by seeking intelligently and intensively the good will of its patrons. He has given the modernization movement a great impetus by his personal pronouncements, by the example of his own companies, by the creation of the committees on city and interurban operation and the plan to have these committeemen make personal inspection of the properties in their sections, and by sending a committee abroad to bring back any ideas in use over there which suggested improvement here. It was also his proposal that the association have a finance committee composed of investment bankers to advise in the difficult problems of financing electric railway improvements and extensions. This will presumably strengthen the association's usefulness with respect to a phase which has heretofore been without expert counsel.

Under Mr. Budd's direction, also, the prestige of the association has been increased by prompt help in critical situations facing individual company members. In fact, there has come this year some realization of the power of the association as an organized force for protection of member companies.

Altogether, a new spirit of progressiveness and a determination to develop the electric railway so that it will adequately meet the demands of the present day are the imprints left upon the industry by Mr. Budd, to whom it is greatly indebted.

Biggest Atlantic City Convention Proves Industry Anything but Obsolete

ONE of the striking features of the Atlantic City convention was its size. A total of 86,349 sq.ft. of floor space was occupied by exhibits, and the attendance was about 5,800. Corresponding figures for last year, the largest up to that time, were 75,681 sq.ft. and 4,404 attendants. If anyone is under an impression that the electric railway as an industry is on the down grade or that the street car is becoming obsolete, as Mayor Hylan of New York and some others say, all he has to do is to look at these records. They certainly exhibit no sign of obsolescence. Nor was the increase in space sold due only to the larger bus exhibits, for the strictly railway exhibits occupied more space than ever before.

In fact, no one could have attended the Atlantic City convention without being impressed with a great feeling of optimism over the future of the electric railway industry. This does not mean that the railway of the future can be a duplicate of that of today. Certainly it will have to keep its equipment up-to-date, use modern methods of selling its service to the public and, in most cases, carry some portion of its traffic by buses. But, by and large, there was a feeling of optimism in regard to the future of the electric railway industry which was more in evidence than at any previous convention for a decade.

High Points of the American Sessions

THE material progress that has been made in the industry was exhibited in many ways but in no other more prominently, perhaps, than in several addresses by bankers who expressed decided optimism in regard to the future of the electric railway business. This feeling was founded on the belief that local transportation is a necessity, and that there is no means at present or in sight to furnish this transportation in sizable cities that is as satisfactory or as economical as the electric railway. Of course not all bankers may feel the same way but the address on this subject by Mr. Harris on Wednesday evening, and the testimony of others of the desirability and success of the policy of customer ownership are noteworthy. The dependence of real estate values on good transportation was strikingly confirmed by the testimony of an authority on real estate, and the pre-eminence of the electric car for this service was shown by the papers and discussion on the place of the motor bus in city transport.

This question of transportation by means of buses, an often-debated subject, was much clarified by the sessions of the American Association at Atlantic City. The opinions of bus manufacturer and railway operator, as expressed in the addresses of Mr. Brosseau and Mr. Shoup, were fundamentally the same on this point, namely, that the electric road is best for mass transportation, and the bus for supplementary service—and that the final answer is co-ordinated transportation. It is only a short time ago that some bus manufacturers were claiming that the electric car was obsolete, while to some electric railway men the idea that buses had any considerable place in public transportation was anathema. Thus the California Electric Railway Association less than three years ago passed a resolution severely criticizing the publishers of this paper for establishing *Bus Transportation.* The announced purpose of this periodical was to encourage the idea of co-ordinated rather than competitive bus and electric railway transportation, but the practicability of that plan did not seem so evident to many then as now. The addresses of Messers. Brosseau and Shoup at Atlantic City on Thursday should help to convert the doubters on both sides, if any remain, though naturally there remain differences in details that experience will work out.

By Striving for a Definite Objective T & T Association Makes Real Progress

CONCENTRATION on a few subjects has marked the work of the Transportation & Traffic Association during the past year. In contrast with some of the other associations which have had a dozen or more committees, this association has confined itself to the study of four main subjects. These are accident prevention, development of new business, trackless vehicle operation, and relief of traffic congestion.

The report of the committee on accident prevention shows the growing seriousness of the automobile hazard, but intimates that the time is now ripe to secure municipal co-operation in attacking this problem. This year more attention has been given to the development of new business than ever before. Practically one entire afternoon session at the convention was devoted to an advertising and publicity symposium. Presentation of papers by publicity men at this T & T meeting gave them a chance to talk directly to the railway executives, and sell them on the idea of advertising, instead of simply selling the idea to themselves over again. The general tenor of the papers presented at that time indicates that electric railway managements have become convinced that the industry must advertise its wares in much the same way as any other business does. A number of definite and helpful suggestions were made by the various speakers, telling just what had been done in their own localities and what results had been accomplished thereby.

More interest than ever before attaches this year to the report of the committee on trackless vehicle operation. It is to be regretted, however, that the statistics presented by the committee cover only a comparatively small proportion of the railways now operating buses. Had it been possible to secure data from a larger number of such companies, the average figures presented would have been more informative. An interesting point brought out in the discussions of this report concerned the benefits of standardizing various phases of bus operation. The suggestion that too much standardization in bus operation would rob this method of transportation of one of its best qualities is worth careful consideration.

Relief of traffic congestion, the fourth subject studied by the Transportation and Traffic Association, is one which is growing in importance every day. There was a time when traffic regulation was considered by many railway executives to be outside the scope of their legitimate interests. But that time has passed. In the opinion of President Punderford, this subject is the most important one to which the association has given its attention, and his opinion is shared by many of the other members. By confining its study to a very narrow field the committee on relief of traffic congestion has made real progress. It would be impossible briefly to summarize the results attained by this committee, but the facts developed by its investigation are of such compelling interest that the report should be read by every railway man.

Engineering Association's Accomplishments Exceed Those of Any Previous Year

SOMETIMES it has been said that an engineer is a good man to collect data and establish conclusions but a poor one to put his thoughts into words for the information of others. The reports submitted at the sessions of the Engineering Association during this year's convention, however, prove conclusively that the engineers of the electric railway industry are as good at describing their investigations as they are in collecting the data. The reports of the committees this year were remarkable not only for the wealth of real information contained, but also for the pleasing manner in which it was presented.

One of the outstanding achievements of this association during the past year is the revision of the Engineering Manual and its publication in the form of a bound volume instead of the previous loose-leaf form. The special committee on Engineering Manual deserves great praise for what it has accomplished in this respect.

A recent development which has been attracting considerable interest among electric railway men throughout the country is the articulated train. This subject was carefully studied by the committee on heavy electric traction and the results of its investigation as embodied in the report are well worth the study of everyone interested in this type of vehicle.

Another committee report of outstanding importance presented at the sessions of the Engineering Association is that on way matters. The report of the closely allied committee on welded rail joint research is also of great interest. Probably no other phases of the work of this association have been more thoroughly studied than have these subjects. The findings of the way committee are definite and important and are set forth with remarkable clarity in its report.

Wood preservation has been studied by a committee whose findings indicate the growing importance of this subject, a fact which is perhaps less widely recognized than it should be. In connection with power generation and distribution, the matter of greatest interest at the present time is probably that of automatic substations. This subject was fully dealt with in the reports of various committees studying it.

One outstanding impression was given by these committee reports, as presented during the convention. If the modernization discussion during the past year has accomplished nothing else, it has at least set the engineers to thinking in new terms—in what might even be called radical terms, radical in the sense that they are considering wide departures from precedent.

Although the various committee reports and the discussion that followed their presentation covered many subjects involving improvements in more or less common practice, there was evidence in the discussion of a distinct trend toward critical analysis of methods which have previously been accepted primarily because of the long pedigree of precedent behind them.

But the thinking is being done in the committees and not in the convention, for the amount of discussion on the floor was small. Another aspect of the engineering proceedings is that the business of the committees has been so extensive that it consumes the entire time of the meetings. Thus there is no room on the program for papers on special subjects or other diversion from the conduct of routine business. This tends to lessen the interest of the convention sessions.

The Year's Work Reviewed

President's Address Surveys the Work Undertaken—Several Special Committees Have Contributed Materially to the General Progress of the Association's Active Year—A Year Marked Especially by the Increased Extent of the Practical Helpfulness to the Member Companies

By Britton I. Budd

President American Electric Railway Association
President Chicago Rapid Transit Company

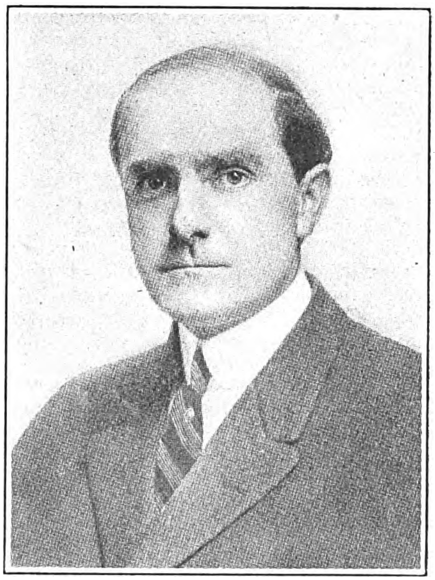
IT AFFORDS me a great deal of pleasure to welcome you to the forty-third annual convention of the American Electric Railway Association. Fortunately for me the duties of office were less onerous this past year than they were in previous years, in which some of my predecessors acquitted themselves so creditably. The critical period in our industry was safely passed and we were on an ascending grade when I assumed office.

At the opening of the convention I wish to direct your attention to the efforts put forth by your executive committee to make this gathering interesting and instructive. More space has been taken this year for exhibition purposes than at any previous convention. Manufacturers of railway equipment have spent a great deal of time and money to emphasize the educational features of our convention. Representatives of railway companies should show their appreciation of the efforts of the manufacturers by making an intensive study of these exhibits. They owe it to themselves as practical railway men and they owe it to the manufacturers. They owe it to the companies who send them here to acquire knowledge of the industry.

In order that full advantage may be taken by delegates of this opportunity to see the latest improvements in equipment, Wednesday has been set aside as a special day to view exhibits. No regular sessions will be held on that day and I trust that every delegate will inspect the exhibits with the idea of learning something that will benefit himself and the company he represents.

The setting apart of a day in which to inspect the exhibits is a new departure in our conventions, and I believe it is an important one. Modernization should be the watchword in our industry, and the time we spend in studying what the manufacturers are doing to help us accomplish our aims in that direction is time that is well spent. I hope the experiment will prove so popular this year that it will be made a part of our regular program at succeeding conventions.

What I have said with respect to exhibits applies with equal force to your attendance at convention meetings. We come here for serious business and we should so apply ourselves that each one of us will go home to our respective duties with some new knowledge gained. If we do not our companies have wasted money in sending us here. I have stressed this matter previously during my administration and I shall continue to emphasize it as long as the necessity for doing so remains.



Britton I. Budd

The various committees of your association have given freely of their time and efforts in the preparation of the reports which they will submit to you. These reports have great educational value and we should not be satisfied by merely hearing them read. They should be carefully studied and fully discussed.

The various activities of the association will be covered in detail in the report of the executive secretary. I wish, however, to call attention particularly to the work of two or three committees which has been directed along lines more or less new in our association. I appreciate the excellent work done by all our committees, and in singling out two or three for special mention I do not mean to belittle the others.

In searching throughout the year for the proper personnel for committee work I found that we at association headquarters know very little about the rising young men in the industry. It is of the utmost importance that these young men be given an opportunity to develop in their chosen profession. Not as much has been accomplished during the year in this direction as I would wish, but a start has been made. Nothing is better calculated to develop the active young man in the industry than committee work. It broadens his vision and gives him a grasp of the importance of the industry that he could obtain in no other way. I trust that in the coming year the executives of our companies will co-operate with association headquarters in bringing attention to the names of junior officials who can and will give earnest attention to committee work.

One of the departures from the usual committee activities was the appointment of the committee on foreign operation, to make a survey of electric railway and bus conditions in Europe. This committee was composed of James W. Welsh as chairman; Harley A. Johnson, president of the Engineering Association, and Harry L. Brown, editor of the ELECTRIC RAILWAY JOURNAL. The committee spent some six weeks last summer in studying foreign transportation practices. The report of this committee is available to you at this convention and should prove interesting and instructive. You will find in studying that report that the relations between the electric railway and the motor bus in Great Britain closely resemble our own in their fundamental aspects. The general opinion of the transportation men in Great Britain is that motor buses can never replace electric railways for high-density traffic, although the motor bus has a definite place as an auxiliary to the railways.

Other new committees created during the year were the committees on city operation and on interurban operation. The importance of the work of these committees cannot be overemphasized. A considerable part of our program on Friday will be devoted to hearing and discussing the reports of these committees.

Much good work has been accomplished by these committees during the past year, and they will accomplish better work in the future as their objects become more thoroughly understood. When you have heard their reports read at this convention, I believe you will be impressed with the great possibilities for continued work of this kind in the future. They will place before you a composite picture of the industry as a whole which it is difficult for the executive to visualize without such a survey as these committees have made.

The key men of these committees are known as regional vice-chairmen. While the work of these men has involved the expenditure of a great deal of time, as well as some money, I am sure that each committeeman has gained so much in knowledge and experience that he will feel amply repaid, as will the company which employs him. I have taken a great deal of interest in the work of these committees because of the educational opportunities it offers the individual committeeman and the benefit to their companies and to the association. Especially are the smaller companies benefited and made to feel that they are as much a part of the association as the larger companies. I earnestly recommend that these committees be continued and their work further developed.

Recently your executive committee authorized the creation of an advisory committee on electric railway finance. This committee is made up of men who are eminently qualified in finance and investment. The duties of this committee will be to bring to the attention of executives financial matters of interest in the industry.

The financial structure of electric railways has not received the attention of executives to the degree that its importance merits. Little effort has been made to educate operating officials in this important phase of our industry. The appointment of this committee is opportune. The financial position of the industry has materially improved during the last year and I am confident it will continue to improve. Several large issues of traction securities have been absorbed by the public in the last few months, something which seemed hardly possible a few years ago.

The customer-ownership idea is being applied successfully in the electric railway field. This plan of financing offers many advantages and I feel that its application will be greatly extended in the future. We have all been giving a good deal of thought and attention to modernizing the industry. That work must go on, which means that new capital must be found. At least a part of this new capital must come from the sale of junior securities, which the public will readily absorb when it knows that the proceeds from such sales are to be applied to the purchase of new equipment and the improvement of service. With large numbers of our customers stockholders in our companies, our public relations will be improved and we shall find it less difficult to obtain reasonable and equitable rates of fare.

Some companies may think it difficult if not impossible for them to start such a financial program. My answer to that is to make every effort to put the financial structure of your company on a basis that will inspire public confidence in your securities, then ask your customers to supply the needed capital for new equipment and improved service. If a company is really serving a community, it will find a ready response to such an appeal. It may take some time to accomplish this, but it can be done and must be done if we are to meet the public requirements.

Much has been accomplished in recent years in the way of improving public relations. This has been accomplished through improved service and intelligent publicity. Customer-ownership is helpful in that direction, but it will not take the place of good service and telling the public the facts about our industry. In that work our publicity committee has been helpful. No opportunity has been lost to help individual companies and the industry as a whole.

Recently we appointed several representatives on Secretary Hoover's conference which is studying safety measures on our streets and highways. This is a problem which deserves our most careful consideration and our earnest co-operation. The loss of human life on our streets and highways is appalling. Transportation companies have done much in the way of accident prevention on their properties, but we should not be satisfied with confining our efforts within our own companies. Our experience in such work especially qualifies us to assist in all community efforts of this kind. We owe it as a civic duty. Active participation in all such movements is a benefit to the industry, directly and indirectly. It is an important factor in our public relations.

One problem which appears to be on the way to a solution is motor bus operation. At the present time about 150 of our companies are operating some 2,000 buses, and it is probable that the number will be greatly increased in the immediate future. I am told that about 25 per cent of all the buses purchased this year have gone to electric railway companies. This broadening of transportation facilities and co-ordination of bus and rail service is encouraged by the American Electric Railway Association. Where there is a public need for bus service, we should supply it. Transportation is our business, and with our experience we are the agencies best qualified to meet the requirements of the public, whether by rail or bus. We should furnish this service even if we must for a time conduct it at a loss, because we gain in public good will by giving the public the service it wants.

I have the utmost faith in the future of the electric railway industry. It has been fully demonstrated that there is not as yet any substitute for it. Notwithstanding the phenomenal increase in the number of automobiles and motor buses in the last few years, the number of passengers carried on electric railways has increased greatly in the same period. This increase will continue in every place where the electric railway is giving a needed service and the character of service which the public demands. In conclusion I wish to thank all my associates in office, who have loyally and heartily given me their support and encouragement during my term as president. The staff at association headquarters, the executive committee and the members of the various committees have done everything possible to be helpful. My work with them has been a real pleasure and I thank them most sincerely for their co-operation while I have been privileged to serve the industry during the past year.

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Northern Texas Traction Company Wins Coffin Prize[*]

Report of Charles A. Coffin Prize Committee to American Association with Remarks Made by President Budd in Making Presentation—Achievements of Other Companies Outlined

WITH the presentations made by certain electric railway companies for the second annual prize, the committee is becoming increasingly impressed with the great stimulus given to modernization and general improvement in the industry by the Charles A. Coffin Foundation, established by the General Electric Company. The material which came to light through the contest last year and the example afforded other electric railway companies by a wide reading and study of the accomplishments and methods of the winner have exerted an influence for betterment the results of which are already discernible in the work of a number of companies during the past year. Thus, the Coffin Foundation is affording a very helpful impetus to the general program of modernization that is steadily gaining headway. The new presentations this year will help further to build this new spirit of aggressive development in the industry and carry it on with accumulative effect.

It will be recalled that under the conditions of the foundation it is provided that an annual award of the Charles A. Coffin gold medal will be made to that electric railway company in the United States which during the year has made the greatest contribution toward increasing the advantages of electric transportation for the convenience and well-being of the public and for the benefit of the industry. It is also specified that the company receiving the medal shall receive $1,000 for its employees' benefit or similar fund. Every electric railway company in the United States was invited again this year to participate in the contest and urged to send to the committee a statement of its activities and accomplishments as comprised within the field of the award.

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[*] This report of the Coffin Prize Committee was slightly abstracted for publication here.

For the contest this year the committee agreed upon and published eight points which would be considered the principal factors in making the award. It used the same relative ratings for each of these points in summing up the claims of the various companies as were used last year. These eight principal factors reported on by the companies were as follows:

1. The particular initiative, skill and enterprise manifested in popularizing electric railway service—more riders and more revenue.
2. Outstanding success in gaining public good will.
3. Economies which have been introduced in operation resulting from original ideas.
4. Economies in operation viewed as a measure of the extent to which the company has taken advantage of new developments in operating and maintenance practice and equipment originating with others.
5. Improvements in construction practice which have resulted in reduced first cost, reduced maintenance or a greater reliability of service.
6. Particular success in conducting a safety program and actually reducing number and seriousness of accidents.
7. Outstanding accomplishment in development of good relations between management and employees.
8. Special accomplishment in financing which reduces the cost of new capital, such as the distribution of securities among customers and employees, rearrangement of the financial structure, etc.

This year presentations were filed by nine companies. The committee made a detailed study of the contents of each report and carefully weighed the merits of each claim. All of the presentations contained evidence of much worth-while accomplishment. All of the contestants are to be congratulated, not only on the fine work they are doing for their own betterment, but for the elaborate plans taken to put their accomplishments before the committee. In compiling and writing their reports they have taken stock of themselves and they have made available to the field their experience. Both results are a justification for the labor and expense involved, entirely aside from the prospect of winning the award.

Their statements range from a brief listing of achievements to a most comprehensive and detailed explanation and proof of the claims made. The choice of the winner this year was by no means a simple matter to decide. But after extended deliberation and study, the committee finally came to unanimous agreement as to that company which measured up highest in its accomplishments during the year

MANY IMPROVEMENTS

As already indicated, the committee found much to commend in the progressive improvement work done as noted in the briefs of each of the companies. In the report of the Aurora, Elgin & Fox River Electric Company, Aurora, Ill., the committee was particularly impressed with the physical improvements, bettering of service and the general policies followed which have resulted in an increase of 1,000,000 passengers in a year and made 65 per cent of the employees stockholders in a period of seven months.

The particular accomplishment of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C., in which the committee had special interest was the transformation of a $20,000 deficit into a $23,000 net. This is all the more notable in view of the fact that it was done in spite of a diminishing population and an increasing number of automobiles.

The work done by the Interstate Public Service Company, Indianapolis, Ind., in taking three companies, two of them run down and not paying, and developing them into a fine, profitable railroad is so outstanding in all its phases that the committee points with pride and high commendation to the whole achievement. The committee was especially impressed with the extensive work done in helping the farmers, both as to the best crops to grow on their particular soils and as to right time of marketing. This has not only developed good will and passenger business, but has brought the railway a very handsome growth in its freight haulage.

The Memphis Street Railway, Memphis, Tenn., has met with particular success in reducing its expenditures for accidents by splitting fifty-fifty with the men any savings under the amount established as the average over a certain previous period. This not only saved the company more than $15,000 in the year ended June 1, 1924, but added 2.10 cents per hour to the pay of the men.

The San Francisco-Sacramento Railroad, Oakland, Cal., has a record which stands out for the remarkable freedom from accidents. Since the road was put in operation Sept. 3, 1913, the company has never killed or injured a passenger. This company has also been a strong influence behind the formation of a drainage and irrigation district that will improve a 200,000-acre section of land and bring in settlers, which in the end will work to the advantage of the railroad. While protected from unwarranted motor bus competition by the state commission, this company has not turned a deaf ear to the merits of bus transportation. It has put in through rates and joint schedules with authorized existing motor carriers connecting with the railway where these carriers have obtained permits from the railroad commission to operate in territory beyond the company's lines.

The Shreveport Railways, Shreveport, La., has accomplished a reduction in its accident expenditures from 5 per cent of the gross to 2 per cent. It stands out also for its insistence upon clean, well-painted, well-lighted cars, operated on regular schedules over well-maintained tracks, and for its efforts to keep trainmen constantly drilled in the art of smooth operation and courteous treatment of passengers.

The Union Street Railway, New Bedford, Mass., has found merited reward in executing the policies expressed in its motto, "Safety and Service, Courtesy and Cleanliness." It has also made the most of economies where these could be practiced without affecting the quality of service.

The United Railways & Electric Company, Baltimore, Md., has presented to the committee a notable record of improvement. It is also evident that here is a property which is operated with exceptionally high efficiency. The committee was particularly impressed with the planning and careful execution of a five-year modernization program which culminated this year to produce an annual saving of $1,000,000 in the company's operating expense.

From this point on the committee will discuss the presentation of the railway company which is to be awarded the prize this year. The committee was particularly impressed with the evidence that here was a management that knew what it should do and then proceeded to do it.

A feature of the company's activity which deserves special mention here is its short-haul real estate development. By a careful survey of the city the company found that there were more than 24,000 vacant residential building lots within four blocks of existing street railway lines. This information was brought before the public in an intelligent advertising campaign, and it has served simultaneously two important purposes. It has tended to check the agitation for long extensions of car lines out to new real estate developments in outlying sections and it has served to develop short-haul riding. It simply brought before the public incontrovertible facts showing that the railway had anticipated the needs of the public long in advance and that with the abundance of building lots adjacent to street railway lines it was an imposition to ask the company to build extensions when the present lines will serve a city of 100,000 more people than it now has.

The winner stands out for its happy faculty of keeping the public interested in its activities. Two cars painted pure white, with various safety and merchandising slogans on the outside, manned with operators dressed in dress uniforms and run on various lines, is one example of the means adopted to arouse interest in street railway service. Incidentally, the use of these white "talking" cars was considered of enough interest to be syndicated by the Newspaper Enterprise Association and the story forwarded to 135 newspapers in various parts of the United States.

Newspaper advertising, good slogans inducing the automobile driver to ride the street car, dash signs for company advertising and slogans, and similarly the use of interior car cards, all have been effectively employed in impressing upon the local people the fact that the street railway management is aggressively seeking to give good service, please its patrons and attract more business to its lines. In other words, no one in that town thinks of the railway as a "dead one."

A most notable achievement is summed up in the company's claim that in spite of increasing costs and private automobile competition its ratio of operating cost to gross revenue has been kept down to the low figure of 61 per cent for the year.

Besides a consistent, pleasing and effective advertising campaign, of which the presentation contains a host of examples, this winning company also makes the point that its service has been popularized by the use of one-man single and double truck cars. The original installation dates back to 1916. The change-over from two-man operation has been brought about over a period of eight years. The public has been completely sold on the idea because the company shortened the headway and increased the schedule speed on all lines.

The use of metal tokens with the odd fare of 7 cents was inaugurated as a means of speeding up. The tokens were sold without reduction in the rates. They were not used extensively because people seemed to be afraid of losing them. The company, through the operators, gave each passenger as he boarded the car one day a simple metal ring on which to carry his tokens. It was handed to him in a small envelope on which were printed the reasons why the use of tokens would benefit passengers. About 35,000 of these rings were given away between 5 a.m. and 2 p.m. of last May 31. The sale of tokens jumped immediately from 1,300 a day to 6,000, and the sale has continued since then at nearly that level. The total cost of this scheme was $600.

Under the heading of economies introduced in operation, the winner shows how the cost of trainmen's wages per car-mile has been steadily decreased since 1920, without any reduction in wages. In 1920 the figure for this item was 9.45 cents per car-mile, while at the end of June, 1924, it was 6.35 cents. This is the result of extending the use of one-man cars and of faster schedule speeds. Similarly, the energy consumption over the same period has been reduced from 2.2 kw.-hr. per car-mile to 1.75. Use of light-weight rolling stock, building of new and up-to-date shops, installation of modern tools and shop equipment and the educational work carried on with the shop men have been factors in bringing about a steady decline in the cost of maintaining equipment from 3.5 cents per car-mile in 1920 to 1.9 cents per car-mile in 1924. The cost of maintenance of way and structures has come down from 2.5 cents per car-mile in 1920 to 1.4 cents in 1924. Besides the effect of light-weight rolling stock in this figure, the extensive use of track welding equipment and modern track tools have had a bearing on producing the results. These reductions have been achieved in spite of the fact that the wage scale now prevailing on the property is as high as the scale for 1920; that the standard of maintenance is higher than at any time, and that the condition of the property has furthermore been materially improved.

The use of a carefully prepared budget system, which the company designates as "the bogey," has resulted in a co-ordination and control of expenditures which has helped materially in the general introduction of economies throughout the company. Careful attention to the prevention of fires, equipping all buildings with fire-fighting equipment, organization of fire-fighting brigades, with frequent drills, and general good "housekeeping" have resulted in a decrease in the company's insurance premium of about 20 per cent since 1920. An interdepartment telephone installed in the shop has facilitated the work there by bringing master mechanic and foremen into ready communication.

In its accident prevention work, this company is continuing its system, followed for some time back, of analyzing the individual performances of trainmen with regard to accidents. The results have been very satisfactory, as shown by the fact that the number of accidents and amount of money paid out during the past year have continued to show a decrease over previous years in spite of an increase of more than 5,000 automobiles owned in the city and an increase of approximately 100,000 revenue car-miles operated. In addition to monthly meetings of the trainmen by lines, at which the courteous treatment of passengers and accident prevention are discussed, another feature introduced during the past year was joint meetings between claim adjusters, transportation department inspectors and other interested employees. This has resulted in close co-operation between the claims and other departments since there is a better understanding of claim department requirements. The use of signs reading "Look out for the cars" and hung on the overhead at street intersections has saved accidents.

With respect to the development of good relations between management and employees, the winning company states that it has never had a serious difference of opinion between the management and employees. The employees have been kept acquainted with full details concerning the company and it has been made plain to them that there are no secrets in the operation of the property. This has resulted in an understanding on the part of the employees of the necessity for inaugurating new economic practices. It has gained for these economies the wholehearted support that was so necessary to make them successful. These economies have been obtained without the payment in any form of a bonus or a commission.

One rather unique feature of the company's relations with its men is that at intervals the manager holds meetings with the city and interurban trainmen and acquaints them with the trend of the company's affairs. These meetings have served to make the trainmen feel that they are a vital part of the organization and as such are entitled to know the trend of affairs. At these meetings the trainmen also get facts and figures which enable them to give the public intelligent answers to any questions that may be asked. On one occasion the trainmen on city lines were asked to give their individual ideas on how to increase the company's business. Prizes were offered for the best letters written on the subject. Ninety-five per cent of the trainmen sent in letters in response to this request. Many good suggestions were set forth. A similar competition for the interurban trainmen brought letters from every one of them, without exception.

This company believes that service means more than just providing transportation. It supplies a service that is called fast. The headways are much less than is necessary on most lines. It believes that its patrons should wait as short a time as possible for a street car. Furthermore, the frequent headway practically insures a seat for every passenger. Even during the peak hours it is not unusual to note the absence of standees. In general, this company has modernized its property and its service. It has something good to sell and is selling it by modern methods—by advertising and by "delivering the goods."

In this brief way, the committee has endeavored to point out a few of the accomplishments of the winner which were set forth in its claims for supremacy in this year's contest. The committee is pleased to announce now that the Charles A. Coffin gold medal for 1924, an award for outstanding contribution to the art of electric railway transportation, is awarded to the Northern Texas Traction Company, Fort Worth, Tex.

President Budd, chairman of the committee, read the report of this committee and called George H. Clifford, vice-president and general manager of the Fort Worth company to the platform and presented him with the medal.

Mr. Clifford, in accepting, said it was a great pleasure to accept the medal for his company, which had won only because of the full co-operation received from each of the employees. The company has attempted to follow progressive methods for some years, he said. Its reward has been in the pride of accomplishment and the consciousness of duty well done. But during this last two years, since the establishment of the Coffin Prize, there has been the added incentive of the possibility of winning this gold medal. The Coffin Prize, he continued, should serve as a challenge to electric railway men to meet all their obligations to the public. The submission of briefs in these contests serves the very useful purpose of bringing new ideas before the industry. He hoped it would be possible, for this reason, to have a much larger number of presentations in future years. In expressing thanks to the donor of the medal and to the committee, Mr. Clifford assured his audience that the prize had been won by an organization which greatly appreciated it, and which would strive to continue to contribute in every way to the advancement of the industry.

F. J. Gannon, treasurer of the Employees' Benefit Association of the Fort Worth company, received the $1,000. In expressing the thanks of the employees, he said that they had come to realize that they were going to be in business in one town a long time and that if they wanted to be happy and successful they had better cultivate good will. Now, as the employees of a Coffin Prize company, he said they would strive to live up to that distinction.

American Association Proceedings

Finance, Co-ordination and Management Were Discussed, Each Being the Subject of a Separate Session— Modernization Was the Keynote Throughout

THE first session of the American Association was called to order in the Greek Temple on Tuesday morning promptly at 10:05 by President Britton I. Budd. The hall was tastefully decorated with evergreens and bunting, and at the right of the hall on an easel was a large banner of the Metropolitan Section of the American Electric Railway Association, organized Sept. 23, 1924.

Mr. Budd first introduced Armand T. Nichols, director-general Atlantic City pageant. He extended a cordial welcome to the association on behalf of Mayor Bader, who was unable to be present. Mr. Budd replied in cordial terms.

An abstract of Mr. Budd's presidential address appears on page 579.

The report of the executive secretary, presented by Mr. Welsh, briefly outlined the accomplishments of the association during the year.

Executive Secretary's Report

The keynote of the association, sounded by President Budd at the beginning of his administration, was "Modernization." The purpose of this was to refute a growing impression on the part of the public that electric railways were out of date, and at the same time to disseminate among electric railway companies a greater familiarity with existing improvements applicable to their properties.

Some stimulus in this direction had already been supplied under the Charles A. Coffin award for the most outstanding accomplishments by an electric railway company. The evidence presented by the 17 electric railways participating during the previous year gave ample proof of what electric railways were doing throughout the country under good management and with the use of modern methods. A brief review of some of the high points in these presentations is now before the association in book form, furnishing an opportunity to every electric railway in the country to measure itself by some of the standards presented therein.

To bring this matter closer home, however, to individual properties two special committees were authorized. The country was divided into geographic sections and a regional vice-chairman empowered to canvass his territory and collect information from each property as to the latest methods, practices and facilities in use.

The manufacturer members of the association have been enlisted in this movement and their co-operation secured in the presentation of an exhibit this year representing the latest improvement in mechanical and electrical developments. This exhibit is the largest electric railway exhibit ever held anywhere, at any time. It covers the equipment, facilities and accessories used in every department of electric railway and transportation service, and in itself alone is incontrovertible proof of the stability and necessity of the electric railway industry.

Even the possibility that a lesson might be learned from foreign practice was not overlooked, and at the president's suggestion a committee was sent to Europe to bring back the latest developments abroad, both in general operating practice as well as the present attitude toward the motor bus, in order that no opportunity might be lost for ascertaining what the best thinking in the world on this subject might be.

The problem presented by the development of the motor bus has been squarely met by the association, which has consistently stood for the co-ordination of all forms of transportation in each community under one responsible management. It believes that there is a very important place in transportation service for the bus. It does not believe that service on rubber tires will replace that on rails. Officially, the association at this convention will vote on admitting to membership the subsidiaries of electric railway companies operating motor buses. The electric railway industry, therefore, recognizes the bus as a new and useful tool in transportation service.

Probably the most acute problem confronting all users of public highways is that of traffic congestion. This was made the topic for the Midyear Meeting and the papers presented there have formed a basis for solving many phases of this difficulty. The association is co-operating with other national associations and the national government in an effort to formulate fundamental principles for use in specific cases. The official magazine of the association and the statistical bureau have dealt with this problem extensively during the year.

The recent session of Congress has been exceptionally prolific in the number of measures submitted directed at restricting or otherwise regulating and taxing transportation service. In many of these cases the acts were not specifically aimed at electric railway operations but, the language being general, made no exceptions. To prevent unjust legislation required constant vigilance and activity on the part of the association officers and particularly your committee on national relations.

Committees of the association have been active in studying the important problem of taxation as affecting electric railways, and the statistical bureau and the association's special committees have co-operated with the department of publicity in emphasizing the need for relief from paving burdens.

Public safety is now a problem of the parent association as well as its affiliated organizations and we are co-operating with the National Safety Council in its efforts to have safety work organized as a definite procedure in each industry.

The Engineering Association has increased its activities in developing American standards to be accepted by all industries through the channel of the American Engineering Standards Committee. Specifically it has developed rules for car and carhouse wiring, etc. The new Engineering Manual just issued should be the salesman on every member's property for association standards.

"The electric railways have come back" was the news broadcast in financial circles and to the public early in the year. Recuperation from the effects of the war were somewhat slower in our industry than in some others, but the encouraging traffic figures of the governmental census of 1922 were the primary basis for this conclusion. The electric railway census taken each five years corroborated the statistical and financial studies of the association so completely that the association felt justified in giving the utmost publicity to these encouraging reports through its various publications, as well as through speeches of its officers.

The association has promulgated the principle that the electric railway company is the responsible agency which should handle all forms of local transportation service. If this policy is a sound one it follows that there rests upon each electric railway company the obligation to provide a complete and adequate transportation service by all available means in the communities which it serves. To do this effectively the electric railway company should know more about the transportation needs in its territory than any other individual or organization. Where the electric railway company has sponsored such a survey, either alone or in co-operation with other community interests, it has placed itself in a position to know in advance whether additional facilities should be provided, and in many cases has been thus able to forestall competitive undertakings.

CHANNELS THROUGH WHICH ASSOCIATION'S ACTIVITIES ARE CONDUCTED

Among the principal agencies to which credit is due for the association's accomplishments may be cited the work of its officers, the reports of its committees and the various departments of the association at its headquarters office in New York.

The publicity and advertising section

has had a most exceptional year. Suffice it to say that electric railways are becoming more popular every day as a result of the department's insistence on telling the story to the public and the support which this policy is receiving generally through the industry.

During the year the association answered more than 13,000 requests for information, an increase of 13 per cent over the previous year. More than 85 per cent of the railway membership are consistent users of the association's service and are taking advantage of this important privilege.

The publication of *Aera* is one of the important activities of the association. The magazine during the last year has continued to grow in value to the industry.

This has been a year of important developments in determining the association's policies on the problems of the industry, and the clear thinking of our president in these matters has been of inestimable value in directing the affairs of the association.

Report of Treasurer

The annual report of Barron Collier, as treasurer, showed for the nine months ended July 31, 1924, revenues of $274,198.52; operating expenses, $149,816.52; a net income of $124,382. Two special payments, one of $2,000 to the Joint Committee of National Utility Associations and one of $2,500 to Public Utility Reports, Annotated, brought the net surplus to $119,882. The association also administered. a fund of $18,108 belonging to the welded rail joint committee, but raised from special contributions. The treasurer pointed out that the last two months of the association year required large expenses and that the surplus on Nov. 1, when the next complete audit would be made, would be much smaller.

Committees on Constitution Changes and Finance

Arthur W. Brady, Anderson, Ind., reported on the proposed change in the constitution and by-laws, owing to the absence of the chairman, L. S. Storrs. These amendments permitted admission to membership in the association of subsidiaries of present company members operating other forms of transportation than electric railways. The amendments were adopted.

John G. Barry presented the report of the committee on finance, whose duties during the past year have included the investment of the association's funds, rulings on contributions toward other organizations and increase in its staff, question of dues of certain member companies, expenditures of the association, etc. The committee reported that the association's activities had been conducted in an efficient and economical manner and that its financial affairs were in excellent condition.

The president appointed C. D. Emmons, J. J. Stanley and R. I. Todd members of the committee on resolutions.

The report of the committee on national relations was presented in abstract by Mr. Henry, chairman. An abstract follows:

Committee on National Relations

The committee was represented at and took part in the hearing on November 19, 1923, before the Interstate Commerce Commission on steam road depreciation, Docket No. 15100. Subsequently, a sub-committee of this committee, consisting of Messrs. Ralph R. Bradley, Arthur W. Brady, Frank Karr and William H. Maltbie, filed a brief on behalf of our association in that proceeding. This was done simply to be sure we were not failing to be represented in all of these depreciation matters, not expecting the commission to make any order concerning us in that proceeding, and the hearing was followed by the commission giving out its tentative report and findings regarding steam railroad depreciation charges.

Afterward, being specifically advised by the Interstate Commerce Commission that an independent hearing would be granted to electric railway companies, the chairman of this committee, under instructions of the executive committee of the association, appointed the following sub-committee to be in full charge of depreciation account matters before the commission on the part of electric railways: J. H. Hanna, chairman; W. H. Maltbie, vice-chairman; Arthur W. Brady, Willian Chamberlain, Thomas Conway, Jr., F. W. Doolittle, W. F. Ham, L. R. Nash and C. E. Thompson. This sub-committee has kept in close touch with the matters through Andrew M. Bunten, chief of depreciation section, Interstate Commerce Commission, and has had several conferences with Mr. Bunten, followed by answers to written inquiries made by him. He now has under consideration the matter of issuing a tentative plan following the same line of procedure that was had in the consideration of depreciation charges by steam railroads. When that tentative plan is promulgated it will be followed, no doubt, by a public hearing called by the commission. These matters of necessity proceed slowly and it is not possible at this time to give any idea when such a public hearing may be expected. Under authorization of the executive committee, W. H. Maltbie has been appointed by the sub-committee as special counsel to represent the association in depreciation matters before the Interstate Commerce Commission.

SECTION 15A

On March 19, 1924, the Interstate Commerce Commission held a hearing on the subject of the application of Section 15a of the interstate commerce act (as amended by the transportation act, 1920) to electric railways, I. C. C. Finance Docket No. 3392, of which all member companies were notified in advance. As a result, a large number of electric railway representatives were present, individual statements being made by 17 companies and appearances entered by over 60 companies. The chairman of this committee conducted the presentation of the testimony on the part of electric railways, making a general introductory statement on behalf of the industry and then calling to the stand all the representatives who desired to make statements.

This hearing was followed by the filing of briefs by individual companies and by the committee. Subsequently, the commission sent out to all electric railways reporting to it a questionnaire asking certain definite information which the commission desired to have before undertaking to reach a decision in the proceeding. This questionnaire was quite generally answered by our companies, but up to the time this report was prepared the commission had issued no order in the proceeding. It is understood, however, that the commission eventually will enter a decision in the case of each individual company as to whether or not it is within the provision of Section 15a, based largely on the information given to the questionnaire above referred to.

On March 17, 1924, the Interstate Commerce Commission, acting under the provisions of Section 15a of the interstate commerce act, issued an order requiring carriers subject to Section 15a to file with the commission on or before May 1, 1924, a report of any railway operating income, value of railway property, etc. In view of the fact that the commission had issued no decision in Finance Docket No. 3392, "Application of Section 15a to Electric Railways," Mr. Henry, as chairman of this committee, requested C. D. Mahaffie, director bureau of finance, Interstate Commerce Commission, to excuse electric railways from filing the reports above mentioned until such time as the commission should issue a decision in Finance Docket No. 3392. In a letter to Mr. Henry, April 12, 1924, Mr. Mahaffie decided that such electric railways as questioned the application of Section 15a to their companies need not file the report called for by the commission's order on March 17, 1924.

INTERCHANGEABLE MILEAGE

The Interstate Commerce Commission has called a general hearing for September 24, 1924, on interchangeable mileage. This is the first action on the part of the commission in the matter since the courts decided against the plan adopted by the commission for interchangeable mileage, and from communications sent out by the commission regarding the hearing, it seems to be the plan of the commission to commence a further consideration of the matter right where the original hearing left off. This committee expects to be represented at the hearing referred to and to take such steps as seem to be necessary to protect our industry in the matter.

STEEL CARS

On March 11, 20 and 21, 1924, a subcommittee of the Senate interstate commerce committee, consisting of Senators Gooding, chairman; Howell and Mayfield, held hearings on Senate bill No. 863 and House bill No. 4107. These bills both provided that all cars used by interstate carriers in transporting baggage or express should be constructed, fitted up, maintained, heated, lighted, cleaned and provided with toilet facilities in such a manner as might be required by the Interstate Commerce Commission. Both bills also provided that all such cars should be of steel construction if accepted for baggage and express service—after July 1, 1925, in the Senate bill, and after July 21, 1926, in the House bill; both bills further providing that cars accepted for service prior to those dates should be "constructed of steel or steel underframe or equally indestructible material." In addition the Senate bill specified that prior to July the Interstate Commerce Commission might provide for service by full railway express or baggage cars of other than steel or steel underframe construction where the necessities of the public service require.

James J. Forrester, national legislative counsel for the Brotherhood of Railway and Steamship Freight Handlers and Express and Station Employees, who had charge of the presentation of the testimony in favor of these bills, requested that the House bill be substituted for the Senate bill. On March 21, the third day of the hearing, the chairman of this committee appeared before the sub-committee and made a statement against the bills, explaining the hardships that they would impose on electric railways in a financial way and requesting that if a bill were favorably reported it would be so amended as to exclude the electric railways from its provisions. The chairman of this committee also called on H. A. Mitchell, vice-president and general manager San Francisco-Sacramento Railroad, San Francisco, Cal., who in his statement opposed the application of the provisions of the bill to electric railways, calling attention to the financial difficulties under which electrical railways were already operating.

On May 6 the Senate interstate commerce committee reported the Senate bill (S. No. 863) with substantially the same provisions as those mentioned above except that the effective date of its provisions was extended to July 1, 1927, and the bill was further so amended as to permit the Interstate Commerce Commission to exempt from its provisions, on application and public hearing, such carriers as operated short trains or operated trains only short distances at a low rate of speed; also, the bill as reported excluded from its provisions express or baggage cars locked or sealed when not carrying any person or persons while such cars are in motion. It will seem, therefore, that the bill as reported did not specifically exempt electric railways from its provisions, but made it possible for part of them to become exempted in some cases upon application to and hearing before the Interstate Commerce Commission.

The bill as reported passed the Senate, went to the House and was left on adjournment of the House in the House committee on interstate and foreign commerce. The present status of the matter is not satisfactory to our industry and further attention must be given it when Congress convenes again.

HOWELL-BARKLEY RAILWAY LABOR BILL, S. No. 2646, H. No. 7534

On March 18, 28, 29 and April 4 and 7, 1924, the Senate interstate commerce committee held hearings on the Senate railway labor bill providing for "The Expeditious and Prompt Settlement, Mediation, Conciliation and Arbitration of Disputes between Carriers and the Employees and Subordinate Officials and for Other Purposes." On March 29 the electric railways were heard by the interstate commerce committee. Upon request of the chairman of our committee, Frank Karr, vice-president and chief counsel Pacific Electric Railway, Los Angeles, Cal., a member of the committee on national relations, presented a strong statement on behalf of the American Electric Railway Association and spoke in opposition to the bill, citing the differences as to methods of operation and labor conditions between steam and electric railroads and stating that it would be impossible for electric railways to assume the additional financial burdens that the bill would impose upon them. He asked that electric railways be excluded from the provisions of the bill as they had been from the labor provisions of the transportation act. At the conclusion of Mr. Karr's statement, Donald Richberg, counsel for the organized railway employees, stated that if the electric railways and their employees did not wish to be included within the provisions of the railway labor bill the proponents of the bill would not object to their exclusion therefrom.

On June 6 the Senate interestate commerce committee favorably reported the bill with amendments. The language related to electric railways in the bill as reported in paragraph 1, Section 1, reads as follows: "Including interurban and suburban electric railways operating as a part of a general railroad system of transportation." It was intended by the committee to exclude electric railways by this affirmative clause, but our committee did not regard the language as satisfactory and insisted on a wording of the amendment as previously prepared by it. This it presented to the chairman of the committee on interstate commerce of the House.

In the House the proponents of the House railway labor bill (identical with the Senate bill) succeeded in having the interstate and foreign commerce committee dismissed from further consideration of the bill. The new rules of the House, adopted at the beginning of the first session of the Sixty-eighth Congress, provided that if a bill had been in a committee for thirty days without being reported, the proponents of the bill by filing with the clerk a petition with the names of 150 representatives attached could bring to a vote the question of having the committee dismissed from further consideration of the bill. Such a vote was taken after a petition of the kind referred to had been filed and by a majority vote the committee was dismissed from further consideration of the bill and the bill was taken up by the House for immediate consideration. No substantial progress was made on the bill on that day and under the rule it came up again on Monday, May 19 (the third Monday), and again on the first Monday of June. No better progress having been made on the bill on the last day named, Representative Barkley, who was pressing the bill for passage, agreed to lay the measure aside so that other legislation might be considered.

Mr. Henry, chairman of this committee, was present on the floor of the House (being an ex-member) during each of the days referred to when the bill was being considered and was prepared to have an amendment offered to exclude electric railways from the provisions of the bill. However, the bill did not reach a stage where such amendment was in order. If opportunity is afforded such an amendment must be offered during the next session of Congress.

ELECTRIC RAILWAY TRAINS CONTAINING STEEL CARS

On February 28 the Senate interstate commerce committee reported without hearings Senate bill No. 1499, preventing all common carriers subject to the interstate commerce act, as amended, engaged in the transportation of passengers from using any car other than a steel or steel underframe car between or in front of any steel or steel underframe cars. This bill, as reported, was passed by the Senate and was left at the adjournment of Congress in the hands of the House committee on interstate and foreign commerce. No hearings were held thereon. Our committee on national relations has asked to be heard on the bill and in the meantime the chairman thereof, through correspondence, has endeavored to have the committee so amend the bill as to exclude electric suburban and interurban railway companies.

A number of other bills of importance to electric railways were introduced during the last session of Congress and referred to various congressional committees. Many of them have received no attention on the part of the committees to which they were referred, but will be in order for taking up for action by those committees at the next session of Congress. The committee on national relations has requested to be heard on all of these bills.

The Committee desires again to call the attention of the members of the association to the fact that they can at all times call on the Washington office for assistance in legislative matters with the assurance that all possible service will be rendered.

The report was signed by W. A. Baehr, H. G. Bradlee, Ralph R. Bradley, Arthur W. Brady, C. D. Cass, Charles R. Ellicott, P. H. Gadsden, C. E. Groesbeck, J. H. Hanna, G. H. Harries, Frank Karr, W. H. Sawyer, Charles L. Henry, chairman.

Committee of One Hundred

The report of the committee of one hundred, read by F. R. Coates, said that during the last fiscal year the committee had financed the advertising section of the association, and its committee on policy had directed the policy of this section. It had made only two campaigns for funds, namely, one in 1921 and one in 1923, and of the 902 railway, manufacturing and associate members solicited, 261 had contributed. All expenditures had been supervised by Henry R. Hayes, and complete reports are on file at his office and at association headquarters, where they are available to all contributing members. The funds on hand had carried the expenses up to date.

The report of the committee on community section, company section and individual membership was summarized by C. E. Morgan, Brooklyn. An abstract follows:

Community Section, Company Section and Individual Membership

The report begins with a description of the recent formation of the Metropolitan Section in New York City. Since this organization meeting was held, favorable comment has been received from various railways in the metropolitan district. The present membership of the section is 238, and the committee feels that similar sections could profitably be organized in other cities.

There was a slight decrease during the year in the number of company section members. It is felt, however, that with the reorganization of the Newark and Camden sections, which is now under way, there will be a substantial gain in membership. Reports of the activities of other local sections were appended to the report of the committee.

On Sept. 15 there were 805 individual members as compared with 787 on Oct. 1, 1923, an increase of 18. During the year the committee investigated and approved 33 new applications for membership.

The report is signed by C. P. Billings, L. C. Datz, C. R. Ellicott, W. H. Hyland, H. A. Johnson, J. K. Punderford, Martin Schreiber, J. E. Wayne, E. M. White, C. E. Morgan, chairman.

R. P. Stevens, New York, summarized the report of the committee on company and associate membership. An abstract follows:

Company and Associate Membership

The committee on company and associate membership reports that the total number of new member companies received during the year from Oct. 31, 1923, to Sept. 15, 1924, was as follows:

	1923-1924	1922-1923
New railway companies......	16	9
New associate companies.....	6	2
New manufacturer companies.	58	50
Total	80	61

The total company membership of the association on Oct. 31, 1923, was 658. We, therefore, show a gain in membership of approximately 6 per cent.

Certain companies resigned their membership or were dropped from the roll in accordance with provisions of the constitution, these numbering altogether 38, of which 11 were railways and 27 were manufacturers. The net gain in membership during the year was 42, all told, as follows:

Railway companies	5
Associate companies	6
Manufacturer companies	31
	42

The permanent campaign inaugurated in 1922 should, in the opinion of your committee, be continued in the future. The committee is convinced that the service of the association has become a real necessity to the industry as a whole, and is essential to its welfare and progress, as well as to the well-being of every electric railway property in the country. It is felt that every electric railway company should be a member and lend not only its financial but, what is more important, its moral support to our organization, and to the work which it is doing.

The report was signed by W. R. Alberger, Harry L. Brown, F. G. Buffe, R. F. Carbutt, Edward Dana, John A. Dewhurst, Charles R. Ellicott, A. W. Flor, H. B. Flowers, L. E. Gould, C. W. Kellogg, T. A. Kenney, George R. Lyman, C. E. Morgan, J. P. Pope, R. Schaddelee, Karl A. Simmon, E. M. Walker, E. P. Waller, R. P. Stevens, chairman.

W. H. Maltbie of Baltimore, briefed the report of the committee on special taxes. An abstract follows:

Special Taxes

This committee gave its attention to four topics.

Keeping of Auxiliary Ledger for Income Tax Purposes.—The street railway industry is subject in connection with depreciation to two distinct supervisions: A state public service commission, which in general has in view in the allowance for depreciation only the accumulation of a sufficient sum to take care of current replacements. It frequently happens that the depreciation allowance is considerably less than would be required to provide for depreciation on the straight line, average life basis. The Income Tax Division, on the other hand, is concerned primarily with depreciation as a depletion of capital. It happens in some cases, therefore, that the depreciation allowance which is acceptable to the Income Tax Division is considerably more than that which is permitted by the local public service commission.

A ruling permitting a special set of books for income tax purposes was passed with regard to a member company, but this ruling the Income Tax Unit has refused to make public. During the year the committee has considered the matter further but has not as yet succeeded in getting a general ruling from the Income Tax Unit. Certain member companies are keeping, with the knowledge of the Income Tax Unit and without objection therefrom, a supplemental or auxiliary ledger in which depreciation is set up for income tax purposes at figures differing from those set up on the ledgers kept in accordance with the requirements of the local regulatory body.

Depreciation of Way and Structures.—Since the last convention the Interstate Commerce Commission has decided to take up the entire question of depreciation of electric railways, following in general the plan it has worked out in connection with steam roads. It has seemed wise to your committee therefore to defer action on this question of depreciation of way and structures until final rulings of the Interstate Commerce Commission.

Taxation for Highway Purposes.—During the past year a member of this committee served with ex-President Gadsden on a special committee on this same subject in behalf of the transportation conference called by the Chamber of Commerce of the United States. The conclusions of this special committee were submitted to the Transportation Conference held in Washington on Jan. 9 and 10, 1924, and were accepted with only verbal changes by that body. Conclusions 1 and 5, consolidated into the following form were incorporated in Referendum No. 43 of the Chamber of Commerce of the United States and approved by a vote of 1,326½ to 512½:

> In addition to bearing an equitable share of the general tax burden, the road users should pay the entire cost of maintenance of improved highways through special taxes levied against them, such special taxes being applied exclusively to that purpose.

Meanwhile at the request of ex-President Emmons a member of the committee attended the session of the National Tax Association and obtained the adoption by that association of a resolution for the appointment of a committee of seven to investigate taxation of transportation agencies for highway construction and maintenance. The report of this committee will be presented at the September session of the National Tax Association.

Educational Taxation Publicity.—The fourth matter referred to the committee was the suggesting of such forms of publicity as would educate the public to the real relationship of taxation to transportation by electric carriers. The first step in this publicity program is to make the public realize the vital change in utility taxation which resulted from placing utilities under commission control. This was illustrated by actual changes in the case of one company. Publicity methods, including poster material, were discussed.

Special taxes are a burden upon the industry, not merely in the amount of money which they take but in the fact that they force fares to a higher level than they would otherwise reach and make more difficult the establishment and maintenance of the proper public relations. When they were first assessed they took money from the stockholders and gave it to the public. Today they take money from the car riders, for the benefit of the general public. Just in proportion as this fact is understood there will develop a public sentiment in favor of their abolition. In other words, it is a matter of public education, a matter which cannot be accomplished by a single advertisement or by a few weeks or months of publicity, but a matter calling for continuous effort, for presentation of the basic principles again and again in as many interesting and attractive forms as can be devised, and for the use of all available forms of publicity. A certain amount of success has been already reached in some communities. In others success can be reached in a relatively short period. In still others results will be long delayed.

It seems to the committee that it is the duty of every carrier to take part in a national program of education without regard to the immediate effect upon the individual carrier, in order that we may have a national understanding of the problem and a consequent limiting of the taxes imposed upon transportation to an amount which represents the industry's fair share of the expenses of government.

The report was signed by F. C. Chambers, A. T. Davison, Edwin Gruhl, H. A. Mitchell, A. G. Neal, A. M. Robertson, H. B. Sawyer, Ernest Stenger, Paul Shoup, executive committee member, and W. H. Maltbie, chairman.

Work of the Chamber of Commerce

In his report as national councillor of the U. S. Chamber of Commerce, J. N. Shannahan, Hampton, Va., spoke on the work done by the chamber as highly important and constructive, and as affording the only practicable way in which business can make itself felt on important questions of the day. He also spoke of the special work done in the study of transportation questions by the chamber, and in conclusion urged active participation by the members present in the civic and business affairs of the country.

The first address of the morning was by Allen G. Hoyt, vice-president National City Company, New York. He was introduced by President Budd as a man having not only wide experience in financing but also contact with electric railway operation as president of the Kansas City, Clay County & St. Joseph Railway and director of the Chicago Rapid Transit Company. An abstract of Mr. Hoyt's address will be found elsewhere in this issue.

Prof. T. N. Carver of Harvard University then read a paper on "Customer and Employee Ownership of Electric Railways." It appears in abstract on another page.

C. W. Kellogg, Stone & Webster, Boston, presented a discussion of Professor Carver's paper, which appears elsewhere, as does also a written discussion by Fred Scheel, vice-president of the Utility Securities Company, Chicago.

Vice-President J. N. Shannahan proposed a vote of thanks to Mr. Hoyt and Professor Carver for coming to Atlantic City and presenting their papers, and the meeting then adjourned.

Thursday's Session American Associatian

THE second session of the American Electric Railway Association was called to order in the Greek Temple by President Budd at 10:10 Thursday morning and the report of the committee on nominations was presented. It was read by H. B. Potter of Baltimore, in the absence of C. D. Emmons, chairman of the committee. The report follows:

NOMINATIONS

For president: J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

First vice-president: F. R. Coates, president and general manager Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.

Second vice-president: W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill.

Third vice-president: R. P. Stevens, president Republic Railway & Light Company, New York.

Fourth vice-president: J. P. Barnes, president Louisville Railway.

Treasurer, Barron Collier.

For members of the executive committee: Harry Reid, president Interstate Public Service Company, Indianapolis, and C. E. Morgan, second vice-president and general manager Brooklyn City Railroad, Brooklyn, N. Y., to represent the railways; E. P. Waller, manager railway department General Electric Company, Schenectady, and B. A. Hegeman, Jr., president National Railway Appliance Company, New York, to represent the manufacturers.

Arthur W. Brady, Anderson, Ind., then presented the report of the committee on uniform regulatory laws. An abstract follows:

Uniform Regulatory Laws

This committee was created by action of the executive committee after the 1923 convention for the purpose of considering regulatory laws affecting electric railways and other transportation facilities furnishing similar service, with a view to ascertaining the possibility of securing greater uniformity in those laws. Generally speaking, these measures are similar in their broader aspects, but in important features of principle and detail they are widely dissimilar. For instance, power to fix rates and to prescribe service is conferred on public commissions by practically all laws regulating transportation agencies and other public utility services. On the other hand, there are great differences in those laws with respect to such fundamental matters as the term and kind of franchise, license or permit which may be granted, the public agency through which such grant may be secured, and the extent of local control.

A striking instance of dissimilarity of especial importance at this time to the electric railways is found in the power of the regulatory commissions to prevent or control the establishment of a new but unnecessary or wasteful transportation service in competition with an established agency furnishing similar service. In some jurisdictions the commissions are vested with full power over such competition, in others they have limited power, and in still others they have none at all.

The lack of harmony that exists in case of laws regulating electric railway and other transportation agencies exists also with respect to laws regulating other classes of public service. The results are harmful to public and private interests alike. One evil effect of this discord is the resultant state of mind of the investing public. Whatever creates uncertainty on the part of investors adds to the cost of procuring the vast sums needed for public utility life and growth, and the expense of such added cost must be included in the price for the service charged to the public.

There is no higher authority on this subject than the investment bankers of the country, who form the intermediary between investors and utilities. Their position is stated in a report of a committee of the Investment Bankers' Association of America in October, 1923, as follows:

"With a growing industry still requiring large sums of new capital from year to year for some time, it is essential, from an investment banking point of view alone, that the laws for the regulation of the public utilities by states be broader and more uniform than at present."

The National Association of Railway Utility Commissioners and the American Bar Association have also recognized the serious consequences which spring from the more important differences in public utility regulation, and which will flow in greater volume unless checked.

At the 1923 annual meeting of the section of public utility law of the American Bar Association a committee was appointed which reported at the 1924 meeting in Philadelphia the draft of a proposed "uniform public service act," accompanied by a full discussion of the subject. The proposed bill was referred by the association to the Conference of Commissioners on Uniform State Laws, in whose hands it now rests.

The "uniform public service act" represents the work of a committee of five lawyers of ability, and in itself, as well as by the accompanying discussion, evidences the painstaking care and the breadth of view of its authors. It is intended to cover every phase of public utility regulation, and should receive the careful consideration of all persons interested in seeing that such regulation be placed on the proper basis. Your committee quotes two portions of the bill of especial interest to the electric railways.

In considering the subject of uniform regulation as applied to the electric railways, the fact should be borne in mind that in so far as those railways are common carriers by railroads engaged in interstate commerce, the tendency of federal legislation is and for many years has been in the direction of a single system of country-wide regulation. To the extent that the laws enacted by Congress are applicable, uniformity in regulation already exists. In the case of the steam carriers this uniformity, of course, extends much farther than in the case of the electric railways, since it is only a part of the latter that fall within the terms of the interstate commerce act, and these are omitted from some of the regulations to which the steam carriers are subject.

The committee has not undertaken to prepare for submission to the association a bill for the uniform regulation of electric railways and kindred systems of transportation. The drafting of such a bill on behalf of a single branch of the public utility industry would perhaps complicate instead of simplify the situation. There are certain principles which apply equally to all kinds of public utilities, and which should be constantly observed when regulatory legislation is proposed. A

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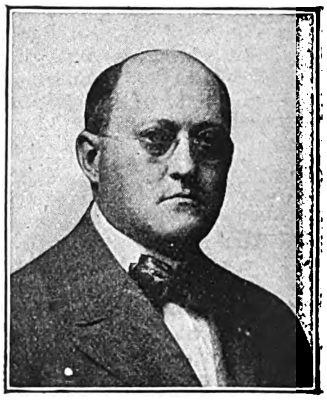

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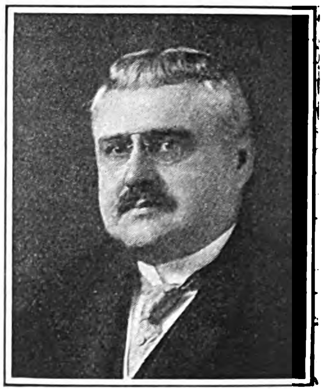

B. A. Hegeman, Jr.

New Members of Executive Committee, with Terms Expiring in 1927.

regulatory act applicable to all public utilities which recognizes and awards proper weight to these principles should meet the needs of the electric railway industry and of the public which it serves.

The committee recommends that the association favor and do what it can to further the efforts being made to bring about greater uniformity in regulatory laws.

L. S. Storrs, New Haven, presented the report of the publications committee, in which was reviewed briefly the work being done by *Aera*. The report stated that more material had been published than heretofore, that the editorials were forceful and that the magazine was gaining in value and popularity.

The report on valuation was presented by F. W. Doolittle, New York. The report follows, somewhat abstracted:

Valuation

For the current year the committee has continued its study of the weight of the various evidences of value as disclosed by court and commission decisions, has made a study of the economic principles which must govern if the industry is to continue to render adequate service, and has also made three special studies of terminology, depreciation, and of a group of engineering and accounting problems.

CONCLUSIONS

1. That there is a general tendency of courts and commissions to broaden the scope of evidences of value, so as to include all elements that would influence the price offered by a prospective purchaser, and to recognize the importance of direct testimony as to present fair value.

2. That the weight which should be given to each of the several evidences of value must depend upon conditions in each individual case, the prime object of a valuation being to safeguard present and future financial requirements and recognize and protect investment honestly and prudently made.

3. That under existing legal conditions the industry should be assured sufficient revenue to protect itself from the risk that future valuations will lead to a rate base below original cost of property now being installed, and must face the probability of revaluation from time to time with the resulting expense and disturbance of financial programs.

4. That the lack of standard practice in the use of technical valuation terminology is responsible for much of the confusion in the decisions and opinions of commissions and courts of review.

5. That technical terms employed in valuations should be carefully defined and their use standardized, and to this end the committee reports a series of suggested definitions.

6. That the larger property elements are rarely retired on account of age or wear but usually on account of obsolescence, inadequacy, or change of public demand.

7. That the trend of commission and court decisions is away from the older practice of deductions from rate-making value on account of accrued depreciation and toward limiting such deductions to the amount of reserves collected from the public and invested in plant extensions.

8. That in the electric and gas accounting systems the factor of uniformly and definitely accruing depreciation has given place to a retirement reserve applicable to the property as a whole and accumulated with due regard to the prosperity of the business, and that such methods are properly applicable to electric railway accounting.

RECOMMENDATIONS

1. That member companies in all valuation proceedings should submit complete evidence as to original cost, present-day reproduction cost, and present and probable future trend of unit costs, and direct testimony as to fair present value.

2. That the association through appropriate committees undertake to co-operate with the state commissions in replacing the requirement of uniform charges for depreciation based upon estimated life by the more flexible system of appropriation to a general retirement reserve.

3. That the determination of public utility values can be promoted by co-operative effort of the Accounting and Engineering Associations with the view of establishing clearer distinctions between certain related but not identical phases of the problem and that to this end these associations consider among other matters the standardizing of investigations and records of property life, the collection of more definite and detailed information on miscellaneous construction expenditures and the revision of methods of accounting therefor, the methods of determining and proving going value under the various conditions which confront member companies, and the collection of the necessary data and the publication of current index numbers of electric railway construction costs.

4. That every effort should be made to reduce the expense of valuations and that in particular appraisers should adopt the standard methods of estimating in use by engineers and contractors as a means of reducing unnecessary delay in the presentation of the case and the examination of witnesses.

LEGAL PRINCIPLES DISCLOSED BY TREND OF COMMISSION AND COURT DECISIONS

The various decisions of the commissions and courts reported during the period beginning June 1, 1923, continue to exhibit wide divergence in point of view as to the proper basis for the determination of fair value; but the general tendency seems to be to drift away from a recognition of any particular element of cost as a controlling or determinative factor, a tendency which is probably the direct outcome of the action of the Supreme Court of the United States in the Southwestern Bell Telephone case, 262 U. S., 276, and its definite rejection of the prudent investment theory as set forth by Justice Brandeis. This tendency is not, however, universal.

The decisions rendered by the Supreme Court of the United States during the past year show no variation from the procedure established in the leading case of Smyth vs. Ames "that a public utility is entitled to receive from the public a fair return upon the fair value of its property." In its opinions the court still maintains the position that, before a fair value can be determined, consideration must be given to (a) original cost of construction plus subsequent net capital expenditures; (b) amount and market value of stocks and bonds; (c) present as compared with original cost of construction; (d) probable earning capacity of the property under the particular rates prescribed by statute or the commission; and to any other matters which are germane to the determination of such a value of the property.

The recent decisions of the courts, however, continue to exhibit a growing tendency to focus attention more and more upon (1) original cost plus subsequent net capital additions, and (2) reproduction cost as of the time of the inquiry. It should be understood that the committee, in using these two terms, assumes that not only the physical but the non-physical elements of value are included to make up a valuation element upon each of these bases. A summary of the decisions of the higher courts during the past year shows no substantial tendency toward increasing the weight to be given to either of these elements. There has, however, been a tendency to reject the decisions of the lower tribunals, which exhibit a palpable failure to give substantial recognition to current reproduction cost in spite of statements to the contrary contained in the decisions of the tribunals under review.

Utility companies engaged in valuation proceedings should not be content with mere proof of the amounts comprising each of the several elements of value to which consideration must be given, but should go beyond this point at which the utility's proof ordinarily ceases, and show by an analysis of the financial history, and more especially by the present requirements and financial position of the utility, what rate base as a practical matter, entirely aside from the engineering problem, is actually necessary to enable the utility efficiently to function. It is submitted that it is the duty of the companies to aid the courts and commissions in determining what weight should be given to the several elements of value if a just decision is to be reached.

A public utility, unlike a manufacturing enterprise or other business which is not affected with a public use, cannot choose the time at which it enlarges its plant and facilities. A utility is obliged to provide additional facilities when required by the public, irrespective of whether in its judgment the cost of such additional facilities may, at that time, be much in excess of the sum for which they could be constructed at some time subsequent thereto. Under these circumstances, equity demands that the investors in public enterprises should be protected in some fashion against the consequences which would follow if a subsequent material recession in cost levels should occur, assuming that the fair value of the present property, without reference to subsequent additions at that time, is to be fixed upon the basis of its then reproduction cost new.

If reproduction cost new is to be the main criterion of value, investors in public utilities are entitled to create out of earnings, or, in other words, out of specific contributions by the ratepayer, a sufficient sum not only to take care of retirements, but also to create a reserve which will offset a possible loss in value due to a future lower construction cost level. If this is not done, a substantial part of the capital invested in public utility enterprises during the last few years is subject to a hazard which the investor in such enterprises should not be called upon to bear. His profits are limited by regulation to little more than the rate of interest required on his capital invested in the property. Unlike the investor in industrial enterprises, he is not allowed the prospect of extraordinarily large profits as compensation for such risks.

The outstanding feature of recent years in public utility finance has been the inauguration and development of the customer-ownership movement. If this movement is to succeed, and particularly if the sale of common stock of public utility enterprises is to be made possible, it follows that the junior investment in public utility enterprises must be safeguarded in rate-making proceedings.

Any rule of valuation which has for its practical effect the wiping out of a part of the investment of the utility tends to wipe out all or a large part of the investment represented by the common stock and perhaps even of the preferred stock. Apply this principle to a hypothetical illustration; if a property has been almost entirely constructed during the past decade (which has been the case with many large and prosperous electric utilities) and assuming that 60 per cent of the investment is represented by bonds, 20 per cent by preferred stock and 20 per cent by common stock, it would follow that if at some subsequent time construction cost levels should fall 20 per cent below those which prevailed during the last ten years, the reproduction cost new of the now existing property, on the basis of prices then prevailing, would be no greater than the amount of the funded debt and preferred stock then outstanding. The common stock investment would have been entirely wiped out; the margin of protection for the preferred stock would have disappeared; the funded debt of the property, instead of being 60 per cent of its value (which had been the case at the time it was constructed), would then be 75 per cent of its fair value, if that is based upon its then reproduction cost new—a proportion too high to meet the requirements of conservative investors. Under such circumstances, the utility's credit would be destroyed; it would be unable to sell bonds, because the proportion of its funded debt to the valuation fixed would be too high, and it would be unable to sell stock because of the fate which had befallen those who had previously invested in its stock.

Under such circumstances, it is clearly to the public's interest, as well as to that of the investor in utility enterprises, that fair value should be determined upon common-sense lines. The United States Supreme Court, in holding that no single standard of value should be followed but that each should be given such weight "as may be just and right in each case," obviously had in mind that the underlying equities of the situation should control. A determination of fair value, in the last analysis, cannot equitably be made unless the equities are carefully analyzed and the financial requirements of the property, both present and future, fully safeguarded. Protection of investment honestly and prudently made in utility enterprises will tend to lower the rate of yield demanded by investors and will, therefore, secure capital at the lowest possible rates. A policy which introduces extraordinary hazards will stunt the growth of utilities, increase the cost of capital to them and may even drive capital out of the field. The future progress of the customer-ownership movement depends upon whether a utility's earnings shall at all times be sufficient to enable it to pay dividends upon its junior securities and to earn in addition thereto a sufficient amount to keep its junior securities at or near par, permitting the utility to sell additional amounts of junior securities when and as required to provide new capital or to refund maturing obligations.

The foregoing analysis of the economic principles controlling the determination of value may be summarized as follows:

1. The committee repeats the recommendations hertofore made by its predecessors in the preceding year that member companies in all valuation proceedings should submit complete evidence as to original cost, present-day reproduction cost, and present and probable future trend of unit costs.

2. In spite of its advantages, as regards the stability of the rate base and the added security of investments in public utilities, the committee recognizes the legal limitations upon the evidential value of the investment in the property as the sole criterion of fair value. These limits were well stated by the predecessor of this committee in the following language: "So long as the courts continue as at present to hold that the taking of the property for public use comes at the time of the establishment of the rate, rather than at the time the property is first devoted to the public service, the 'return on investment theory,' whatever may be its economic virtues, has no legal standing or foundation in state or federal constitutions and that the utility which attempts to base its rights upon this theory will find itself deprived of its final protection against legislative aggression."

3. The committee is of the opinion that the weight to be given to each of the several elements of value varies to some degree in each individual case. A determination of fair value, however, cannot equitably be made unless the financial requirements of the property, both present and future, are fully safeguarded and investments, honestly and prudently made, are recognized and protected. No value can be a fair value unless it accomplishes those two things. The committee therefore recommends that such weight be determined according to the equities of each situation. The United States Supreme Court, in holding that no single standard of value should be followed but that each should be given such weight "as may be just and right in each case," obviously had in mind that the underlying equities of each situation should control.

DEPRECIATION

The 1919 committee on valuation recommended that no deduction for accrued physical depreciation be made in determining the fair value of well maintained railway property whether this value were based upon investment or cost of reproduction. This recommendation was made without extended discussion of the subject of depreciation and of the possibilities of arriving at the same results in a rate case whether or not deductions for depreciation were made. In indorsing this recommendation of the 1919 committee the present committee suggests certain limitations or reservations and presents a discussion of the principles involved through which it hopes that the attitude of the association on the subject may be more specifically set forth.

It is often held, in partial opposition to the recommendation of the committee, that although accrued depreciation should not be deducted from investment, it should be deducted from cost of reproduction, at least under present conditions when such cost materially exceeds the investment, on the ground that appreciation and depreciation, being of similar character but opposite effect, should either be considered together or else both excluded. Such reasoning does not appear to be sound, to the extent at least that appreciation is due to a decrease in the purchasing power of the dollar by which value is measured. The intrinsic value of property is not changed when the yardstick by which it is measured is shortened. Depreciation, on the other hand, is a physical characteristic involving the age and probable future useful life of physical property, and having, therefore, no connection with measures of value based upon prevailing economic conditions. The committee therefore urges that no distinction be made with respect to accrued depreciation between valuations based upon investment or on cost of reproduction to the extent that the difference between such valuations is caused by the varying value of money.

The theory of accrued depreciation rests upon the assumption that property is gradually consumed in service and that the loss in value may, in part at least, be measured by lapse of time or extent and character of service. It is undoubtedly true that many elements of railway property, such as ties, rail, poles, trolley wire, etc., do wear out or deteriorate with some approach to uniformity. However, when such elements reach the end of their useful lives they are commonly renewed through charges to operating expense, and no standard accounting system now in effect requires the regular accumulation of any specific reserve against which the retirements of such elements might be charged, and the uniformity of renewals of such elements in a mature property of substantial size makes a reserve for such purposes superfluous. Any deductions from the value of such elements on account of their age or condition therefore involve injustice and confiscation.

In the case of larger property elements, such as cars, buildings, power stations, power station equipment, etc., retirement of units is very rarely due to age or wear, but rather to obsolescence, inadequacy, or public demands for different equipment or service. Depreciation or loss in usefulness in most of these cases do not gradually *accrue*, but rather *occur* more or less abruptly from causes which cannot be foreseen with any approach to accuracy.

Within certain limits it is possible to foresee retirements due to inadequacy, but in general no accurate forecasts are possible as to the time when important elements of railway property must be retired, and if such forecasts were possible it would be inequitable in many cases to charge the users of existing property with the cost of its premature retirement because the advantages resulting from such retirement, such as more comfortable, safe, or efficient substitute equipment, are enjoyed by the users of such equipment. In view of the facts that the minor elements of railway property which gradually wear out are renewed through operating expense without the accumulation of reserves, and that more important elements rarely wear out but abruptly cease to be useful at times which cannot be foreseen or, if foreseen, should not have their retirement provided for in advance, the committee is of the opinion that computations of and deductions for accrued depreciation based upon inspection of property or its estimated useful life should have no part in valuation proceedings for rate-making purposes.

The committee does not hold that no reserves should be accumulated for future retirements of property not normally chargeable to maintenance. On the contrary it urges that sufficient reserves be accumulated reasonably to provide for anticipated retirements and for contingencies. Such reserves may be substantially less than required to offset the theoretical depreciation above considered. It may not always be wise to limit reserves to these purposes and proportions. Where the commissions having jurisdiction over public utility property or the courts to which appeals may be taken have a definitely established practice of making deductions for accrued depreciation in determining fair value, or where existing franchises or other agreements provide for municipal purchase of public utility property under conditions which permit of deductions for depreciation, it is wise to accumulate adequate depreciation reserves as an insurance against loss in such proceedings. Even in the absence of such impelling reasons for liberal reserves, the committee would not criticise their accumulation to the extent possible under moderate rates of fare and without curtailment of normal returns to investors.

It is pointed out, however, that such insurance usually involves higher charges to patrons on account of the unnecessarily large reserve which they are called upon to create, and that the protection thereby afforded to the utility at the expense of its customers serves no useful purpose whatever other than insurance against a practice involving depreciation which has no logical foundation under the conditions surrounding regulated public utilities. Any insurance against a contingency which is wholly avoidable is economically unsound and a needless extravagance. It is such insurance that is often responsible for claims for depreciation annuities in rate cases in excess of appropriations actually made to retirement reserves, with counter charges that the utilities are inflating their costs of service to be covered by revenues from patrons. There is nothing illogical about such claims of a public utility if it prefers to segregate on its books its reserve for retirements only and to retain in its surplus such further provision as may be needed for insurance against confiscation, the two provisions being combined for simplicity in rate cases.

It is sometimes contended that the active advocates of the accrued depreciation theory are in some cases endeavoring to accumulate reserves for depreciation largely in excess of retirement needs in order that in due time governmental agencies may take over the properties at a cost far less than the investment therein through the deduction of the excessive reserves. Any such motives for the accumulation of excessive reserves should not prevail unchallenged and without publicity. If the patrons of public utilities are opposed to their ownership and operation by governmental agencies because of demonstrated inefficiency and political handicaps, they should not be led into such ownership because of a favorable purchase price established through reserves which they have themselves unwittingly contributed. If advocates of municipal ownership wish the patrons of public utilities gradually to provide funds for municipal purchase of utilities, these funds should be openly accumulated and should be distinct from necessary provisions for retirements.

A study of the decisions of regulatory commissions and courts in recent years discloses a definite trend away from the older practice of deductions for accrued depreciation. This trend has doubtless come about through a clearer understanding of the peculiar conditions surrounding property dedicated to public service as distinct from that engaged in unregulated industry. Numerous decisions, not only of commissions but of state and federal courts and the United States Supreme Court, have wholly repudiated the theory of accrued depreciation deductions from value for rate-making purposes.

Coincident with this repudiation of the accrued depreciation theory there has developed primarily among the regulatory commissions a practice of making deduction from valuation to the extent only of reserves which utilities have accumulated from revenues derived from their patrons and invested in the property devoted to public service. It is the contention in these decisions that the property acquired through funds which the reserves represent should not earn a return for investors in the property for the reason that investors have made no sacrifice in creating the reserves. It is further contended that the reserves, having been contributed by the patrons for the upkeep of the property, should be held and invested by the managers as a trust fund, the income to be used either to increase the fund or to replace revenues otherwise collected from patrons. It is sometimes held that the deduction of the reserve from the value of the property as a whole, thereby eliminating the revenue derived from the reserve, works no hardship to any interested party if the reserves are otherwise adequately maintained and investors are provided with a suitable return on the property which they have furnished.

Without undertaking to oppose this view, the committee points out the danger of injustice to investors in assuming that accumulated reserves have in fact been contributed by patrons rather than through a sacrifice in return which investors have made to accumulate reserves during periods of inadequate revenues. The facts in each can be established only through a study of the financial history of the property, which will ordinarily be available for a sufficient period to show whether or not the cumulative return to investors has been reasonable or otherwise. If such return has been deficient, the question arises as to whether the reserve belongs to the property or to the investors, or should be divided between them. It is the opinion of the committee that reserves wholly created at the expense of the investors out of inadequate revenues should not be considered for purposes of deduction in determining the rate base, and the decisions of a number of the commissions and the regulations of the Federal Power Commission indorse this view. In the event that with inadequate past revenues the reserve is nevertheless assigned in any cases to the property and not allowed as belonging to the investors, the propriety of an offsetting allowance for some form of non-physical value should be given special consideration. It would appear simpler in such cases to recognize the reserve, together with the surplus, as the property of the investor, and correspondingly to reduce the allowance otherwise appropriate for non-physical value.

The committee is of the opinion that deductions in valuation for depreciation even to the extent of existing reserves really serve no useful purpose, and that the entire question of such deductions may be avoided through a method adopted by certain commissions which avoid injustice to any interested parties. In its decision in the Duluth Street Railway case (1923) P.U.R. 1923D 705, 736, the Wisconsin Commission established a rate base without any deduction for accrued depreciation but held that the income from the reserve should be credited to the reserve, thereby reducing the current provisions for retirements to be collected from patrons.

The committee indorses this procedure adopted by the Wisconsin Commission as a sound and logical solution of the question of accrued depreciation and a means of avoiding further controversies over this problem, which has confused many past valuations.

The committee finds recent decisions and the action of the National Association of Railroad and Utilities Commissioners in recommending uniform classifications of account for electric and gas utilities, these classifications being the only national system so far developed by the state commissions to be in accord with its recommendations in this and previous reports, in that reserves are provided not for accrued depreciation but, rather, to equalize the cost of retirements and to make reasonable provision for contingencies. The word "depreciation" does not anywhere appear in the uniform system of accounts already adopted by more than one-half of the state commissions having jurisdiction over the accounting of electric and gas utilities, the word "retirements" being substituted, thereby avoiding the indefiniteness, confusion, and misunderstanding which the use of the term "depreciation" involves.

It is significant that, consistent with the provisions of these uniform accounting systems, certain state commissions have fixed definite limits to the accumulation of retirement reserves, which limits have no apparent relation to theoretical depreciation existing in the properties. There is further significance in the flexibility in retirement appropriations provided for in the electric and gas accounting systems, which recognize that there is no such factor as a uniformly and definitely accruing depreciation, but rather, that retirements which occur without regularity can adequately be provided for by a reserve applicable to the property as a whole and accumulated with due regard to the prosperity of the business. It is believed that reserves for railway property as a whole based upon available experience can be fixed with greater accuracy than is possible through separate consideration of the various component parts of the property.

The committee recommends that the association, through appropriate committees, undertake to co-operate with the state commissions in eliminating from accounting methods for electric railways any requirement for uniform charges for depreciation based upon estimated useful life of the property, and in substituting therefor the more flexible system of appropriations for retirements prescribed for other utilities.

TERMINOLOGY

No little confusion is added to the complex problem attending the determination of values of properties of public service corporations by the unfortunate and loose choice of terms in the presentation of valuation cases before regulatory commissions. And often the confusion does not stop here, but is passed along by the commissions and perpetuated in commission decisions and opinions of courts of review.

Terminology, in its application to valuation law and literature, embraces not only the choice of technical terms, but in its general aspect extends to a definite use and a correct distribution of these terms.

The present lack of uniformity in the choice and accommodation of terms in treatments of the subject of valuation proceeding from different sources is a situation that can perhaps be condoned, but such condonement ought not to be extended to cases where those responsible for the presentations on the subject use loose and contradictory terms in the same report or decision.

Until such time as it is found possible to go into the matter of a reclassification it seems desirable to limit this portion of the committee's report to recommendations covering definitions of such items as will be made more definite thereby.

Valuation.—The committee recommended that the term "valuation" be used to indicate the final value fixed by a duly constituted authority. It is suggested, however, that qualifying adjectives such as "fair," "final" or "official" be used in connection with the term "valuation" so as to give definite indication of value fixed by a duly constituted authority.

Appraisal.—Following the general lead indicated by courts and commissions in their use of the term "valuation" in official findings of property worth, it is recommended that the term "appraisal" be used to indicate a complete engineering estimate, embracing all the elements of value proceeding from a given hypothesis. When the term "appraisal" is used as applying to engineering estimates, the hypothesis from which it proceeds should be plainly stated, such as "engineer's reproduction cost appraisal," "engineer's historical cost appraisal," etc.

Reproduction Cost. Cost of Reproduction.—These terms with no qualifying words or phases should be used only when the figure presented represents the cost of producing the property at wage rates and material prices prevailing as of the time of inquiry. The determination of this figure necessarily involves the exercise of judgment as the inventory of an established utility property is sure to include some items not on the market at the date of inquiry. The engineer's appraisal on this basis is, therefore, an "estimate" and there should be no hesitancy in so designating it.

Historical Cost.—This term applied to engineering appraisals is defined as meaning the estimated cost of a property resulting from the pricing of the various items or groups of items in an inventory, taken as of the date of the inquiry, as of the time or times when acquired, constructed, or installed. This determination also involves much of estimate. "Historical investment," "book cost" or "actual cost" are the terms that should apply to the results of an accounting analysis that is comparable to the engineering appraisal.

The following definitions are given for the words and phrases used in the schematic presentation, illustrating the classification of terms commonly used in engineering appraisals and in the determination of "fair value."

Final or Official Value is defined as the figure determined upon by legal authority as representing "fair value," after consideration of all relevant facts.

Value of Fixed Physical Property is the figure which results from the consideration of land, the cost of specific construction of property other than land, with the necessary and concomitant general and miscellaneous construction expenditures. Estimates of the value of physical property may be made to proceed from different hypotheses and it is therefore necessary that the basis of the engineering appraisal be clearly stated.

Land of a street railway or other utility company may consist of right of way or other land used in utility operation.

Community Value of land is that value which the land in the proportion that it may be held has for ordinary community purposes. It is the normal market value of similar and contiguous land.

Consequential Damages as an element in the cost and value of land is defined as the excess above the market value of the land for ordinary community purposes that must be paid for, severance, abutting and other damages.

Acquisition cost of land is defined as being the sum total of the expenditures made incident to the actual negotiations for and purchase of the land, such as commissions, cost of plats, title insurance, cost of abstracts, notarial fees, cost of recording deeds and all similar expenses incurred in connection with such acquisition.

Specific Construction is defined as the sum resulting from the application of unit costs to the discoverable items that appear in an inventory plus allowances for omissions in inventory and in price.

Priced Inventory is defined as the result obtained by the application of unit prices to the discoverable items appearing in the inventory. The priced inventory should include, either in material quantities or in the unit costs, allowances for inevitable losses, due to waste, breakage, theft of materials, in amounts determined from experience. All costs determined for application to items of inventory should include the cost of non-productive time, direct supervision, transportation of employees, and all direct supervisory expense. Material costs should include freight and handling and all purchasing and stores expense.

Omissions in Inventory and Pricing.—It is necessary to make allowances for undiscoverable items and for deficiencies in price determinations in order to obtain an approach to the full and complete cost of specific construction. Omissions in this sense are defined to be such allowances as are necessary to overcome the natural tendency toward understatement in studies involving the consideration of innumerable details.

General and Miscellaneous Expenditures.—This term when applied to valuation studies refers, of course, to construction expenditures. The term as defined in this connection included not only the expenditures which cannot conveniently be allocated to specific accounts, but also the expenditures designated "Franchises" in the classification of accounts prescribed by the Interstate Commerce Commission and adopted by numerous state commissions. The accounts included are No. 501—Engineering and Superintendence; No. 545—Franchises; No. 546—Law Expenditures; No. 547—Interest During Construction; No. 548—Injuries and Damages; No. 549—Taxes During Construction; No. 550—Miscellaneous.

Engineering and Superintendence includes all expenditures for services of engineers, draftsman and superintendents employed on preliminary and construction work and also all expenses incident to construction work. All such expenditures are properly included under I. C. C. Road and Equipment Account, No. 501.

Franchises. — The courts have quite generally held that in the determination of fair value nothing shall be included for franchises except expenditures actually made to a state or to a political subdivision thereof in consideration for the privilege of doing business. Franchise costs are included with general and miscellaneous construction expenditures in this discussion only because they are so treated by the Interstate Commerce Commission in the classification of accounts prescribed by that body. It is, of course, recognized that electric street railway companies have in the past paid for franchises and are from time to time required to make expenditures for the purpose of perpetuating their rights to do business in accordance with the terms of franchise agreements. Often the exact amount of the expenditures, however legitimate they may be, are not of record. Where such payments are known to have been made, they should not be excluded in an engineer's appraisal, or from the final valuation, because of the necessity of resorting to estimates of the amounts expended. Such expenditures are of the order of franchise costs and it is recommended that they be included under the heading "Franchises" in addition to actual recorded amounts paid in consideration of franchise grants. Of course, such payments must not be confused with payments for current operating expenses, property taxes, gross earnings taxes, or payments for special taxes.

Law Expenditures embrace all expenditures for legal services in connection with the construction operations of the property whether such services be rendered during the specific period when construction work is going on, before such period or subsequent thereto. All such expenditures are properly included under I. C. C. Road and Equipment Account, No. 546.

Interest.—I. C. C. Road and Equipment Account, No. 547, bears the heading "Interest During Construction." It is recommended that this heading be restricted to the one word "Interest" in the presentation of engineering appraisals and that in the presentation of valuation cases it be made to include all interest properly chargeable to capital, whether accruing during construction, prior to construction or subsequent to construction.

Injuries and Damages.—This term is intended to embrace all expenditures for injuries and damages made in connection with the construction operations of the property whether the actual disbursements occur during the specific period when construction work is going on, before such period or subsequent thereto. All such expenditures are properly included in I. C. C. Road and Equipment Account, No. 548.

Taxes.—This term as used in presentation of engineering appraisals is defined as including all taxes assignable to construction operations and properly chargeable to capital.

The term ***Miscellaneous*** as used in connection with general construction expenditures is defined as including the following: (a) Incorporation, (b) Organization, (c) Financing, (d) Promotion, and (e) Administration.

Incorporation.—This term as applied to engineering estimates is defined as including fees paid to governments for incorporation.

Organization is defined as including office and other expenses incident to organizing corporations, also counsel fees in connection with organization.

Financing as applied to engineering appraisals is defined as embracing the cost of preparing and issuing stock certificates; and also the financial sacrifice on the part of the electric railway company represented by the amount charged by bankers and investment brokers for underwriting security issues, such amounts being the difference between the price at which such issues are sold to the underwriting agencies and the amounts paid for same by the investing public.

Promotion is defined as including cost of preparing and distributing prospectuses, cost of soliciting subscriptions for stock, fees paid to promoters for their services in organizing the company.

Consolidation usually results in a property with some duplication in equipment and with a total cost in excess of the necessary cost of a single system to serve the community. On the other hand the result of a consolidation is usually the establishment of a unified service at a lower fare than was possible under competition. So much of consolidation costs as measures the expenditures resulting in direct benefits to the users of the service, either in rates charged or in the convenience of the service, is defined as a reasonable amount to be included in historic cost appraisals presented as a consideration in the determination of fair value.

Superseded Property.—To the extent that it represents property in the acquisition of which reasonable business judgment was exercised and to the extent that the contribution by users of the service through the fare box have not provided for its retiral, is defined as a proper inclusion in an historic cost appraisal as a consideration in the determination of fair value.

Other Non-Physical Elements.—Undoubtedly, there are cases where the circumstances that have attended the creation of electric railway and other utility properties demand the consideration of non-physical elements other than those which are herein mentioned, but the attempt is not made here to enumerate all such considerations.

Administration.—under this heading are to be included the salaries and expenses of general officers of an electric railway under construction, assistants, clerks and other employes in general offices engaged on construction accounts or work; rents and repairs of general offices and all office expenses incident to construction operation, whether such services are rendered during the specific period when construction work is going on, before such period or subsequent thereto.

Working Capital is defined as those floating assets, cash and materials and supplies so essential in the establishment and preservation of the credit of the company and the proper maintenance and operation of its physical plant.

Non-Physical Elements of Value are defined as such elements as are not susceptible of physical enumeration or measurement, but which represent real and genuine value attaching to a property that has justified its conception, maintained its existence, and demonstrated its serviceability in the life of the community.

Going Concern Value is that value which a plant possesses by reason of the fact it has advanced from the state of a mere collection of physical units just ready to commence operation to the state where it is an operating plant, functioning and doing business; it is such value as it possesses over and above a like plant which is operable but not actually operating.

ENGINEERING AND ACCOUNTING PROBLEMS

Whatever legal and economic principles may eventually be held to be controlling, the actual fixing of values will continue to depend upon the correct and practical application of sound engineering and accounting principles.

Life of Property.—The relation of the age of a particular unit of property to its remaining service life is frequently discussed in valuation proceedings, particularly by those engineers or commissions who believe that property should be depreciated on a life table basis, and in many other investigations the probable service life of units of property is a matter of practical importance.

Lives of different classes of property vary with differing conditions of use, not only from city to city but even in the same city from time to time. No table of lives can be prepared which will be of general or continuous application, but methods of recording and compiling life data can be developed which will make possible more accurate estimates than any now available. This is particularly true if the estimate is confined to retirements due to actual use. When, however, service life is so defined as to include the influence of possible inadequacy and obsolescence, no accurate estimates are possible. Bearing in mind that inspection by competent engineers familiar with both conditions of operation and with the progress in the art is the only satisfactory basis for judgment as to the future usefulness of property, whether now in service or about to be acquired, it should be possible to standardize methods of engineering inspection and forms of recording valuable data which will cast much light up the difficult problem of providing for necessary property retirements.

Miscellaneous Construction Expenditures.—In the past much confusion has resulted from lack of uniformity in methods employed to determine miscellaneous construction expenditures or construction overheads. More recently substantial progress has been made in associating with specific construction a greater part than heretofore of the miscellaneous expenditures and in clearly defining the nature and the extent of these miscellaneous expenses which cannot be so associated. There is still an opportunity for improvement and the Engineering and Accounting Associations can be of assistance to the industry by developing and recommending practices which will enable appraisers to prove from records currently kept the amounts of the several miscellaneous construction expenses claimed.

Economy in Appraisal Work. — The committee fully concurs in the findings of its predecessors that much unnecessary time and expense have been employed in the making of valuations and that, in so far as possible, time and expense should be kept at a minimum. Reference has been made in previous reports to the so-called "yardstick" method of appraisal. It should be borne in mind that no one "yardstick" can be chosen which is applicable under all conditions, and in each case that "yardstick" should be chosen which involves detail commensurate with the requirement of the case in question.

Because of the practice frequently indulged in by counsel of examining appraisers in the most minute detail on the nature and value of the smallest physical units in order if possible to show items which have been overlooked or errors which have been made and by imputation thus to reflect unfavorably upon the whole appraisal, engineers have been driven to the practice of making appraisals in detail wholly incommensurate with the necessities of the case and detail which lends but specious accuracy to conclusions. So long as courts and commissions permit the dissection of reports into insignificant and inconsequential detail it will be necessary for appraisers to spend time and money necessary to protect their conclusions against an attack of this nature.

There are in use by engineers and contractors methods of estimating as a basis for the preparation of bids which are recognized as more or less standard practice. We would suggest that the adoption by appraisers of such methods is the best protection against the unnecessary and inconsistent examination by counsel referred to above. Conclusions reached by a method which is in frequent, if not in general use, have a weight considerably exceeding that of conclusions following equally good but less generally used methods.

The investigations and recommendations of the Accounting and Engineering Associations concerning estimating practice would be of substantial help to the industry if they resulted in the recognition of certain methods as standard.

The principal possibility of effecting economies in the making of appraisals apparently lies at this time along the line of a closer contact between the engineering and legal staffs and in the agreement between parties as to inventory in advance of the trial of any case.

Evidences of Going Value.—Going value is generally recognized by courts and commissions, but not infrequently allowances are inadequate because the evidence submitted is fragmentary or otherwise unconvincing. A most useful service can be rendered by the Engineering and Accounting Associations in making a study of the methods of proof of going value most appropriate under different circumstances.

Index Numbers—Authoritative index numbers of electric railway construction costs would be most useful in determining the effect on an appraisal of pricing as of various dates. If such index numbers were available they would permit such determinations with sufficient accuracy for many purposes without the great labor involved in detailed repricing of inventories. It is appreciated that no single index number can be developed which can be applied indiscriminately to all classes of electric railways—urban, interurban, rapid transit, etc. To achieve flexibility in application it is necessary that the index number for individual use be a composite of several primary index numbers relating to different classes of property and to different elements of cost. With the relative weight of the different classes and elements of cost known the primary index numbers may be combined into general index numbers suitable for use with different types of property.

The detailed work of developing such index numbers is considerable, but once developed they may be brought to date from time to time with reasonable effort. Some data have been assembled and the committee feels that the possibilities of constructive work along this line are such that they warrant further study.

The report was signed by E. J. Bechtel, H. M. Brinckerhoff, H. A. Clarke, Thomas Conway, Jr., W. Findley Downs, J. A. Emery, T. E. Francis, C. W. Gillespie, J. B. Klumpp, W. H. Maltbie, L. R. Nash, A. S. Richey, Frank Silliman, Jr., W. B. Tuttle, E. D. Uhlendorf, W. H. Sawyer, executive committee member; J. P. Barnes, executive committee member; F. C. Hamilton, vice-chairman, and F. W. Doolittle, chairman.

G. A. Richardson, vice-president and general manager Chicago Surface Lines, presented the report of the committee on unification and co-ordination of all forms of local transportation.

Unification and Co-ordination of Local Transportation

The purpose of a city's transportation system is to carry people who desire to ride, in the quickest and most convenient manner possible, safely and at a reasonable fare. The wide variety of service to be rendered in the various sections of a city requires the use of several methods, but in order to permit the tremendous variety of routes necessary to the individual citizens, the parts of the system should be under a single management, and should be so carefully co-ordinated as to provide the maximum of service at a minimum cost without discrimination or special privileges.

The entire cost of transportation must be paid for by the fares collected. Competitive or duplicate service is wasteful, and under existing public regulatory methods should not be permitted in the best interests of public welfare.

Proper unified service may involve the use of various types of vehicles for various methods of operation, but the present flurry of opinion that the street railways may be supplanted cannot be sustained. Many authorities might be quoted, but the following comments published in the proceedings of the A.E.R.A. for 1920 are probably most interesting since they come from representatives of the largest motor-bus system operating under conditions and traditions most peculiarly fitted to motor-bus service. This quotation is an extract from a paper written by Messrs. George J. Shave and Frank C. Pick of the London General Omnibus Company, Ltd.

"It is possible to frame an ascending scale of densities of traffic, and to note the limits in the scale which mark the service capacity of different instruments of transport. Such a rough scale prepared for London would be as follows: Very light—under 500,000 passengers per mile of route per annum; light—from 500,000 up to 1,000,000; medium—from 1,000,000 up to 4,000,000; heavy—from 4,000,000 up to 6,000,000; very heavy—over 6,000,000 passengers per mile of route per annum. (Mile of route is here used to define 'mile of street,' or the operation in both directions.)

"Then, calculating the maximum possible carrying capacity of the flow of motor omnibuses or tramcars through the streets or of trains on a railway and the minimum possible load for each class of service which would be economical, we can decide as follows: Very light passenger traffic can only be economically carried by motor omnibus; light passenger traffic is best carried by motor omnibus, but can also be economically carried by street car; medium passenger traffic can be carried by motor omnibus, street car or railway train; heavy passenger traffic can only be carried by street car or railway train; very heavy passenger traffic can only be carried by railway train.

"Such a scale may be applicable to American conditions without change, but probably the maximum limits for medium and heavy traffic are slightly higher."

A general review of the present-day situation is all that can be stated, because each specific problem can only be answered by a careful analysis of the factors involved.

The ideal development of a city as to its growth, zoning, transportation plan, or any other essential feature, cannot be made to exist, but the nearest practicable approach may be worked out on the basis of the fundamental principles herein outlined.

In the development of city transportation through the last seventy years various types of vehicles have been used, each new type supplanting its predecessor when proved more efficient and more serviceable. As the cities grew in size the tendency toward competition and promotion grew also, but the development of the electric car put a new enthusiasm in the public mind and promoters built lines wildly.

Resulting confusion, speculation and lack of system in routing ultimately proved disastrous, and in all cities a partial or total consolidation of lines became necessary. This grouping of various routes has permitted the street railways to serve the communities adequately for a relatively low fare, and has stimulated the growth of the various neighborhoods as natural conditions warranted, since the unlimited ride for one fare, with liberal transfer privileges, has enabled the people to choose their home locations without too much regard for the location of their places of employment. The result of consolidation, too, has been to permit simpler car routings, to create greater reliability of service; has removed duplicate or waste investment, and has enabled the desirable and necessary extension work to be carried financially in the beginning by the lines of heavy riding. Maximum service to the public at the lowest cost is only obtainable under a unified system.

The rapid development of the automobile started a new wave of promotion and speculation in transportation. From the irresponsible jitney has grown the motorbus, and because of the enthusiasm over a new idea in transportation having a real semblance of value, destructive competition has been freely established and publicly welcomed. War conditions in some instances prevented railway development of the motor bus as an auxiliary, while the natural hesitation of discriminating and informed railway leaders, who saw the weaknesses of the new vehicle, left to the promoter the whole field of motor-bus exploitation.

The situation in many cities is now too much like that early period of street railway promotion and must develop toward an economical co-ordination of all essential public carriers.

Three general classes of public carriers are well recognized as workable and desirable in proper circumstances.

1. *Rapid Transit lines*, using elevated, subway, private rights-of-way, or combinations of these.
2. *Surface street railways*, operating single cars, with two men or one man, or part time each way; operating motor and trail trains; or two motor-car trains; operating on streets, or private rights-of-way, and in subways in congested areas.
3. *Motor buses.* Double deck for busy routes; single deck for lighter traveled lines.

Each of these can have a logical place for operation, but an electric street railway can and does serve completely and most effectively in many cities. The possibilities of economic use of rapid transit lines or of motor buses is extremely limited, as compared to the use of surface street railways. Each type of service is undergoing development, and none needs development as much as the newest of the three, the motor bus.

A rapid transit system, involving a very expensive right-of-way, is only justified where the density of travel can create sufficient use for the investment. Elevated railroads cost at least four times as much as surface street railways, and subways four or five times as much as elevated lines. Yet when cities reach a size above three quarters of a million, the congestion of some streets slows down operation of all vehicles on these thoroughfares and so concentrates travel in certain directions as to make it a civic necessity to cut new special streets, or create new levels for the transportation of the great volumes of passengers. The congested area, or number of such routes affected, varies with the population and topography of the city. The most economical answer is in each case only decided by the special local circumstances. But rapid transit, or special right-of-way transit, is an absolute necessity in some cities and serves its purpose best when used to carry people rapidly between congested areas and various distributing points, to or from which they are carried by other units using the uncongested public streets.

It is evident that the rapid transit system must be a trunk line collecting most of its passengers from surface lines and carrying them from the point of transfer to the business section at high speed over unobstructed right-of-way. Electric trains on private right-of-way provide the speediest, most comfortable and most economical method of handling large volumes of passengers without interference to or from local traffic along the line of travel.

No form of increasing street capacity in congested areas is so effective as a subway-elevated combination railroad, but the necessary economy for the system as a whole demands that the use of surface lines be rearranged on the building of rapid transit lines, so as to cause maximum use of the expensive structures in saving time for passengers and limiting street congestion.

Surface lines are still the most economical and most desirable vehicles for transportation in most sections of all cities. In even the largest cities only a few traffic routes support rapid transit lines, and the passengers cannot all live within walking distance of rapid transit stations. Besides acting as feeders, the surface lines must serve the great part of the city's area. They do so with good speed and at a minimum cost with maximum comfort and safety.

In cities of 750,000 population, or less, and in some cases in cities up to a million, the entire service can be provided without rapid transit trains. On the heavier routes, which are yet not heavy enough to support the expense of rapid transit, two-car multiple-unit trains, able to couple and uncouple on the road with the second car operating as a one-man car to and from the depot, will move with greater speed, economy and convenience than the same number of single cars.

It is essential that the city and state authorities recognize for the most traveled highways the approaching need of rapid transit, so as to retain and maintain for the surface cars a clear right of way for the speediest and safest operation. This is fundamentally necessary because the use of the streets should be so arranged as to provide the maximum good for the greatest number.

Street cars carry passengers along the street with an efficiency in use of street area varying from ten to twenty times the efficiency of private automobiles, and public interest, therefore, demands special freedom of movement for street cars and the making of busy railway trunk lines into "through traffic streets," with preference of right of way over cross streets.

The riding public must, in some way, pay the cost of transportation. The streets are intended for maximum service of the city's population, and when they become inadequate new streets must be bought and paid for by the public, directly or indirectly, whether in the form of street widening, subways, or elevated structures for electric trains.

It is then equally logical that the public set apart the street railway trunk-line streets for the principal use of the street railway lines that are such a predominant convenience. Such action postpones the time of building subway or elevated lines, and can provide speedy transit for the majority of the people, while good pavements on other than street railway streets can give sufficient routes for other vehicles, such as private automobiles, trucks, etc. In a heavily congested area relief can be largely provided by the building of subways for surface cars before it is necessary to develop a rapid transit system.

The street car has been developed to operate with the maximum economy under various circumstances. Two-man cars can be coupled to operate as three-man two-car trains. Single motor cars can be used as either one-man or two-man cars, depending on the volume of business. Special one-man cars can operate on lightly traveled lines. Each unit has been developed so that its maintenance is low and its cost of operation well below that of any other type of vehicle, even with fixed charges for track structure included. The use of these units is well understood.

The new unit in transportation is the motor bus, and its place and function have not yet been well established. In its present form it shows great possibilities, but much improvement can yet be developed to make it a more economical vehicle, and to permit it to serve with greater effectiveness.

The open-top double-deck bus has limitations in carrying capacity in inclement weather. Much of its appeal, in pleasant weather, is because of the open top, but this is like the original summer street car and has sufficient drawbacks ultimately to eliminate the open-top vehicle as a regular means of transportation. It is unnecessary and wasteful duplication of service to provide for general use a vehicle having less than 50 per cent of its seats available in inclement weather, since the rest of its passengers must then be cared for by other means of transportation, so that there are in regular operation double facilities for passengers, one of which is used on rainy days and the other on clear days. Improvements which will provide a steady earning capacity must come, since the sight-seeing value of the open top is really a serious factor only with the Fifth Avenue service in New York.

It is highly improbable that buses can ever operate at a cost as low as that of a street car with fixed charges left out. Under comparable conditions the bus is not able, on either congested or free streets, to operate at so high a speed as the street car. In the relative use of street space, per passenger served, considering area of vehicles and speed of movement, street cars are approximately twice as efficient as buses.

Since it is more costly to operate and more wasteful of street space, the double-deck bus should be limited to that class of service giving special accommodation in seats and limited stops. This appeals to a certain part of the traveling public, and is justifiable if a higher fare is collected for its limited service, and if it does not interfere too much with the operation of street cars serving the greater portion of the people. It should not normally operate on railway streets. The adding of bus lines on a double-track street is the equivalent of creating a four-track street.

The single-deck bus has a comparatively low carrying capacity and can be operated by one man. It serves its purpose to give a reasonable headway on such streets as cannot economically support the investment in a street railway line, either in short routes or as extensions or feeders for railways. The single-deck bus cannot economically compete in operating cost with the surface cars except on lines of light loads and headways of more than 15 minutes. The relative economy depends on the cost of track and auxiliary structure, and its effect on cost per mile operated.

In smaller cities, where the downtown area is not congested, single-deck buses of a co-ordinated system may properly be routed to the heart of the city where the point of delivery from the logical feeder bus route to the street railway line would come so close to the downtown district as to make a transfer between bus and car undesirable.

Bus operation that competes with street railways is manifestly wrong. Any bus system operating in or adjacent to metropolitan areas served by street cars is competitive. Since buses operate on public streets without being charged for paving maintenance and installation cost which the street railways bear, they are collecting a higher fare with a very low investment, and are rendering only such service as is profitable, leaving the lean lines, light hours, and most of the service in inclement weather to be furnished by the railways. Destructive competition of this sort is totally unfair and unjustifiable.

The spirit of promotion, or of exploitation, prevails in most motor-bus developments. Public enthusiasm over gasoline-driven vehicles is clouding sound judgment. Many bus lines are being developed solely to force purchase by an established railway, others to promote bus sales.

Among the interesting opinions bearing on the general subject is that in the case of the Washington Rapid Transit Company (P.U.R. 1923 B, 328) in which it is said: "In our opinion there is a legitimate field for bus service, but it does not lie in the multiplication of lines or of vehicles reaching the heart of the city. It lies rather in providing service in extension of the street car lines into territory so thinly settled as not to justify the large investment necessary for street railway service. The bus lines should be feeders. They should create business and not rob the street railways of the just reward due their heavy investments for the public benefit. An exception to this principle arises when the existing street railway service proves to be inadequate and, for reasons either physical or financial, additional street railway lines cannot be created. In such cases, even in thickly settled territory, the obvious recourse is to bus lines; but, in the absence of legal objections, the best interests of the public will be promoted by causing such lines to be owned and operated by the street railway companies and to coordinate them with the car lines so that transfer privileges and other desirable joint relations may result."

CONCLUSIONS

1. The electric street railway is, and will continue to be, the predominant factor in city transportation.
2. Modern transportation uses, under various circumstances, three general methods, rapid transit trains, surface street cars, and, in a slight degree, motor buses. The proper use of each must be made clear in the public mind.
3. Competitive conditions in transportation should not be permitted since the riding public must pay a higher cost due to duplication. Competition from new organizations is largely developed for promotional reasons.
4. The value of a well regulated coordinated system, adequately serving the community and sufficiently compensated therefor, must be made clear to the railway managements, to the regulatory bodies, and to the public.
5. If more than street cars in their various forms and combinations are needed, electric railway managements, and the American Electric Railway Association, should advocate proper and sufficient use of the various transportation factors to make a suitable corelated system giving adequate and convenient service.
6. Analysis shows the very effective use of street area by surface cars. The use of streets should be arranged for the maximum public good by greatly reducing vehicle interference with surface cars. Great public benefit would result from segregation of traffic giving busy car lines such freedom of movement as is provided for private automobiles by boulevards or through traffic streets.
7. Further investigation and report should be made, tabulating opinions and rulings of commissions and public authorities, so as to show the need for creating a regulated monopoly of local transportation which would establish favorable financial conditions, proper traffic control and distribution, and greatly increase the safety and speed of street cars. In the public interest, heavy investments in elevated and subway lines should be obviated on as many routes as possible, by special development of surface streets to permit safe, speedy, free running by street cars.

The report was signed by H. C. Abell, C. P. Billings, B. C. Edgar, W. F. Ham, A. D. Mackie, A. T. Perkins, D. W. Pontius, A. E. Potter, R. T. Sullivan, F. R. Coates, C. D. Emmons, L. S. Storrs, G. A. Richardson, chairman.

At this point in the proceedings, President Budd read a letter from President Coolidge addressed to Vice-President W. H. Sawyer. The letter appears on this page.

The meeting was devoted from this point on for the next hour to a discussion of the co-ordination of motor bus and electric railway from two points of view—one paper by Mr. Brosseau, president Mack Trucks, Inc., New York, and the other by Paul Shoup, president Pacific Electric Railway Company, San Francisco. Both papers appear elsewhere in full.

Hon. Ezra B. Whitman, chairman Public Service Commission of Maryland, then made an address on "Coordination of Transportation." An abstract follows:

Co-ordination of Transportation Systems in Maryland

Mr. Whitman opened his talk by saying that in a case recently before the commission the attorney for the railway company said he did not think the commission had sufficient experience or intelligence to decide the case. The commission had already made up its mind to decide in favor of the railroad, but this statement made it hard to do so. The speaker then referred to several bus installations in the vicinity of Baltimore. In one case the property owners in a suburban district wanted the United Railways & Electric Company to build a trackless trolley line to serve a real estate development, but the commission knew that the company would lose money if it did so. At the same time, such an extension would be very helpful to the real estate owners and would also benefit both the city and the county from enhanced realty values. It refused to require the extension, but the road was built because the realty owners raised a fund by which the company was guaranteed $10,000 during the first year, $7,500 during the second year, and $5,000 during each of three succeeding years, if there should be a deficit. Last year the company collected the full amount of the first-year guarantee.

In another case, some wealthy people petitioned for the right to put 20 buses on Mount Royal Avenue, but the commission realized that if this line was put in service, a considerable part of its traffic would undoubtedly come from the parallel trolley lines. In consequence the commission put the question of this installation up to the railway company, and it was agreed to put the line in service. During the first year the deficit from operation was $35,000.

In another instance in Baltimore the company had put in a north and south bus line in the western part of the city to connect a number of trolley lines. A similar line was desired on the East Side and an outside company offered to put it in, but the commission requested the United Railways & Electric Company to install the line.

Maryland has many good roads, and leading out of Baltimore are a number of fine avenues, most of which have independent bus lines. Before the present commission assumed jurisdiction, one of these lines ran down town and others have now petitioned for the same privilege. Up to this time the commission has ruled that these must stop at the junction with the trolley lines, and passengers come into the city by trolley, but there is great pressure from users for travel without change. This is one of the problems of the commission. If the bus companies ran down town they might be required not to carry local passengers, but it would be difficult always to enforce this rule as regards local riders.

The speaker cited another instance in Baltimore. The Roland Park Company

A Message from the President

WASHINGTON, D. C., Oct. 2, 1924.

MR. W. H. SAWYER,
Vice-President
American Electric Railway Association

YOUR letter concerning the annual convention of the American Electric Railway Association, at Atlantic City, is before me. I have noted your statement that this convention is to give particular consideration to the traffic problem, which in recent years has become so serious in our cities.

It is gratifying to know that the executives of the urban and interurban transportation companies are grappling so vigorously with the entire set of problems which involve the coordination of various modes of intramural transportation, including buses, with a view to assuring the best service to the public at the lowest cost.

It is apparent that this set of problems must demand the attention of municipal authorities and the transportation companies for a long time to come. There has never been a time when greater need existed for the comparison and exchange of experience in dealing with these matters.

I am glad to have your assurance that the electric railway industry is now in a more healthy condition than at any time since the war. I feel that broadly constructive policies and liberal attitudes are necessary in dealing with these problems, and wish you to extend to the association members my congratulations on the fact that they are taking these matters up in such effective fashion. CALVIN COOLIDGE.

has developed a very fine real estate district and wanted the railway company to extend one of its lines 1⅓ miles, and agreed to take sufficient bonds to pay for the construction of this line and to cover deficits within a certain time, except that it would receive a credit of $50 a year for every house erected. When the company declined to accept this plan, the park company presented the case to the commission.

The matter has been settled by the park company buying a six-wheel bus and the railway company operating it. The flat fare in Baltimore is 7½ cents, and an additional charge of 2½ cents is made for passengers who ride to the end of the 1⅓-mile bus extension and also use the trolley cars. Here also there is pressure for an extension of this bus service down town.

A committee representing various civic organizations is now considering the question of how the suburban extensions should be operated. The railway company at present is required to extend its lines to the city limits, and it may be that a charge of 2 or 3 cents extra for short extensions, as in the Roland Park case, may be the best thing.

Much the same situation occurs in the country districts. Thus, in the western part of Maryland, the electric railway interests in Frederick have organized a bus company and there are also several independent bus companies. The advantages of co-ordination of the services are recognized, but it is difficult to see how the independents can be forced to sell out.

A very similar situation exists on the Eastern Shore, though there it concerns steam railroads and motor bus and motor truck lines. Owing to the inroads on its traffic by the latter, the Pennsylvania Railroad threatened to abandon some of its lines and did so in one case, and was about to do so in another. People along this latter line, however, petitioned for a continuation of railroad service, which they said was necessary for their community existence. In the meantime, the Pennsylvania Railroad has been installing some motor trucks in co-ordinated service with its railroad system.

These are some of the practical questions which the commission is trying to solve in the right way.

L. F. Eppich addressed the meeting on the subject of the necessity of electric railways in communities. His discussion was from the point of view of the real estate man, and it appears elsewhere.

W. D. B. Ainey, chairman of the Public Service Commission of Pennsylvania, addressed the meeting on the same subject. He spoke briefly of the marvelous changes of the age in which we are living and wondered whether we can quite keep pace with them. Yet we must, he said. We must revise our ideas, as these changes come along, for the public outlook has changed. Whereas years ago a man with a new invention was ridiculed, today the public accepts new things promptly and is very quick to respond to the new and discard the old. These changes bring up many problems which it is useless to try to avoid. Mr. Ainey said that electric railway men have the American grit, energy and vision to solve these problems as they apply to transportation. Not only must new forms of transportation be accepted and utilized, but into the transportation business must be incorporated the progress made in allied industries, such as the great development in the generation and utilization of power.

In Pennsylvania some of the railway companies are still utilizing power plants which consume coal at the rate of as high as 4.54 lb. of soft coal per kilowatt-hour. Mr. Ainey emphasized the fact that railways must take advantage of cheaper power development as it comes along, and tie in with the super-power development. More careful scrutiny of railway operation is needed, for the type of service which was given by electric railways before the war is no longer acceptable to the public.

Friday's Session, American Association

President Budd called the final session of the American Association to order Friday morning at 10:15. The first report presented was on insurance, by John T. Staub, Baltimore, chairman. An abstract follows.

Insurance

The committee reported that it had held a number of conferences with the Central Traction and Lighting Bureau, which is a fire insurance organization designed to deal with the electric railway industry, for the purpose of securing for the entire industry a reduction in fire insurance rates. A statement was submitted to that bureau showing fire insurance premiums paid, fire losses sustained and losses recovered during the period from Jan. 1, 1895, to Dec. 31, 1922, which showed the ratio of losses sustained to premiums paid over this entire period to be 38.69 per cent and the ratio of losses recovered to premiums paid to be 31.96 per cent.

On the basis of the figures in this statement the committee concluded that the loss ratio warranted a reduction of 15 per cent in the fire insurance rates for the industry and recommended that member companies make application for such reductions. It was also recommended that the committee be continued.

The report was signed by O. H. Bernd, G. H. Bourne, N. H. Daniels, B. J. Denman, C. E. Fahrney, F. M. Hamilton, A. D. Knox, J. H. Moran, H. A. Nicholl, C. B. Scott, P. E. Wilson, C. E. Morgan, and John T. Staub, chairman.

In presenting the report on publicity, W. H. Sawyer, East St. Louis, Ill., called attention to the assistance which the association was able to give in publicity matters and that many companies were not taking advantage of it. He also said that Barron Collier, Inc., had proffered the services of its large staff of artists and ad makers to the association and to its member-companies without charge. All designs put out by the association within the last few years had been contributed by the Collier company absolutely without charge to the association, and railway company members could have the same assistance without expense. Mr. Sawyer then presented the official report of the committee. An abstract follows.

Publicity

Using a wide variety of mediums, including newspaper advertising, car signs, news articles and the radio, the committee has emphasized particularly these facts during the past year: That the electric railway industry has come back strongly and is going forward to perform a greater service than ever before. That buses are not going to supplant electric railways, but that they will have a supplemental place in local transportation controlled by electric railway companies. That city street congestion must be relieved in simple fairness to the electric railway passenger. That the electric railway industry is burdened with many unfair taxes, especially for paving. That the fixed fare, whether 5 cents or any other inflexible rate, is economically unsound and is being abandoned generally. That interurban railways offer the quickest and best short-haul freight and express service and that their influence in this field is widening. That owners of private motor cars should abandon the practice of giving free rides to potential electric railway passengers.

To disseminate these facts the committee has issued regularly posters for use in cars, stations, on factory bulletin boards, etc. It has also done these things: Prepared and distributed, with cuts, suggested newspaper advertisements. Made releases through newspapers and magazines whenever news value warranted. Co-operated with all state committees on public utility information in supplying material, particularly to the smaller papers, state and city officials, libraries, schools and colleges. Issued monthly the bulletin "Truth" for clipping by editors, or display on bulletin boards. Furnished salient news facts about such outstanding situations as the abandonment of service in Akron to state committees and companies by wire and special mail. Prepared and distributed booklets dealing with outstanding facts in the situation. Aided in obtaining speakers for conventions, state and sectional and local. Co-operated with writers for financial papers, magazines and other publications in the preparation of special articles.

For the future the committee submits the following recommendations. Start a "Shop Early" campaign—10 to 4 o'clock—immediately in advance of the holiday crowds. Continue to emphasize the traffic congestion and paving problems particularly. Strive by continued co-operation with the Committee on Co-operation of State and Sectional Associations to obtain 100 per cent membership of electric railways in state committees on public utility information.

Consider the advisability of producing posters in color as has been done so effectively by the Chicago Rapid Transit Company and the London Underground Railway. The problem of producing color work is strictly one of financing. Under the present budget of the Advertising Section it is virtually impossible to obtain artistic poster effects and make a national distribution of them, but the question of extending the section's activities along this line would seem to be worthy of study.

The report was signed by P. S. Arkwright, Frank L. Blanchard, John S. Bleecker, F. R. Coates, P. H. Gadsden, L. E. Gould, Luke Grant, J. P. Griffin, F. T. Griffith, H. M. Lytle, J. C. McQuiston, Martin P. Rice, O. A. Smith, L. S. Storrs, E. M. Walker, E. F. Wickwire, Barron Collier and W. H. Sawyer, chairman.

Robert G. Gordon of Louisville addressed the convention on the Muscle Shoals situation. His address appears in part elsewhere. The meeting then adjourned.

James Walker, consulting engineer of Chicago, presented the report of the committee on rapid transit. An abstract follows.

Rapid Transit

In January, 1924, the committee on rapid transit was appointed to begin the work of collecting facts and data in connection with the development of rapid transit. Many cities are apparently going ahead with some contemplated provision or actual rapid transit installation to relieve their own peculiar transit conditions, but without regard for the enormous cost involved in the building of real rapid systems with a sufficient capacity for both present and future needs.

The committee feels that the whole question should be covered in the broadest possible manner in order that the range of facts and principles presented may include sufficient ground for the formulation of true conclusions, and it finds that the work of gathering these facts is a large one and that in the time afforded there has been opportunity only to make a beginning. It will be necessary for future committees on rapid transit to carry on this work.

It is believed that a real study of this subject should include all the methods of local transportation within a community where rapid transit already exists or is contemplated, to determine, if possible, at what point in the growth of the large modern city it becomes necessary or expedient to start such an undertaking. Cities and their collective populations are imitative. What one has the other wants, until today there is a so-called "subway" question in many American communities not yet so equipped.

Rapid transit or grade separated routes follow three principal forms of construction, namely, subways, depressed lines and elevated railroads. Subways hold the public eye chiefly because they do not interfere with, but rather enhance the value of, contiguous land. This enhancement has very practically been considered in some instances as the logical reason for the enactment of assessment legislation by means of which a substantial part of the construction cost might be raised. Enough data have been gathered in this connection to prove that the owner of property abutting on subway routes is a substantial beneficiary. The subway line also has the advantage of protection from the weather.

On the other hand, either the publicly or privately owned subway has the highest construction cost of any form of modern rapid transit route, thus at once presenting economic difficulties in regard to the public conception of a normal rate of fare. The subway is noisy so far as the passenger is concerned, and, as now operated, has no higher speed than the elevated or depressed line and a somewhat lower capacity in the number of trains and cars per hour.

The depressed line may be used to advantage under certain conditions and is next in cost to the subway when constructed through the settled portion of the city. Its operation is in the open air and its effect on the abutting property has thus far been considered advantageous. Manifestly this form of construction in most cases results from the adaptation of former steam railroad right-of-way and would otherwise be used only in residential or outlying sections of the city rather than through the business or downtown sections.

The elevated line on steel structure with ballasted deck has the advantage of the relatively lower cost, high speed, large capacity in trains and cars per hour, open air operation, non-interference with sub-surface utilities and general adaptability to construction through any section of the city. Though noisy to abutting dwellers, its general record has been that of enhancement in the value of contiguous property. The cost of elevated lines is about the same whether on public or private right-of-way, because the damages in occupancy of the street about offset the cost of land for private way.

In order to make a beginning in the collection of information a program of inquiries was started covering the cities of New York, Brooklyn, Boston, Philadelphia and Chicago. This program involves: Description of the existing rapid transit properties in various cities; statement of cars in operation; earnings, operating expenses and traffic; aims of the systems in regard to service and benefits to the public; problems of relationship and financing; methods of control and regulation; cost of typical and unusual construction; general descriptive matter; cost of construction of rapid transit lines at present-day prices. Under these nine headings are fifty-two sub-headings covering detailed information as to all the general characteristics of rapid transit systems. Investigations are being made also of conditions in Cincinnati, Cleveland, Detroit, Los Angeles, Pittsburgh and St. Louis, cities which are contemplating subway construction.

It has also been thought desirable to obtain information concerning Old World cities, such as London, Paris, Berlin, Glasgow, and also from Melbourne and Sydney. The foregoing eleven American and six foreign cities are being covered by direct inquiry, and indirectly through the files of the ELECTRIC RAILWAY JOURNAL. From the latter have been indexed and partly abstracted some 16,000 articles on local transportation covering the last 30 years of history of these cities.

The general function of the rapid transit lines should be the movement of mass traffic at maximum speed. All other local transportation within the city can be so related to the rapid transit systems as to provide the maximum convenience to the traveling public. Comparative average speeds under heavy traffic conditions in city operation may now be rated at about 8 to 9 m.p.h. for bus service and 9 to 10 m.p.h. for surface street railways, while the local movement in rapid transit is 14 to 15 m.p.h. and express movement from 18 to 25 m.p.h.

Average rush-hour passenger capacities under operating conditions similar to the foregoing measured by one-way movement alone would be for the bus lines 9,000 to 10,000 passengers per hour, surface cars 14,000 to 16,000 passengers per hour and rapid transit trains from 45,000 to 60,000 passengers per hour.

Subways in the business district, where underpinning of high buildings is required, are estimated to cost $8,850,000 per double-track mile. In well developed residential and small store district, where street traffic must be maintained and construction operations are considerably hampered, subways are estimated at $5,080,000 per double-track mile. Subways in sparsely developed sections are estimated at $3,800,000 per double-track mile.

The average of these three classes is in excess of $5,000,000 per double-track mile or $2,500,000 per single-track mile. Elevated construction in sparsely settled sections is estimated to cost only $1,050,000 per mile of double track and a double-track surface railroad (overhead trolley), including modern pavement in the railroad area, costs in some cities today approximately $100,000 per mile of double track.

Based on the above figures, the elevated rapid transit lines would cost about 10 times as much as trolley railroad in the street, and subways would cost 50 times as much as a trolley railroad in the street, while the maximum capacity for carrying passengers in a subway railroad is only approximately four times as great as that of a trolley surface railroad.

In closing, the report of the committee on rapid transit calls attention to the fact that only a beginning has been made in the collection of information necessary to a better understanding of the subject, and that much work yet remains to be done.

The report is signed by J. H. Alexander, E. J. Burns, Edward Dana, J. S. Doyle, B. J. Fallon, R. F. Kelker, Jr., W. H. Maltbie, L. H. Palmer, F. R. Phillips, G. A. Richardson, W. S. Twining, James Walker, G. C. Hecker and W. S. Menden, chairman.

Mail Pay

L. H. Palmer, United Railways & Electric Company of Baltimore, presented the report of the committee on mail pay. It spoke about the hearings earlier in the year on the subject of adequate compensation from the Post Office Department for the transportation of mails by electric carriers. He said that the committee had learned, on Sept. 22, that no decision would be handed down before the present convention. The report said that the committee had made every effort to present all the facts to prove that an increase in the payment for transportation of mails should be made, and the committee expressed its thanks to member and non-member railway companies for information furnished.

Co-operation with State and Sectional Associations

The report of this committee was presented verbally by J. P. Barnes, Louisville, Ky., chairman. He explained that the committee had made an effort to be represented by some member at the meeting of every state and sectional electric railway association during the past year. In this way it had encouraged co-operation between these associations and the national association. The committee had also in this way kept in close touch with the various state committees on public utility information, and this has proved a great help.

Edward Dana, Boston, Mass., presented the report of the committee on education. An abstract follows.

Education

The report of the committee on education was preceded by a personal statement from Edward Dana, general manager Boston Elevated Railway, chairman of the committee. He testified to the value of the results of educational work done on the Boston Elevated Railway during the past few years and said that his work on the committee during three years had impressed him with the vital relations that education bears to the gradual economic upheaval which is going on in all industry. A higher level of intelligence on the part of all workers is necessary, particularly those who come in intimate contact with the public, as do most electric railway employees. This intelligence must be largely developed through vocational training in the industry itself.

In reviewing its activities, the committee stated that it early reached the conclusion that the preparation of courses on economics and for trainmen, which was among its assignments, required the time of a specialist. To accomplish this, an appropriation of $5,000 was recommended. The executive committee deemed such an appropriation inexpedient, but authorized the education committee to solicit the amount in voluntary subscriptions from member companies. A considerable amount had been subscribed under this authorization when the committee learned of several public utility courses in preparation and decided to wait until these were available before proceeding with its own work. The same applied to the course for trainmen. It was recommended that the preparation of both the economics and the trainmen's courses be assigned to next year's committee for action.

The committee reported that it had prepared and circulated a pamphlet to arouse interest in educational work on the part of employees.*

The report then summarized the work of the preceding two committees, reiterating the importance of the complete educational program outlined under ten heads in the 1922 report.

The body of the committee report was occupied with a review of educational work being done on electric railway properties, with an introductory statement. This part of the report is summarized below:

The form which will be taken by the educational work on an electric railway property depends in part on its size, in part upon its location with respect to special educational facilities and in part upon the vital interest of the management in the subject and conviction as to its importance. Moreover, the underlying principle in all successful work is simply furnishing to ambitious employees the opportunity to get such instruction as they need to help them achieve their ambitions.

The instruction may be given on the property or it may be obtained in public or private schools. In addition, there must be an atmosphere of self-improvement, which must be fostered by the management. The situation in hopeless unless the men at the top believe in education for everybody and show their faith by their works.

Large properties can well afford to employ men who have had teaching, as well as practical experience, to "head up" their educational work. Where this is impracticable, the man (or woman) who has the strongest convictions and the requisite executive ability and experience should give part time to this work.

INSTRUCTION NOW GIVEN BY SEVERAL LARGE COMPANIES

The Employees' Mutual Benefit Association of the Milwaukee Electric Railway & Light Company has a well organized educational department. With the director, who was formerly dean of one of the best known vocational institutes in the country, the faculty comprises 14 men and women.

The library is an important adjunct to this educational work, and a branch of the Milwaukee Public Library is maintained. The library undertakes to provide E.M.B.A. members with reference material on special topics in which they are interested. A women's study and information class has also been conducted. It is designed particularly for women who meet the public in the capacity of secretaries, clerks, telephone operators, etc. The follow-up training of bus operators has also been conducted to supplement previous training practically completed. The training of car repair men on a systematic basis with a full time instructor has gone on continuously. He is supported by instruction manuals and at regular periods gives examinations of the type which would be found under civil service regulations. There is also in preparation a course to be given the supervisors of the transportation department, and plans are under way for a course in the teaching of courtesy. Recently a six-year training course has been started, under the direction of the Industrial Training Conference of Milwaukee, for picked men who are known to have good abilities but who need a thoroughgoing type of technical knowledge to qualify for real advancement.

The educational work of the Chicago, North Shore & Milwaukee Railroad is highly organized. Up to March, 1923, the services of the educational director were confined to work among the foreign-born employees, covering English, citizenship, foremanship, living conditions and recreation. Later the scope of the educational program was broadened to include all departments.

The educational department has used without remuneration the services of five employees as teachers. The educational director is assisted in his work by an educational committee and he has the hearty co-operation of all department heads.

The Boston Elevated Railway is co-operating with the Massachusetts State Department of Education and the Massachusetts Institute of Technology in educational work. The former conducted three classes on the property during the past year, awarding certificates to the numbers indicated: Public utility economics, 106; practical electricity, 15; dynamo-electric machinery, 12. The department provides instructors and text and the company furnishes quarters. The instruction was excellent and the spirit fine. The company refunded tuition fees to all who completed courses. With the M.I.T. the company co-operates in a six-year college-grade technical course, in which students spend alternate terms in college and in industry. Of the 200 students enrolled, four are employees of the "L".

The Arkansas Central Power Company, Little Rock, furnishes street railway, electric light, power and heating service. Among its various departments 112 students are enrolled in special courses conducted by the extension division of the University of Arkansas. If a student makes an average grade of 90 in his studies the company pays the entire expense of the course. In addition, the Little Rock Electric Club, to which the company department executives and several of their assistants belong, arranged with the superintendent of the high school a special course designed for the benefit of employees of utility corporations and firms in all branches of electrical industry. A number of employees have also taken intensive courses in combustion and in electric meters at the university. Vice-President C. J. Griffith says that of the value of educational courses to workers in all departments there can be no question.

The Northern Texas Traction Company, Fort Worth, co-operates with the federal and state vocational training boards. There are 54 men employed in different departments of this company taking courses with the International Correspondence Schools and 11 with other correspondence schools and university extension bureaus. Three classes in electric shop practice are conducted for the benefit of 44 men in the mechanical department, under the direction of the Federal Board of Vocational Education, functioning through the Texas State Board for Vocational Education and the local school board in Fort Worth. On Dec. 1, 1923, the manager of the company organized all department heads into a class for the purpose of studying the economics of the street railway business. It was also planned that department heads would organize classes of employees within their departments and disseminate this information to all employees of the company. The total number taking educational work is estimated at 131, or 17.5 per cent of the 750 employees of the company. This company is now in its third year of systematic educational work.

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*The title of this was "Getting Educational Work Started on an Electric Railway." Several thousand copies of this have been distributed at nominal cost, two large properties using 1,000 copies each.—EDS.

The New Orleans Public Service, Inc., has a "Utility Educational Club" composed of employees ambitious to advance in their work. During 1923 the membership grew from 15 to 500. The club encourages men to enroll in established courses and assists them in their studies. At each meeting company officials address the club on details of operation and upon the opportunities which exist for ambitious employees. The results to date have been highly satisfactory.

The Beaver Valley Traction Company, New Brighton, Pa., has aimed its educational efforts toward the employees' homes and has invited members of their families to participate. Lessons are given in two sections, at 1 p.m. and 4 p.m. respectively.

MR. MCCANTS EXPLAINS THE SAN FRANCISCO TRAINING PLAN

Being impressed with the importance of the work in platform training carried on by the Market Street Railway in San Francisco, the committee requested M. McCants, general manager of the company and a member of the committee, to prepare a paper explaining his system in detail. His contribution forms an appendix to the committee report. An abstract follows:

Almost two years ago the Market Street Railway began to lay plans for the revision and improvement of its training system for motormen and conductors. Ten general rules were laid down to be followed by those in immediate charge of the work, and these rules played no small part in the ultimate success of the program. These rules (in abbreviated form) follow:

1. Keep the management in close touch with the more significant developments of the program.
2. Develop the program gradually.
3. Take all members of the training department into active partnership.
4. Start with the essentials.
5. Put the training system on paper.
6. Make the "system" understandable.
7. Make the "system" systematic.
8. Make the work thorough.
9. Make the methods objective.
10. Measure the results of the training wherever it is possible and do it in terms of figures.

The management wanted to keep in close touch with the growth of the training plan to prevent serious blunders, without taking the initiative away from those in immediate charge. It asked that the most important plans contemplated be submitted in rough outline on paper to compel careful planning. When a conference of a group of instructors was to be held, a careful outline of the program was prepared in advance and submitted to the management. After each meeting a carefully organized report was prepared and submitted to the management. The management was thus able to keep its "finger on the pulse," to suggest timely modifications of plans and to obtain some valuable information concerning various conditions.

One of the chief advantages of going slowly was to educate the instructional staff. The line instructors were men of limited education, with only vague ideas of the proper pedagogical methods. No phase of the training system was installed until it was understood by all instructors, until all inquiries had been answered and all proposals for amendment had been carefully submitted.

One of the greatest helps in guiding the discussion was the outline for the entire program, approved by the management beforehand. This provided a definite objective for each meeting. If the "minutes" of a meeting failed to coincide with the outline, the management was apprised of the amount of wandering from the proper subjects.

In the instruction a start was made with only the bare essentials; the knowledge that a new man cannot get along without if he is to operate safely. As time and experience showed that the student could be expected to learn more during the student period, instructional materials were added, but never much at one time.

Equal in importance to "sticking to essentials" was the practice of "putting it on paper." When instruction or materials were developed on paper for use by students, by probationers, by line instructors and by others an immediate and striking improvement followed.

The purpose of making the training easy for the student was accomplished partly by making the language as simple as possible. Whenever the line instructors reported any items in the student materials as hard to understand, these materials were changed in the direction of simplicity. It was found that if the student was taught a few new points each day and if he was drilled conscientiously until each point was mastered he could learn a surprising amount in a very short time.

It was learned that in trying to make the work easy more ground could be covered if efforts with the same student were not duplicated. The essential facts were designated for student instruction; the other materials were reserved for instruction during the three-month probationary period.

It was also found imperative to cover the entire scope of instruction by standardized examinations. Thus, a genuine spirit of professional rivalry was fostered, not only among individuals, but also among divisions.

In the examinations it was not assumed that all street railway knowledge is of equal importance for the company's purpose. Instead, it was assumed that those points should be emphasized which are of greatest practical value, and as a criterion the cases of violations of rules were chosen. Company records of violations were examined for a period of several years, and if any rule was on record as having been violated such questions as these were asked: (1) How often is the rule violated? (2) How serious is such a violation? (3) How much can it be reduced by training? (4) What form of training will have the best effect?

Thus the field was canvassed, and the scope of the training work, the nature of the work and the amount of emphasis to be placed upon each phase were decided.

By way of determining the result of the training, the training department was required to furnish data and acceptable facts in proof of the results accomplished. Comparative statements were asked for, giving the number of hours traveled per accident by the new men, and figures were compared month by month to trace the improvements. The new men were compared with the "old timers" on this basis. Other things asked for were the number of violations of rules, the number of times there were tie-ups on the line, the number of errors made when the new conductors turned in the cash, the number of errors made in the various examinations, the reduction in complaints, the increase in commendatory letters.

By various measures used the management was able to say that the improved system for training platform men had actually achieved tangible results. And the following "fourteen points" are some of them which were known to be obtained: (1) Fewer and shorter tie-ups on the lines. (2) Fewer shop repairs necessary. (3) Fewer reports of rough car operation. (4) Greater adherence to schedule time as noted in inspectors' reports. (5) Better calling of streets. (6) Fewer passengers carried past destination. (7) Fewer passengers boarding wrong car by mistake. (8) Fewer arguments with passengers. (9) Fewer complaints from passengers. (10) More commendations from passengers. (11) Fewer passengers "passed up" or left behind at transfer points. (12) Students voluntarily "break in" for a longer period. (13) Better co-operation between conductor and motorman. (14) A reduction in accidents, so that in the last three months the probationers have had a lower proportion of accidents than the experienced men.

The report was signed by V. W. Berry, E. J. Blair, C. F. Crane, W. J. Edmunds, C. B. Fairchild, C. J. Griffith, R. M. Howard, J. S. Hyatt, M. B. Lambert, M. McCants, H. H. Norris, A. J. Rowland, Martin Schreiber, J. V. Sullivan, T. S. Wheelwright, C. E. Morgan, executive committee member, Edward Dana, chairman.

In the absence of E. F. Wickwire, Mansfield, Ohio, the report of the committee on co-operation with manufacturers was presented by J. C. McQuiston, East Pittsburgh, Pa. An abstract follows.

Co-operation with Manufacturers

Last year there were 73 manufacturing companies actively co-operating in the work of distributing good-will literature. At this time the list includes a total of 236 thus actively co-operating. The names of the companies which are participating in the work are printed from time to time in *Aera*. The committee feels that the increase mentioned is very satisfactory. Fred C. J. Dell of headquarters staff has greatly helped, through personal calls and by mail, in increasing the number by explaining the work and pointing out the value of it. The publication *Truth* has grown in circulation from about 7,000 to more than 25,000 copies an issue and is being used on bulletin boards by a great many companies which do not publish a house organ. It carries interesting facts and figures about electric railways. Other companies are sending it out to a selected mailing list of firms with which they have considerable influence.

A year ago the committee report mentioned a series of posters entitled "Men Behind the Industry," which was widely distributed and well received. Another series of posters which has met favor is "What Delays You." These posters depict the trolley service being retarded on account of competing traffic which clogs the line and therefore delays the passenger. A sticker which manufacturing company purchasing agents use on their orders has also been published. It calls attention to the fact that the manufacturers are buying the material ordered for its ultimate use on electric railways, and the firm receiving the order should therefore be interested in seeing that the electric railway industry receives fair treatment.

"Traction Tom" has made his appearance this year and has passed through one series of posters. Other recent publications include booklets entitled "Electric Railways Have Come Back" and "Friendlyizing the Public" and a leaflet "An Old Friend Is Now Getting a Square Deal" has been published. The latter is a reissue.

The committee has worked very closely with the publicity committee, and the activities of the two committees in many ways are identical, as in distributing the same literature. It is planned to continue this operation and to emphasize the need of relief from paving charges, the "shop early" movement and the "traffic congestion" idea, which was started this year.

There are still some manufacturers who refuse to join the movement or fail to respond with any definite answer. In some cases it is quite possible there are good reasons for this course. The committee has received but one strenuous objection from a company which had not expressed a willingness to co-operate, and was not, therefore, listed on the "honor roll" which appears in *Aera*. This company had the wrong idea. The intention is not to discriminate against a company which does not see its way clear to aid. The purpose of the "honor roll" is to give credit to companies making the effort.

The committee appreciates the co-operation which it has received from both railway and manufacturing members.

The report was signed by George A. Barnes, William C. Bell, W. D. Blatz, William H. Boyce, F. R. Coates, C. R. Ellicott, C. D. Emmons, E. C. Faber, James Ashton Greig, Harry H. Lloyd, J. C. McQuiston, E. B. Meissner, George R. Rowland, W. S. Stackpole, E. M. Walker, E. P. Waller and E. F. Wickwire, chairman.

Edwin Gruhl, New York, chairman of the committee on indeterminate permits, presented the report of that committee. An abstract follows.

Terminable Permit

Appointed the latter part of 1923, this committee made a study of the conditions existing in the different states regarding the duration of franchises, as limited by constitutional or statutory provisions. The report presents a review and history of franchise tenure, as prescribed by the states, with special attention given to those statutes based on the principle of the terminable permit; that is, without specified limitation as to duration but subject to revocation for cause. Such statutes are commonly known as "indeterminate permit" laws.

In making a study of those statutes now incorporated in the laws of several states, known as "indeterminate permit" acts, the committee was impressed by the vagueness which has characterized the use of the term, and the general application to situations and conditions not properly coming within its strict meaning. In this respect it is not dissimilar to the freedom in usage of the word "franchise," which is variously used as denoting not only franchises, but grants, privileges, locations, contracts, permits, etc.

It was therefore suggested that a more appropriate term would be "terminable permit." The word "permit" is preferable to the use of the word "franchise," as it is a permit issuing from the state as an operation of law and is not strictly analogous to the franchise issuing from the municipality.

The grant of a franchise is at all times subject to regulation and control in the proper exercise of the state's police power, either by the state or the local authorities. Even with respect to exclusive franchises there is an implied retention of power in the state to regulate their use so as to preserve the public health, or morals, or safety of the people.

There has been no uniformity in the term of franchises granted throughout the country by the legislatures, the municipalities and other governmental authorities; some have been perpetual, some without fixed term, and others for periods ranging from 10 to 999 years. It would be safe to say that the majority of them existing at the present time were granted prior to the era of commission regulation of public utilities and therefore without consideration being given to the effect of state regulation.

Most of the early franchises were granted without time limit and are therefore to be considered perpetual. Especially is this true of grants to the telegraph and telephone companies, railroads and other common carriers. Later, and with the advent of the street railways, there came a growing tendency to limit franchises to periods ranging from 20 to 50 years. In many of the states a fixed period was established in the constitutions.

The troubles which arose over the short term franchises brought out many views as to the advantages and disadvantages of the fixed term franchises.

Judge McCune, in his recent address before the American Bar Association, states that there has been no more important question in the history of franchise negotiations than that of determining the duration of the franchise. He states that the change in the legal status of public utilities has brought about the general acceptance of the satisfactory solution through the application of the terminable permit theory; that the old view that a franchise was simply a contract between the city and company and therefore similar to the ordinary contract between two persons had given way, in the light of opinions of the Supreme Court of the United States, to the recognition of the essentiality of the public service of the utility, and that therefore no less than five parties are interested in the operations of a public utility: the utility company itself, the customer, the municipality, the state from which it obtains its primary authority to transact business, and last, but by no means least, the investor.

THEORY OF TERMINABLE PERMIT

The underlying theory of the terminable permit is that of tenure during good behavior. In its elementary form it has existed in Massachusetts for nearly 60 years. However, this elementary form, as it also now exists in federal grants and certain municipal franchises, is to be distinguished from the terminable permit principle now embodied in the statutes of some seven states, of which those of Wisconsin were the earliest. That feature which is perhaps the strongest point of the terminable permit as now generally known is lacking in the Massachusetts law, in that there is no provision for purchase by the municipality at a fair compensation. Although recommended for incorporation in the law the suggestion has never been adopted. This omission has been the cause of criticism of the Massachusetts prescriptive tenure law, and while such omission may not have been the occasion of any serious results in practice owing to the rare exercise of the revocation power by the street railways in that state, yet its absence in such laws of other states might result in greatly impairing the value of the laws.

In granting charters or franchises for the operation of street railways and other utility services, the policy of Congress has always been to include a reservation of the right to amend, alter or repeal the act at any time. The earliest charters granted to the street railway company in the city of Washington contained such a reservation, leaving with the public authorities continuous control of the street railways.

The terminable permit principle has

been embodied in the federal water power act of 1920 to a greater extent than in any of the previous federal statutes. Under this act a license is granted for an initial period of 50 years, and it is provided that at the end of the 50-year term the license shall be renewed under the then existing provisions of law, unless the property operated under the license is taken over and paid for by the government, or by some other licensee. This is equivalent to the terminable permit with the right of purchase at stated periods, and with the right to terminate for failure to observe the provisions of the license.

The Terminable Permit Under State Regulation

While the Massachusetts plan, the federal grants and one or two municipal franchises provided for indeterminate periods, it remained for the state of Wisconsin to incorporate in its public utility law of 1907 sections providing for terminable permits under state regulation. In brief, the statutes provided that a public utility could, by surrendering its franchises and accepting in lieu thereof by operation of law a terminable permit from the state, acquire, in effect, a legally protected monopoly and the right to continue public service indefinitely, subject only to the proper discharge of its functions and to termination by the municipality with just compensation for its property.

The laws of the different states are not uniform on the subject of the abrogation of retaining of rights and obligations existing in franchises surrendered for terminable permits. In Wisconsin, it has been held that where, under the public utility statute relating to terminable permits an indeterminate permit is taken out, the privilege to be enjoyed by the public utility is measured by the former franchise, but all of the contractual relations of such franchise are extinguished. Similar provisions do not exist in the street railways statute, and, as held by the Supreme Court in the Oshkosh case, the surrender of a street railway franchise in order to procure an indeterminate permit does not relieve the railway company from the obligation to pay annual installments provided for in its franchise.

Terminable Permit as Against Limited Franchise

The courts which have considered the terminable permit laws have quite carefully and clearly pointed out the advantages of such laws, as have the several economists and writers generally in dealing with these laws. That the principle of the terminable permit is superior to the limited or perpetual franchise is evidenced by the unanimity on this fact, even authorities connected with municipalities and those whose leanings are toward municipal control highly favoring it.

The advantages clearly apparent in terminable permit principle are so patent as to recommend its general adoption everywhere. Nor are the advantages balanced more on the side of any one interested party than on the others. The benefits to be derived therefrom run to the municipality and the state, to the public utility and its consumers, and to the investor.

One appendix contains references to such constitutional and statutory provisions and citations to the more important administrative and judicial decisions on the subject. The terminable permit statutes are printed in full. A comprehensive bibliography is also included as a second appendix.

The report was signed by Harlow C. Clark, Walter A. Draper, Edwin Duffey, H. L. Geisse, F. C. Hamilton, G. J. Kuhrts, F. B. Odlum, Claus Spreckels, R. B. Stearns, Edwin Gruhl, chairman.

Foreign Practice

President Budd spoke about the work of the committee on foreign practice, explaining that the Chicago Rapid Transit Company had contributed the services of one member of this committee, H. A. Johnson, and that the Electric Railway Journal had contributed the services of another member, H. L. Brown.

James W. Welsh, secretary of the association and chairman of the committee, explained some features of the report. He said that while he was chairman, the lion's share of the work was done by the other members, and he referred particularly to the skill displayed by Mr. Brown in analyzing transportation conditions in the cities visited and the indebtedness which the committee owed to Mr. Johnson for his knowledge of engineering conditions. He said the committee was also very much indebted for the results of its work to the cordial co-operation extended to it by the managements of the European systems visited. In London, for example, Lord Ashfield had personally, and through his staff, greatly assisted the committee in supplying it with information. Mr. Welsh then read the summary of the report of the committee, which was published at the beginning of the full report in the Electric Railway Journal for Sept. 20.

In further explanation of the report, H. A. Johnson said that while the report shows that there are not many things which the American electric railways can adopt from British practice, there were some. One is that the car should not be so noisy, and the Engineering Association has arranged to have this subject taken up by two committees during the coming year. Another characteristic feature of British railway practice is the unfailing courtesy of the employees and their willingness and ability to give information needed by travelers. This was not so true in the other countries visited. In regard to car design, while the British design of car has not changed greatly in a number of years, as explained in the report, British operators and car manufacturers have been paying a great deal of attention to details in car design and equipment. The hardware used on the cars, for instance, has been most carefully worked out. These are all points which can be copied in this country to good advantage.

President Budd said it was now time to read the report of the committee on the Coffin prize award. As chairman of the committee, he read the report in full. The responses of George H. Clifford and F. J. Gannon in receiving the Coffin prize are given at the end of the Coffin committee report, which appears on another page.

President Budd called the newly elected officers and executive committee members to the platform and presented them to the members. Their pictures appear on page 588. Handing over the gavel to his successor, Mr. Budd expressed his appreciation of the fine co-operation extended him during the time he had been privileged to serve the association as president. He pledged his full support to the new administration. The members then enthusiastically indorsed a rising vote of thanks to the retiring president, whose administration has been conspicuously one of great advancement in the association work.

President Shannahan responded to his cordial reception and appealed for the co-operation of the membership. He said it was his desire to make the association such a power that no company could afford to stay outside its membership. He spoke of his pleasure in the winning of the Coffin prize by a small company. The small companies are wanted at the convention, and their participation and opinions are wanted in the proceedings.

Continuing, Mr. Shannahan said the electric railways have undeniably turned the corner. The difficulties of financing are passing. Now we must be sure to make no backward move.

The president called for the report of the committees on city and interurban operation, which was presented by Harry Reid, chairman of the interurban committee. H. B. Flowers, chairman of the city committee, was not present. Regional Vice-Chairmen Carbutt, Potter, Porter, Emerson, Wood, Bleecker and Welsh presented their sectional reports.

Gen. George H. Harries read the report of the resolutions committee, which follows:

Resolutions

The committee recommends:

1. That this association express its sincere thanks to the representatives of the public utility commissions, automotive industry, National Association of Real Estate Boards, the banking interests, to the Mayor of the city of Pittsburgh, the authors of papers within our own industry and to the chairmen and members of the various committees that have presented such interesting and instructive addresses, papers and reports at this our forty-third annual convention.

2. That this association place on record its appreciation of the services of the three committees that have made this convention such a notable success: The committee on meetings and subjects for providing such an interesting and inspiring program, the exhibit committee for arranging and conducting so successfully the greatest exhibit in the long history of the association and the entertainment committee for providing such a pleasing and novel program of entertainment.

3. That this association voice its thanks to the exhibitors for their co-operation in putting before our members and guests the wonderful display of equipment, materials and supplies, a truly educational exhibit that has been tremendously helpful to us in our ever-pressing problem of finding the best means of supplying the best service to the public.

4. That this association express its thanks to all the others who have contributed to make this convention such a great success, particularly to the *Convention Daily* for its up-to-the-minute news and record of the convention activities, to the pier contractors, to the various friends who supplied prizes for the entertainment Wednesday night and who assisted in arranging for entertainment of the ladies, and to the publications which, through announcements made in their pages, assisted in bringing a record number of delegates to the convention.

5. In conclusion, that this association voice its high appreciation of the service rendered by President Budd, during whose administration new lines of activity have been followed, new inspiration given to all of us and great accomplishments recorded, and to the other officers of the association for the inestimably valuable services they have rendered the electric railway industry through the association.

The report was signed by C. D. Emmons, John J. Stanley and Robert I. Todd.

General Harries also read a resolution he had prepared in memory of John M. Roach, past-president of the association. It will be published next week. The meeting then adjourned.

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American Executive Committee Meetings

Three Meetings Held at Convention—Committee Reports Are Received at Well-Attended Session—Exhibits Committee and Foreign Operation Committee Complimented—Newly Elected Officers Meet

THE American Electric Railway Association executive committee met Monday, Oct. 6, at the Marlborough, at Atlantic City, with a large attendance.

Routine reports were received from the finance, company and associate memberships, national relations, subjects and meetings, publicity, company section and other special committees.

Chairman J. C. McQuiston of the exhibit committee paid the director of exhibits, F. C. J. Dell, a special compliment for the splendid manner in which the preparations of the exhibits and arrangements for them had been handled. Mr. McQuiston reported that the space sold at this year's convention for exhibit purposes amounted to 86,349 sq.ft.

METROPOLITAN SECTION FORMED

C. E. Morgan reported that the metropolitan community section of the American Electric Railway Association, New York, now has over 300 members, and that the movement is under way to establish three or four additional sections during the coming year. R. P. Stevens commented on this initial meeting in New York to the effect that Mr. Morgan was to be congratulated on the great work he has done in getting this movement started as it means a great deal to the association.

CONTRIBUTIONS MADE TO SEVERAL PROJECTS

A proposal to contribute $2,500 a year for two years to the work of the American committee on electrolysis was approved on the basis that the other national utility associations and the American Telephone & Telegraph Company contribute a similar amount.

A contribution of $1,000 to the support of the National Industrial Conference Board was also approved. A suggestion was made that the conference be asked to make a study of some subjects of special interest to the railway association, perhaps the economics of bus operation, or some such subject.

A proposal to join in the formation of a super-valuation board embodying representation from all the major utility associations was referred to the joint committee of the several associations.

FOREIGN COMMITTEE THANKED

At the suggestion of J. H. Hanna, the executive committee passed a vote of thanks to the committee on foreign operation for the investigation made abroad and the various information contained in its report. Mr. Hanna complimented President Budd on his forethought and wisdom in suggesting and appointing this committee and said that he believed that no piece of work has been done in a long time which was of as great use to the railway companies. It places at their command authoritative information with which to answer the numerous claims which are erroneously made about how the bus is handling "all" of the transportation in London, for example.

A code of principles drawn up by a committee of the Accountants' Association and submitted to the executive committee for approval was referred back to the accountants for revision. In connection with the plan of the association to have a representative present at each of the meetings of the state and sectional associations, a suggestion was made by M. B. Lambert that the vice-chairmen of the committees on city and interurban operation be delegated to fill these engagements.

The executive committee was called together for a luncheon meeting at the Marlborough-Blenheim Hotel on Tuesday, Oct. 7. No business was transacted. Several prominent guests were present.

New Executive Committee Has Meeting

The new executive committee held its first meeting at luncheon Thursday, Oct. 9, at the Marlborough, Atlantic City. There was a large attendance, including several past-presidents and the newly elected presidents of the affiliated associations. The latter, W. L. Davis of the Accountants, H. D. Briggs of the Claims, Charles R. Clark of the Engineering and T. C. Cherry of the T & T, were introduced and cordially received. President Budd conducted the new president, J. N. Shannahan, to the president's chair and turned the meeting over to him.

Executive Secretary J. W. Welsh was re-elected for another year.

In recognition of the very able and self-sacrificing service which Past-President Charles L. Henry has rendered to the association as chairman of the committee on national relations, on motion he was elected general counsel of the association.

Having been elected fourth vice-president, James P. Barnes resigned as member-at-large of the executive committee. L. H. Palmer, vice-president and general manager United Railways & Electric Company, Baltimore, was elected his successor.

A resolution of appreciation for the co-operation and services performed was passed, mentioning a number of the Atlantic City business organizations. Votes of thanks to the committee on subjects and meetings, to the director of exhibits and the exhibits committee, and to the entertainment committee for the excellent work done were also adopted.

Paul Shoup extended a cordial invitation to the association to hold its next annual convention on the Pacific Coast. Mr. Budd expressed the view that this invitation ought to be accepted. He also urged that an effort be made immediately to secure facilities so that it would be possible to have railway cars and equipment at the next exhibition. If the convention goes to the Coast next year, this means that there is two years time in which to accomplish this end.

The executive committee authorized the appointment of a committee on location of the Midyear Meeting and the next annual convention.

BETTER REPRESENTATION FOR MANUFACTURERS

President Shannahan expressed the view that the wonderful work done by the manufacturers at this convention bespeaks the fact that they are deserving of greater representation in the association. He suggested that it was desirable that some plan be worked out, either by expanding the number of manufacturer representatives on the executive committee from six to nine and include some representatives of smaller manufacturers, or perhaps by forming a manufacturers' association subsidiary to the parent association. Mr. Shannahan is inclined to feel that the small manufacturer at present does not have proper representation. A committee was authorized to give consideration to changes in the constitution to study this situation and other suggested changes in the constitution.

Frank Hedley, president of the Interborough, New York, was present on invitation and spoke. Gen. George H. Harries also spoke.

The next meeting of the committee will be held at the headquarters of the American Electric Railway Association in New York, Nov. 21.

City and Interurban Committees Report

A Summary of the Year's Work Is Followed by the Report of Each of the Fourteen Regional Vice-Chairmen—A New Spirit of Optimism and of Progressive Development Is Reported for Each of the Companies Visited

IN APPOINTING these committees, President Budd said the problems of the industry today are to make its service more attractive, to increase schedule speeds consistent with safety, to obtain relief from traffic congestion, increase the efficiency of operation, improve public relations, develop greater volume of traffic, and to determine the proper place of the motor vehicle. He urged the committees to reawaken the imagination of the men in the industry, to recreate enthusiasm, and to secure information and ideas leading toward modernization and development. He expressed the belief that the industry had not reached the limit of its development and that better service, better public relations, and greater energy and enthusiasm on the part of managements would do a tremendous amount of good and result in strengthening the industry in its position before the public and the investor.

BE ON THE WATCH FOR MATERIAL FOR FUTURE LEADERS

As to means by which this modernization is to be accomplished, President Budd suggested that the committees investigate the application by individual railways of improved apparatus and methods and then formulate plans for the dissemination of this information so that it would be readily available to all electric railway companies. He expected that the work of these committees would stimulate interest on the part of railways in the adoption of improved apparatus and up-to-date methods.

As a by-product of the work of these committees, Mr. Budd felt that the visits of the regional vice-chairmen should make available for committee work the names of younger men in the industry who are progressive and are capable of development as future leaders.

The conclusions of the committees regarding the industry as a whole, based upon studies and reports by regional vice-chairmen, are as follows:

Many companies are realizing that their business is transportation rather than electric railway operation.

The earnings of all companies are influenced by a competitive situation resulting from the development of highway and street motor vehicle transportation, and by public relations and general business conditions in the country and in the communities served.

Electric railways are adopting the bus slowly, sanely and conservatively.

They are carrying on activities having to do with public relations as affecting regulatory legislation, both state and local, and franchise conditions appearing in both old and new franchises.

Outstanding features are a search for equipment and methods which will give more comfortable and satisfactory service; frank explanation to customers and employees of the economics underlying rates of fare which make practicable the introduction of the most modern methods, and the encouragement of the public and of employees to become investors and part owners in the properties, to the end that these properties devoted to public service may be conserved rather than destroyed and that the industry may advance with the growth of the communities served.

Efforts to improve gross incomes are being made with a full realization of the fact that in public service there are three parties to the contract—the public, the investor and the employee—and that the function of management is the maintenance of an equitable balance among them which will give to each his proportionate share of the proceeds in the way of service, financial return and wages.

Operating expenses of all companies have been affected by, and the industry is still suffering from, the high costs of material and labor resulting from war conditions which have not completely readjusted themselves.

Tardy recognition of proper public relations and inadequate depreciation reserves have delayed and made difficult the introduction of modern, comfortable and efficient equipment. Companies are giving more serious consideration now than formerly to efficient operating methods, to publicity and advertising and to the design of equipment.

Track extension, while slight, is offsetting approximately track abandonment. Bus service is being introduced to furnish extensions to growing communities where tracks may later be installed when the density of travel warrants.

Franchise conditions governing extensions and transportation service are undergoing a great change, and burdens which make cheap and satisfactory service impossible are being recognized by governing authorities, and in some cases are being ameliorated.

The industry is not going backward nor is it standing still. City systems are today carrying more passengers and rendering greater service in their communities than ever before. Interurban systems are increasing the scope of their activities not only by continuing their former service but by handling freight and express business and furnishing parlor car, dining car and sleeping car service for the convenience of passengers. In a number of instances they are supplementing their rail service with buses and coaches as feeders and for de luxe, express and tourist service.

RECOMMENDATIONS

As a result of the activities of these committees, the information developed by personal visits and careful discussion, the following recommendations are submitted:

1. That the work which had been carried on by these committees be continued.
2. That the committee on city operation and the committee on interurban operation be combined into a single committee.
3. That the chairman of this new committee be a vice-president of the association.
4. That the responsibility for the survey in each district be placed on the regional vice-chairmen and that sufficient assistants or members-at-large be appointed in each district to cover the territory without imposing too great a burden upon any one individual member.
5. That the survey next year embrace Canadian electric railways and that for this purpose a regional vice-chairman and two members-at-large be appointed, the selection being such as to give geographical distribution in the Dominion of Canada.
6. That the handbooks on modern methods be combined into a single handbook, properly cross indexed.
7. That new material collected for the handbook be prepared and distributed to member companies at intervals not greater than three months.
8. That in order to compile the material for the handbook in uniform style, a standing sub-committee on editing be appointed to facilitate its preparation.

COMMITTEE ON CITY OPERATION

The report was signed by: Regional vice-chairmen — R. F. Carbutt, H. B. Potter, C. D. Porter, R. W. Emerson, O. J. Shaw, W. E. Wood, W. V. Hill.

Publicity Representative — L. K. Starr.

Manufacturer Representative—E. F. Wickwire.

Members-at-Large—W. R. Alberger, D. E. Blair, G. H. Clifford, B. C. Edgar, Edward M. Graham, C. W. Kellogg, C. S. MacCalla, E. J. McIlraith, J. P. Pulliam, Martin Schreiber, G. C. Hecker, secretary; H. B. Flowers, chairman.

COMMITTEE ON INTERURBAN OPERATION

Regional Vice-Chairmen — F. W. Woodcock, H. L. Mitchell, Samuel Riddle, John S. Bleecker, G. W. Welsh, V. W. Berry, W. V. Hill.

Publicity Representative—Frank L. Blanchard.

Manufacturer Representative—E. F. Wickwire.

Members-at-Large—D. E. Blair, J. F. Collins, F. B. Culley, V. S. Curtis, H. A. Mullett, George Newell, J. C. Schade, Martin Schreiber, D. W. Snyder, Jr., C. E. Thompson, G. C. Hecker, secretary; Harry Reid, chairman.

Reports of Regional Vice-Chairmen

COMMITTEE ON CITY OPERATION

District No. 1—Northeastern: (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island and New York.)

BY R. F. CARBUTT

Henry L. Doherty & Company, New York, N. Y.

Throughout the section visited a vast number of modern methods of handling city electric railway transportation are in effect on the various systems. Some companies are using a large percentage of the modern methods described in the handbook, while others are using only a very few of them. In other words these modern methods are not by any means being used universally.

Inasmuch as a big percentage of the methods to which we are referring do not require large capital expenditure, it is interesting to analyze the reason they are not used more nearly universally. Those companies which have adopted the large percentage of modern methods have obtained increased earnings justifying the efforts made in their adoption.

It is not because the successful companies have been unwilling to tell the secrets of their success. It is not because the industry in general was not informed regarding a vast number of them. Information has been very effectively disseminated by the competent staff at the American Electric Railway Association headquarters and by *Aera*, the ELECTRIC RAILWAY JOURNAL and *Electric Traction.* The amount of field work performed by our national association and by the publications mentioned is, we are confident, not generally realized by our industry.

Those electric railway companies that have neglected to adopt these money-making modern methods, we believe, are largely those whose managements became disheartened due to the heavy and often unfair burdens our industry suffered during the World War and post-war periods and apparently, as a result, lost faith, to some extent, in the industry.

The appearance of their properties and their own demeanor give one the impression that they are in the same state of mind as the object of some professor's psychological tests. That is, the tests of some one, perhaps, who arranged to have several of his assistants at certain intervals try to make the object of the test sick by telling him he looked seriously ill, that he might die any moment, that he never could recover, that he ought to give up all hope and so forth.

On the other hand, the great majority of the twenty-seven companies visited in the Northeastern section have had faith in the soundness of the general economics of the industry. They realized they were directing the destiny of valuable property, and that careful scientific remedial treatment was necessary, and not amputation.

Another reason these modern methods have not been more nearly universally adopted, we believe, is that during the economic struggle of the last seven or eight years, in attempting to meet the increased operating expenses due to increased costs of labor and material, executive staffs of some companies have been reduced to the point where there is no free lance with the time and the available funds at his disposal for investigation purposes.

As a matter of fact, in some companies, there does not seem to be anyone with the time available to make use of the vast amount of data and information on file at association headquarters, available for the asking; or time even to familiarize themselves with the modern methods used by others, described in detail in the ELECTRIC RAILWAY JOURNAL and *Electric Traction.*

Through the forethought of President Budd these city street railway companies now have at their command not only one free lance but seven represented by the seven regional vice-chairmen of the committee on city operation. Due to the activities of these men, under Chairman Flowers' direction, there is made available, through the "Handbook of Modern Methods," a brief but comprehensive description of a large number of modern methods, a great majority of which can be applied to your company, if you are one of those who have felt compelled to reduce your staff to a mere skeleton form and have neglected to keep in touch with the up-to-date methods of progressive street railway organizations.

An attempt has been made to keep the description of each method confined to a single page which the busy executive can read in two minutes. We have given you the name of the company practising the method and in many cases a reference to where a complete, detailed description of the method is available. We have classified the methods under a logical grouping so that ready reference may be had to any subject in which you be particularly interested.

We do not want anyone to get the impression, that all the modern methods in use in the operation of the electric street railway systems in New England and New York State or in any other section of the United States are described in this compilation because that is far from the case. However, if this committee is continued from year to year, no doubt a much larger percentage of these methods will be presented to you in the brief but concise form used this year in the handbook.

District No. 2—Mid-Eastern: (West Virginia, Pennsylvania, New Jersey, Delaware, Maryland and District of Columbia.)

BY H. B. POTTER

Assistant to the President, the United Railways & Electric Company of Baltimore

I have been able to cover three large properties, the Capital Traction Company, Washington, D. C.; Pittsburgh Railways, Pittsburgh, Pa., Public Service Railway, Newark, N. J.

In addition, I spent a whole week covering the following places in Pennsylvania: York, Harrisburg, Williamsport, Wilkes-Barre, Scranton, Allentown.

I have been particularly impressed by the general high caliber of the men holding executive positions, their great enthusiasm in their work and the absolute lack of the dark blue tinge to the atmosphere that seemed to obscure the perspective of many street railway men during the war period. The properties are being rehabilitated, new methods installed, and a spirit reminiscent of the early 1900's is again in evidence, when most of us were in our early twenties—full of pep, carrying a chip on each shoulder, and working 48 hours a day.

The other side of the picture that is most apparent is the great dearth of high-grade, well-educated, young men in the early twenties that should be coming along to take our places. Further, many men were taken out of the industry on account of the war—either to go into the service or to go into other industries—so that in addition, we now lack men in the early thirties.

This raises the question as to whether we are holding out sufficient inducement in the way of positions that are interesting at present, show opportunity for rapid advancement in the future and, above all, pay salaries that are comparable to those offered in other lines of industry, in which these men have an opportunity to select their future work.

District No. 4—North Central: (Indiana, Ohio and Lower Michigan.)

BY R. W. EMERSON

General Manager Cleveland Railway, Cleveland, Ohio

A survey of the city properties of Ohio, Indiana and Michigan, recently completed, indicates an optimistic state of mind on the part of owners and managers. The temporary setback experienced this year, and particularly this summer, on practically all properties, although serious, is not taken to mean permanent retrogression.

Probably no other industry or public utility in the country has gone through a more trying period than the electric railways, and no other industry has experienced such a revolutionary change in the conception of the duties devolving upon it.

From the old attitude of suspicion under which public utilities were held in the past, there has evolved a better feeling of understanding and co-operation between the public in general and the public utilities serving them. This in itself is a most encouraging sign and is caused by a number of contributing elements, any one of them important but all of them emanating from the one word "contact," the key word of successful modern operation. The disrepute and therefore unsatisfactory condition of the street railway industry as a whole, which obtained fifteen years ago, and which eventually threw many properties into receivership or abandonment, came for the most part as a result of lack of sympathetic contact between the public and public authorities on the one hand, and the public utilities on the other. When, however, these two factions came to a better understanding of each other's problems and rights, the feeling of distrust and rancor began gradually to disappear and instead there came a more friendly attitude on the part of the public toward public utilities and a more considerate and broad minded attitude on the part of the utilities toward the public, with the realization that each was indispensable to the welfare of the other.

The value of friendly public relations was recently forcibly illustrated on a Michigan property, where the municipalities involved voluntarily granted an increase in the rate of fare when it was shown that the continuance of service depended upon it. This they did despite the fact that the franchises involved called for a five cent fare for some years to come. A further indication of the friendly relations which in general exist between the municipalities and the transportation companies of the various cities regarding the serious problem of congestion, is the willingness of the authorities to co-operate in the regulation of traffic. For the most part, municipalities are coming to the conclusion that mass transportation can best be rendered by street cars, and to that end are rendering exceptional service by the regulation of traffic and parking in congested districts.

Probably the greatest contributing factor in the development of this new contact was systematic, painstaking publicity. The value of publicity properly disseminated has now come to be recognized as an essential part of successful operation. Whatever form publicity takes, and the requirements of the various communities vary in this respect, the dispensing of publicity should be in the hands of a man skilled in that line of work.

With the new lease of life which came from improved public relations, came also the willingness on the part of financial institutions to furnish the necessary capital for the rehabilitation and modernization of properties which had fallen into a woeful state of obsolesense. Today, the public utility securities are held in almost as high regard by financial institutions as municipal securities, and not the least of these are the street railways of the country. A large financial institution in the city of Cleveland has recently exchanged bonds of a street railway for stock in the same company and this company has no fear as to the outcome.

The increased ease with which needed improvements can now be financed is leading to improvements in track construction, and in the design of cars, adding to their comfort, and convenience in loading and unloading, a feature which has previously been long neglected. With the revolution of car design has come the introduction of the lightweight car, more economical power generation and conversion through automatic substations, and more efficient consumption of power regulated by various power saving devices.

The tendency at the present time is strongly toward one-man car operation in towns of 150,000 population or less. The two-man car seems to be preferable in towns of greater size. The bus, which was formerly supposed to be the greatest enemy to the street railway industry, is fast becoming recognized as an ally instead. Its proper sphere seems to be to supplement service rendered by street cars. There is an almost universal feeling that all buses should be operated by the transportation companies, that the business of transportation is a natural monopoly and that better and more satisfactory service can be rendered when administered by the recognized transportation authorities, properly regulated. The rapid strides made in the development of the bus, in its attractiveness and comfort, have been instrumental in stimulating manufacturers and buyers of street cars to work out improvements in design so that they may be better able to compete with buses. For that we are largely indebted to the bus.

Another factor which is contributing largely to the re-establishment of successful street railway operation has been the interest taken by employees in the welfare of their company. This is being fostered largely by welfare work among the employees, the establishment of pensions, sick and death benefits, and the sale of stock to employees. The value of courtesy on the part of employees as a means of establishing favorable contact with the public is everywhere recognized. The employee is the point of contact and his value as a go-between varies directly with the interest and enthusiasm which he throws into his work.

So far as the question of taxes is concerned, very little headway has been made toward relief. The tax authorities are very loath to grant reductions in taxes to public utilities. As public utilities are possibly the greatest contributors to the maintenance of government, it is easier to maintain or even increase their tax burdens than to distribute them among many lesser contributors with the inevitable protests which would follow. There does not seem to be sufficient concerted action on the part of street railways to lead to substantial reductions in tax burdens.

Throughout the territory which was observed, there seems to be a decided change for the better in the matter of paving. Cities are coming to recognize more and more that pavement between the rails is not a function of street car operation and there are notable instances where this burden has been lifted from the shoulders of the transportation companies.

To summarize, it would appear, from a study of the properties visited, that this new "contact" has brought about a much more optomistic and promising condition among the city properties, and the problems of rehabilitation and modernization are at least well started on their way to a very successful completion.

District No. 5—Midwestern: (Illinois, Wisconsin, Iowa, Nebraska, North Dakota, South Dakota, Minnesota and Upper Michigan.)

By O. J. Shaw

Secretary and General Manager,
Lincoln Traction Company, Lincoln, Neb.

My investigations and observation justify the statement that during the year past the industry has taken long forward strides in developing better public relations. This has been due, perhaps, to a growing consciousness that the public cannot be blamed for what it has no opportunity to know, and that an informed public can usually be depended upon to treat fairly with its public utilities. The electric traction industry is highly technical and is not understood either as to operation or financing by the class that affords its largest volume of patronage. To this end the tendency has grown quite general to adopt policies of publicity and education: First, through employees' organizations; second, through the paid advertising columns of the newspapers; third, through the spoken word, and fourth, through the use of bulletins or leaflets in cars.

Reports from plants varying in size from a five-car equipment to the largest plant in the district lead to the conclusion that financing developments have varied tremendously. Local conditions, short crops, general stringency, or local surplus in the money markets have been the controlling factors in the smaller cities. Political agitation for home rule regulation or municipal ownership of utilities has been immediately reflected in efforts to finance locally. Customer ownership has been successfully carried on in some instances but the street railway industry has not been as popular in the esteem of the wage-earning capitalist as the light and power industry.

Increased activities are evident in employees' relations with their companies, many special entertainment features such as employee picnics in the summer and dinners and dancing in other seasons in company employee quarters. Informative talks are given by the officials about the company's business and safety matters.

The very small or the very large companies would seem to have better trained employees than the companies operating in medium sized cities. It is obvious that in the smaller companies personal contact between the administrative heads and the men makes for a better mutual understanding of the problems and difficulties; also, that in the very large companies specialists are maintained in charge of important departments because the over-head costs are less in proportion to the number of employees and the gross income.

I firmly believe that the more reasonable men of each community, those on whom we depend for ultimate stabilization of economic matters, look with growing interest toward the electric railway as an essential element in the growth of an industrial city. The novelty has long since passed in the street car business. It is my theory that fanciful appeals for popularizing trolley riding is that much wasted effort. The economy of the problem is the only sensible appeal.

Relief from unfair burdens imposed on street railways comes slowly. Most of us are still paying taxes for Old Dobbin, long since deceased. Old Dobbin's ghost is the most directly expensive heritage of the pioneer days. It is a sentiment and an excuse but in most cases it works. We have shown that street car conductors are deputy tax collectors and that the man with the dinner-pail is paying for the pavement over which his motor-owning neighbor glides and parks tax-free. But the custom sticks like the itch and only in rare cases have companies been freed of paving between tracks in new streets and almost never of the maintenance of present trackage pavement.

In conclusion I wish to say that in small cities the future of the street railway business is questionable and only the most careful and economical management will assure these cities permanent transportation facilities. Street railways in larger cities are fast coming into their own again and the investing public is quickly recognizing this.

District No. 6—Southwestern: (Kansas, Missouri, Oklahoma, Arkansas, Louisiana, Texas and Colorado.)

By W. E. Wood

Manager Houston Electric Company, Houston, Tex.

The regional vice-chairman of District No. 6 did not have the opportunity of visiting all of the properties within his district, but a great many of them were covered personally. The general impression gained is that the properties within his district are rapidly modernizing, both as to their methods and equipment.

El Paso furnishes a happy example of what can be accomplished through the development of good service followed by aggressive publicity of the right sort. In setting their case before the public, they have so impressed the importance of their successful operation to the city, that they have been able to request automobilists not to pick up prospective street car customers along their lines, this rather drastic request being taken by the public in all seriousness and without the slightest resentment.

The furnishing of transportation in the larger cities such as St. Louis, Kansas City, New Orleans, Denver, Houston and Dallas is greatly handicapped on account of acute traffic congestion in the downtown district. The managements of all these companies have been keenly aware of the traffic situation and, in many cases, have done a great deal to alleviate it.

Through the co-operation of the city authorities, Kansas City enjoys traffic regulations and non-parking zones during the busy hours to such an extent that their cars are able to move through the down-town district with great facility during the rush hours. Many of the other cities are receiving such co-operation as will greatly improve their conditions.

Active campaigns to increase car riding are in progress in many of the cities within the district.

City bus operation in connection with the street railway system is being tried in several cities and its progress watched and analyzed with great care.

In Houston there has been in operation for several months a most successful city bus line which was inaugurated to take the place of a competing jitney line, on the jitney's elimination from Houston by popular vote.

A strong feeling is developing among the companies that where city bus lines are necessary or warranted they should be operated by the local transportation company and that the local transportation company should impress the public with the fact that they are in the transportation business and are entirely willing to furnish the most modern, comfortable and efficient transportation, whether it be by street car or buses, using whichever a survey of the situation shows to be the best in each particular case.

The speeding up of service is receiving great attention in all localities. Kansas City, New Orleans, Dallas, Houston and other cities are loading and dispatching their cars through the down-town district more expeditiously by the use of street collectors and traffic aids. Types of equipment are being designed that facilitate a more rapid loading and unloading of passengers. Unnecessary stops are being eliminated in many places. The designation of stops in the down-town district in Kansas City has proved most beneficial.

Civic authorities are being brought to understand that anything which tends to speed up the street cars, furnishes the passengers a more attractive service and at the same time tends to reduce its cost.

It was our privilege to attend a formal opening of a new street car extension in Shreveport. A meeting was held at the end of the new line and talks made by different individuals. The occasion was reported very carefully in the local papers, and the publicity which it afforded undoubtedly helped the local street railway company to better establish itself with the public in general.

The importance of employees' education is becoming more and more apparent throughout the district. It is through the employees that both an economical and courteous service may be recommended. The employees are also a most important factor in informing the public and it is recognized that the more they are taught concerning our business, the more efficiently can they perform these requirements. At the present time, educational work is being carried on through many different agencies. With a continued interchange of ideas and experiences, this phase of our business should prove most beneficial to our organization. In some of the companies, we found more than half of the employees of the railway were enrolled in some form of study.

The outlook for the future throughout the district we found to be generally promising, and the spirit of the different organizations is decidedly optimistic.

District No. 7—Pacific: (California, Oregon, Washington, Utah, Arizona, New Mexico, Montana, Wyoming and Idaho.)

By W. V. Hill*

Manager California Electric Railway Association, San Francisco, Cal.

There are 66 electric railways, operating 5,652 miles of track in this section, exclusive of the four municipally operated lines in San Francisco, Eureka, Tacoma and Seattle.

Following is a summary of the "high spots" of the industry in this section for the current year. This information has been obtained through personal visits, and by correspondence with officials of the companies in states where time did not permit personal visits.

Arizona—Four companies, operating 53.79 miles of track.

The Phoenix Railway Company, the largest company operating in the State, has suffered a steady decline of business for the past four years. Its gross revenue in 1920 was $237,000 and estimated to be $148,000 in 1924. The line was recently offered to the city for $165,000 cash, but the offer was not accepted, although it has tended to stop several political agitators in their attacks on the company. A 5-cent fare prevails and no buses are being operated. The company is paying an unusually high rate for power —2½ cents per kilowatt-hour on city lines and 6 cents per kilowatt-hour on the line running to Glendale.

The company operating in Tucson is showing increased earnings, due, it is claimed by the management, to speeding up service, new one-man cars and reconstructed track.

Nevada and New Mexico—There are two small lines operating 14.75 miles of track. They are simply existing, according to reports.

Montana—Five companies, operating 242.08 miles of track.

Earnings have been disappointing, due largely to use of privately owned automobiles and general business depression. One-man cars are operated on all city lines; there is no bus competition and no bus operation by the companies. One company operates a baseball park which, it is claimed, is helping revenues during summer months by creating travel. There has been some track reconstruction, one company using steel ties and concrete.

Idaho — Three companies operating 100.20 miles of track.

The outlook is not very bright. One company is in the hands of a receiver and will probably be sold and junked; another is seeking to abandon several non-paying lines. Reports are that the companies are scarcely making operating expenses. The interurban lines are suffering from unregulated stage and truck competition. In this connection I would state that we have supplied data and information to these companies with a view of bringing about proper regulation and taxation of the motor carriers.

Utah — Five companies operating 504.83 miles of track.

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*Mr. Hill is also regional vice-chairman of the committee on interurban operation in District No. 7. His report, therefore, embraces his activities on both committees.

Unable to obtain any information to date from this State.

Oregon—Eight companies operating 744.54 miles of track.

The lines in the vicinity of Portland are adopting the bus as a feeder in the newly developed sections and also in interurban service. There was some track reconstruction during the current year but no new cars were purchased.

The earnings of the lines in the state are off slightly, due to the increased number of private automobiles in use, the decreased tourist travel and the slowing down of lumber activities. The interurbans are constantly increasing their freight business.

Washington— Sixtxeen companies, operating 767.61 miles of track.

The earnings of the lines in this state are somewhat off this year, due to the recession in the lumber business and the slight general depression prevailing.

The Pacific Northwest Traction Company, operating a high-speed interurban electric railway and stage service between Seattle and Bellingham (the stage service acting as a bridge between Everett and Mount Vernon) is doing a very satisfactory business. The stages are the last word in construction and the service in general is well patronized and highly appreciated by the public.

The Puget Sound International Railway & Power Company, operating the local system in Everett, has partially substituted buses for the electric cars and the public appear to be very well satisfied with the change. The substitution of buses has enabled the company to broaden its scope of operations, serving parts of the city that were not served by the electric lines.

The Puget Sound Electric Railway, operating between Tacoma and Seattle, has recently inaugurated half hourly service instead of hourly service, which has tended to popularize and increase the earnings of the company. It is also operating stage lines as feeders to Olympia, the capital of the State, a distance of 32 miles.

Most of the interurban lines in the state have joint traffic arrangements with stage lines, which have so far proven successful.

Hawaii—The railway in Honolulu, operating 35 miles of track, has a new indeterminate franchise carrying the right of purchase and fair return. The company has paid 8 per cent dividends on a five cent fare until this year. They have recently expended $600,000 on new safety cars and other equipment and expect to ask for a seven cent fare, with four tickets for 25 cents. The commission is now making a valuation. The new cars purchased are modern and large and are designed for semi-tropical climate.

California.— Twenty-six companies, operating 3,171.33 miles of track. Gross earnings this year will show a slight decrease over the highwater mark of 1923, when the gross receipts exceeded $60,000,000, an increase of $6,000,000 over 1922. The earnings of 1923 were the largest in the history of the industry in this state.

The slight recession in business this year is due primarily to the scarcity of rainfall last winter, affecting crops in general; the hoof and mouth disease among animals, affecting less than one per cent of the total, but having a most unwholesome effect on our tourist crop through quarantine embargoes by adjoining states as well as between counties in the state. California also felt some of the depression which has prevailed throughout the country, although perhaps not as severely as in some other states.

The exceptionally light rainfall and snows in the mountains last winter created a serious situation in the valleys and in southern California. In the valleys crops were retarded and output reduced below normal. In southern California, especially in Los Angeles and vicinity, where hydro-electric power has been used almost entirely for years, the electric railways and other consumers of power were compelled to effect a 25 per cent reduction in consumption. The two large steam power plants of the electric railways in Los Angeles have been reconditioned after having been idle for 10 years, and placed in service by the power company supplying them with hydro-electric power in the past. Through the timely co-operation of state and city regulatory bodies and the public utilities and the public, the situation has been satisfactorily handled. War-time skip-stops were inaugurated and schedules reduced on all lines to a minimum. Interurban lines cut down the size of trains and city lines cut down off-peak service.

The lines in San Diego and vicinity were not affected, for they rely entirely on steam generated power, and fuel oil is plentiful.

One interurban line has suffered a loss of $20,000 in freight revenue due alone to the reduction in the size of the apple crop in its territory resulting from shortage of rainfall.

One company abandoned a 10-mile branch line, which had never paid operating expenses, and installed a bus service, which so far has been showing a comfortable net return.

Several efforts have been made through the filing of applications with the Railroad Commission, to abandon lines in small cities that have been running behind in making operating expenses. The mileage in these cities ranges from 2 to 10, and with practically every family owing an automobile and using them 365 days in the year, the business is not to be had at any fare or for any service performed. Strong opposition has been voiced before the commission at these hearings, however, to the abandonment of the local lines, and the offer to substitute bus service which will not pay operating expenses does not appease the public. It is recognized that to lose its electric railway service, a city is losing a considerable amount of prestige. The question of making electric railway or bus service pay in cities of ten thousand or less, in California at least, is a difficult one to solve.

Notwithstanding this temporary setback, the electric railways in California are expending approximately $20,000,000 during the current year in new rolling stock, electrical machinery and reconstruction of tracks. A number of extensions are being made, including a 22-mile, high-speed interurban line by the San Diego Electric Railway; a mile long subway in the heart of Los Angeles by the Pacific Electric; and also extensive freight yards to handle the constantly increasing freight traffic.

The three interurban lines entering Sacramento have under construction there a Union Terminal Station, estimated to cost in excess of $250,000.

The San Francisco-Sacramento Railroad is concreting a tunnel a mile in length, using concrete ribs weighing 4,500 lb. each, in order to hold the weight of the mountain. This is expensive work, and handling traffic through it without delay is quite a problem.

The Key System Transit Company has added two new ferry boats to its fleet at a cost of $1,000,000, and is now figuring on two more to care for the constantly increasing commutation traffic across San Francisco Bay. New steel interurban cars have been added.

The San Francisco-Sacramento Railroad and the Sacramento Northern Railroad operate through parlor car and dining car service between Oakland Pier and Chico, a distance of 180 miles.

Ten companies are operating approximately 200 buses of various types in supplementary rail service, including 25 double-deck buses in Los Angeles.

The officials of the lines in California are in an optimistic frame of mind and express the view that there is a great future for the electric railway industry in that state. If there is a feeling anywhere to the contrary throughout the country, my advise would be to come out and get the spirit prevailing on the Pacific coast.

COMMITTEE ON INTERURBAN OPERATION

District No. 1—Northeastern: (Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island and New York.)

BY F. W. WOODCOCK

Manager Public Utility Management
Department, Day & Zimmermann, Inc.,
Philadelphia, Pa.

Replies received from letters sent out to interurban roads in territory embraced in first district indicate

1. Falling off in gross earnings due to automobile competition.
2. Increase in operating expense due to higher costs of labor and materials.

None of the roads replying indicated any particular action to offset the falling off in earnings except that one road had installed the "weekly pass."

Further, none of the replies indicated or mentioned any severe bus competition, but practically all referred to the private automobile competition. Apparently properties in this district have not had as severe bus competition as exists throughout the Midwest Section. Some of the tendencies noted were as follows:

1. The use of motor bus as a feeder to supplement railway service.
2. General tendency toward establishing a base bus fare of 10 cents.
3. Increased advertising and publicity.
4. Use of lighter weight and more attractive equipment.

5. Study of fare situation.
6. Generally improved maintenance of properties.
7. General tendency toward studying operating expenses more carefully.
8. Development of freight and express business.

Undoubtedly some of the interurban traction lines will be shut down where the traffic can be more conveniently and economically handled by motor bus. This, of course, depends on the route, volume of traffic, speed, etc. Most of the properties, however, are economic necessities to the communities which they serve and every effort should be made to obtain legislation to protect the tractions against bus competition, because, generally speaking, the tractions can not be successful unless the transportation business is recognized as a regulated monopoly.

It is highly important that all railway men work toward securing adequate legislation in those states which do not at the present have acts controlling the operations of motor vehicles for transportation of passengers and freight.

District No. 2—Mid-Eastern: (West Virginia, Pennsylvania, New Jersey, Delaware, Maryland and District of Columbia.)

By H. L. Mitchell

Vice-President West Penn Railway, Pittsburgh, Pa.

From reports received and interviews with several managers there is noted an optimistic feeling for the future of electric railways.

All important factors contributive to successful operation are now being given serious consideration by practically every company. Many companies are putting their cases before the public through newspaper articles, display advertising and by speakers before civic clubs and chambers of commerce.

Since the advent of the motor car and more particularly the privately owned automobile, managers of electric railways have finally appreciated the fact that there is a close community of interest between the public and the utility. The loss experienced first by urban properties through diversion of traffic by the privately owned car is now being keenly felt by the interurban companies, and the same is being intensified where rapid progress is being made in road improvements. Sooner or later the use of the different means of transportation will be controlled by the true economic forces.

For several years the engineer held the attention of managers in his effort to introduce extreme economy in car design. It is, however, paramount that public comfort be first considered and economical features embodied afterward. The automobile manufacturer first sensed the wants of the public and educated their demands to a more exacting point. The electric railway practically existing without competition of its kind too long remained indifferent to these changes and influences created by the automobile.

Reports received indicate that managers are seriously considering this phase of the transportation problem and where conditions prevent the purchase of new equipment, alterations of old equipment are being made to improve appearance and comfort. It is doubtful if a car may be designed that will be accepted by all, but certainly many conveniences may be embodied that will appeal to the public. The first requisite for good service is suitable equipment.

Undoubtedly, the greatest hardship fastened upon the industry today is the paving obligation. That there is relief in sight is not to be questioned, but it will be slow and tedious. However, the results to be secured will warrant the patient effort in convincing the public of the unfairness and injustice in maintaining street surface for the benefit of a competitor, and moreover, imposing upon the car rider through such indirect methods, a tax which should be principally borne by the real users and destroyers of paving.

Developing good relations between management and employees ranks next in importance. To improve the personnel of its trainmen nearly every company is adopting some form of welfare work. It would require volumes to give in detail the various methods practiced.

The initiation of safety campaigns has assumed a very important part in the industry. Larger companies are using a safety director or engineer for closely following up this work. This is recommended when the system can support such a specialist, the responsibility being too great to impose directly upon the managers or department heads. Although much assistance is offered by the A.E.R.A. and the National Safety Council in the way of posters and bulletins, and much can be accomplished by meetings, posters, etc., nothing in our opinion provides so effective a means of reducing accident liability as team contests and cash awards, organized and supervised by an enthusiastic safety director.

Only two of the reporting companies seem to have had any experience with the bus as an auxiliary. The Citizens Traction Company of Oil City, Pa., reports very satisfactory results.

One of the most progressive steps recently taken by interurban railways is the inauguration of through freight service between Erie and Syracuse and by connections with a trucking company at Erie reaching Youngstown and Cleveland, Ohio, on the west.

It is important that all railways operating in the same community arrange to extend the use of their respective facilities. An illustration in point —the Pittsburgh Railways and West Penn Railways have in addition to inaugurating inter-line freight service, entered into an arrangement whereby either company may operate chartered cars over the tracks of the other.

District No. 3—Southeastern: (Kentucky, Virginia, North Carolina, South Carolina, Tennessee, Mississippi, Alabama, Georgia and Florida.)

By Samuel Riddle

Vice-President Louisville Railway

In studying the interurban operation of this district, your regional vice-chairman made two trips occupying a week each, visiting the following properties and discussing with the officials operating them what was being done to modernize equipment and practices:

Virginia Railway & Power Company, Richmond, Va.
Richmond-Fairfield Electric Railway, Richmond, Va.
Richmond-Ashland Railway, Richmond, Va.
Petersburg, Hopewell & City Railway, Petersburg, Va.
Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.
Piedmont & Northern Railway, Charlotte, N. C.
Savannah Electric & Power Company, Savannah, Ga.
Augusta-Aiken Railway & Electric Company, Augusta, Ga.
Georgia Railway & Power Company, Atlanta, Ga.
Nashville Interurban Railroad, Nashville, Tenn.
Union Traction Company, Nashville, Tenn.
Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.
Birmingham Railway, Light & Power Company, Birmingham, Ala.
Memphis & Lake View Railway Company, Memphis, Tenn.
Chattanooga Traction Company, Chattanooga, Tenn.
Chattanooga Railway & Lighting Company, Chattanooga, Tenn.
Kentucky Traction & Terminal Company, Lexington, Ky.
Louisville & Interurban Railroad, Louisville, Ky.

At the outset, it should be said that there is a relatively small amount of interurban operation in this district. Practically all the companies visited operate outside of the cities in which they have their main offices, but with three exceptions this operation is of a suburban rather than interurban character. In this suburban operation, though, several operating practices, pieces of machinery and novelties of equipment were encountered which, it appears, profitably could be utilized in interurban operation.

But first a word as to general conditions in the Southeast. Possibly because all suburban and interurban railroads in the Southeast are adjacent to and parallel improved highways, all operating companies have suffered from competition of the automobile. Revenues have been reduced to some degree by unregulated and uncontrolled bus and truck competition, but in the main it is the privately owned automobile that is furnishing the formidable competition. Justification for the use of the word formidable is to be found in the fact that not one of the properties visited at the present time is earning an adequate return on the investment.

Fares vary widely in the district, roughly averaging around 2 cents a mile. Zones almost without exception are made the basis for fare collection, but they differ widely in length. Family and commutation tickets are sold on all lines at reduced rates.

Attention everywhere is turning to the desirability of lightweight equipment to effect economies. As a matter of fact, however, although all companies are interested in lightweight equipment, practically all still are using the heavier types of cars, there being a very general reluctance or inability to make the expenditures necessary to replace present equipment with lighter cars. In general, it may be said that all companies feel themselves obligated, at least for the present, to do the best they can with the equipment they have. One-man safety operation, though successful where tried, is not general in the South.

Another characteristic of the operating companies in this district that deserves mention is that without exception, in addition to their transportation business, they engage in a general power and lighting business or else, in the case of many of the smaller companies, purchase their current.

The importance of public relations everywhere is realized. Improvement in this field is being sought by frequency of service, clean and comfortable cars, courteous employees and affiliation with chambers of commerce, boards of trade and civic and luncheon clubs.

Operating practices, modifications of equipment and special devices encountered in the survey which may be of interest to the industry, all of which are described in detail in the handbook, include:

The Memphis & Lake View Railway is setting up, with the experience of other years as a basis, a fund for accidents and suits, and then is dividing with employees any balance in this fund. The Louisville & Interurban Railroad has an employee safety council which is considered a potent force in reducing accidents. This company also has taken out with Lloyd's an insurance policy which protects it in case of accidents costing more than $25,000.

One-man operation, generally avoided because of fear of complications under "Jim Crow" laws, is being successfully carried on by the Kentucky Traction & Terminal Company and the Louisville & Interurban Railroad. The Gulfport & Mississippi Coast Traction also has one-man operation between its terminal cities, with two-man operation in those cities.

Improvement of public relations and traffic stimulation are being sought by the Petersburg, Hopewell & City Railway, Gas & Electric Company with a special week-end reduced rate; by the Savannah Electric & Power Company with a series of advertisements based on the history of the city of Savannah, and by the Kentucky Traction & Terminal Company with a personal solicitation of persons living along its lines. The Piedmont & Northern Railway is aggressively seeking freight business, employing solicitors, writing patrons letters of thanks and building warehouses which it leases.

The Savannah Electric & Power Company has on its safety cars automatically functioning lifeguards; the Birmingham Railway, Light & Power Company has equipped some of its cars so that the space given white and black passengers may be varied; and the Louisville & Interurban Railroad is using a supplemental dash light as well as a headlight on the top of its cars. This last company also has in use zone destination tickets designed to prevent over-riding and to facilitate computation of zone fares.

The Birmingham Railway, Light & Power Company is operating its own foundry, is effecting economies in track construction by the use of slag instead of concrete as a base, is using thermit-weld joints exclusively and has a digging machine mounted on a truck. The Nashville Interurban Railroad Company has in service a weed burner.

In Birmingham, it may be mentioned though this, strictly speaking, is not a detail of interurban operation, pedestrians are required to observe stop and go traffic signals just as are automobiles and vehicles.

District No. 4 — North Central (Indiana, Ohio and Lower Michigan.)

By John S. Bleecker

Day & Zimmermann, Inc., Philadelphia, Pa.

Such a large proportion of the interurban railways in Ohio, Indiana and Michigan are faced with the problem of highway competition that this subject seems to be the outstanding feature of importance for attention. The results of the development of the highway appear in one or more of several ways:

1. Decreased passenger business.
2. Decreased freight business.
3. Lack of growth in passenger business.
4. Lack of growth in freight business.
5. Excessive service.
6. Uneconomic rate schedules.

The illogical situation produced by attempts to regulate competitive service or to compete with a regulated service is not always evidenced by the direct operation of vehicles on highways immediately paralleling the lines of an individual company, but may, nevertheless, exist over the general territory or in the state and produce indirectly the same ruinous conditions as if a line of buses or trucks were actually operating between the terminals of the traction company.

There is, in my opinion, little good to be hoped for from the local application of temporary remedies and expedients. One company may speed up its passenger service and put on limiteds, dining cars, sleeping cars, and the like; another may offer rapid freight handling facilities, engage in active publicity and advertising, or install modern and attractive equipment and facilities; other roads may reduce rates or introduce some special form of ticket, pass or fare adjustment; other lines may install buses of their own, handle freight in trucks, or introduce a door to door delivery and pick-up system. Examination of the activities of the interurban railways in my region indicates that the various companies are trying one or another of the above expedients in an effort to control or secure patronage.

As against the efforts of various kinds which are being made to get business, some of the companies are introducing methods for reducing operating expenses, by purchasing power from transmission companies instead of manufacturing it in small plants; by operating lighter weight equipment and thereby reducing power consumption and maintenance of track; by reducing train crews from two men to one man; by introducing automatic devices in place of manually operated ones; by safety campaigns and the reduction of accidents and their consequent cost; by the adoption of simplified accounting and record keeping; and by the encouragement, through pensions, publicity or prospective profit sharing, of efficiency of its personnel; also, by many other detail and resourceful experiments.

In all of these efforts, the handicap of the uneconomic basic situation of competition in a field where a regulated monopoly furnishing a complete service is the only logical condition, will continue until it is remedied at the source by adequate legislation.

The makeshift expedients are interesting and, in some instances, necessary for a continuation of service of any kind. They are not, however, fundamental, complete or permanent as remedies for the industry as a whole.

The operators of interurban railways are to be commended for their untiring and painstaking efforts to apply local remedies to such ailments as may be evidenced to them in their particular locality.

In my opinion the situation of interurban railways in my territory can be likened to an individual whose constitution has been so rundown that he is suffering from an outcropping of carbuncles in various places on his anatomy. Mark Twain said he looked in the dictionary for the definition of a "carbuncle" and he found that it was a "precious jewel," whereupon he remarked that "humor was out of place in a dictionary." Until such time as a constitution is properly built up by applying basic rather than local remedies, there can be little hope for a complete recovery of the patient.

It is encouraging to observe that the public generally, and through it the legislators and their agents, the utilities commissions, are coming to a definite although somewhat tardy recognition of the necessity for applying these basic remedies.

To enter into a discussion of the laws governing the control and regulation of interurban transportation, whether by rail or highway, would undoubtedly be outside of the scope of the research work expected of the committee, but until this discussion is entered into, conclusions reached and action taken, the industry as a whole will not be permanently and vitally benefited.

District No. 5—Mid-Western: (Illinois, Wisconsin, Iowa, Nebraska, North Dakota, South Dakota, Minnesota and Upper Michigan.)

By G. W. Welsh

Chief Engineer East St. Louis & Suburban Railway, East St. Louis, Ill.

The survey made in the fifth or Mid-Western District of the Committee on Interurban Operation shows above all that there is no cure-all solution for the interurban problem. In the case of properties visited and those with which I have had correspondence, the chief problem to be solved is the problem of private automobile competition and to a minor extent the problem of motor bus competition. These problems will require different solutions on different types of interurban railways. If it were a question of fundamentals the solution might be simpler but the further the survey progressed the more it became evident that local conditions have a distinct bearing in each case.

Generally speaking there are three types of interurban railroads:

1. The long line interurban operating between two large centers of population and performing passenger and freight service practically the same as that furnished by an electrified steam railroad. Examples of this type are the Chicago, North Shore & Milwaukee and the Illinois Traction System.

2. The comparatively long line interurban operating between cities of moderate size and passing through towns and smaller cities between terminals.

3. The short line interurban with terminus in a large center of population or moderate size center of population and running out "fanwise" into smaller cities and towns or in some cases into sparsely settled territory.

It can readily be seen that the same solution of the private automobile problem will not apply equally in all three cases. In the case of the hundred mile line, the automobile owner generally will take the interurban rather than drive the long distance even though highways may be good. On the short interurban of say 25 miles the tendency in many cases is to use the automobile rather than the interurban. What all three sections must do, however, is to provide attractive comfortable equipment operated frequently and on time and keep road beds in such shape that the ride will be comfortable, and above all to maintain such relations with employees and the public that business may be readily secured. Business cannot be secured without good public relations and good service.

Analysis of possibilities of freight transportation shows that it follows closely the passenger business. Outside of the steam railroad the chief competitor is the automobile truck and again on the hundred mile run this does not become as serious a factor as on the 25 mile run from large centers of population where, unless steps are taken to check the growth of the truck business it will be found that the trucks carry considerably more less than carload freight than the interurban railways. Several companies are actively engaged before state commissions and courts in fighting the trucking business with a fair measure of success. Some trucking companies have secured certificates of convenience and necessity to operate as public utilities, but most of them are wildcat operators without any legal standing.

All companies visited are giving serious attention to the use of light weight car equipment and after analyzing operating conditions on a number of roads, it became more and more difficult to define a light weight car. Cars equipped with comfortable seats which weigh as low as 13 tons were found, and such cars were adapted to the service they were giving. In other cases 25 ton cars could be considered as light-weight cars. I do not believe I would be wrong in stating that the 45 and 50 ton cars of the Chicago, North Shore & Milwaukee Railroad can be considered as light-weight cars, taking into account all service conditions.

It was found generally that master mechanics, superintendent of equipment and other department heads on all roads are availing themselves of modern methods depending on the amount of money available on a particular property. Practically every repair shop visited showed some interesting shop kinks which in many cases were home-made.

One of the most interesting developments noted was on the Illinois Valley Division of the Illinois Traction System. This line is 85 miles long, extends from Joliet to Princeton and operates through four or five towns of from 5,000 to 15,000 population. The management have been operating two-man cars weighing 50 tons, geared for 60 m.p.h. with a 2-hour headway between towns. It has purchased new car equipment weighing 19 tons, geared for about 45 m.p.h. and proposes to operate one-man cars with one-hour headway. Special attention was given to the design of the seats in the new cars and sixteen different types of seat cushions were tried out before one was finally adopted. The change to one-man operation involved a change in other operating practices so that in the end on account of doubling the service, there is practically no saving in operating expenses. It is predicted that the increased revenue due to the more frequent, attractive and comfortable service will be sufficient to more than make up for the fixed charges on the expenditure for new equipment.

Another interesting feature noted was through service from Rockford, Illinois, to Chicago, inaugurated by the Rockford and Interurban, the Elgin & Belvidere Railway, and the Chicago, Aurora & Elgin Railroad. Without any increase in operating expenses these three companies so arranged their schedules that fast through service over a distance of 90 miles is being given, and by making the rate 2 cents per mile instead of the steam railroad rate of 3.6 cents per mile a very satisfactory proportion of the available business is being secured, in spite of the disadvantage of slower running and lack of baggage accommodations.

In freight transportation the Chicago, North Shore & Milwaukee Railroad and the Illinois Traction System are showing real progress. The former road handles principally merchandise despatch or less than carload freight and has built up the business to a point where it represents 20 per cent of the gross revenue. The Illinois Traction System handles all classes of freight and now has reached a point where its freight business is 40 per cent of the gross revenue.

Both the Chicago, North Shore & Milwaukee and The Milwaukee Electric Railway & Light Company are operating extensive interurban bus schedules, in some cases over extremely long routes, and on account of being in the field themselves, have very little, if any, competition.

District No. 6 — Southwestern: (Kansas, Missouri, Oklahoma, Arkansas, Louisiana, Texas and Colorado.)

By V. W. Berry

General Superintendent Northern Texas Traction Company, Fort Worth, Tex.

Although this section covers a great area, there are only thirty-two interurban companies, and these are scattered over the entire district. Unfortunately, it has been impossible for me to personally visit all these companies during the past year, but I have been able to visit the larger ones, and with the smaller companies the work of the committee has been carried on by correspondence.

A great deal of good was derived from the publicity issued early in the year through Association headquarters, and the committee work in this section was vastly aided by the information published in trade journals, state public service information bureaus and daily newspapers.

In all the companies there was a disposition to assist the work of the Committee, and in every company visited there was manifested hearty co-operation. However, many of the local operators took the attitude that your representative was a sort of doctor who could prescribe the cure for whatever disease affected their properties. We had to confine ourselves to pointing out the remedy used by some other operator in somewhat similar circumstances. In disseminating information of this character we found a great need for a handbook of electric railway practice, such as is now being issued.

In every case the interurban companies in this section are making every effort to furnish the best service of which they are capable, although local conditions in the various places make impossible a single standard of service. All are, however, keenly interested in modernizing their roads and are making every improvement which their finances permit. In order to modernize their service, new and up-to-date rolling stock, including in a few instances light-weight one-man cars, is being installed to replace heavy and antiquated equipment. Automatic substations are gradually replacing manually operated substations, and in this section during the last year approximately 100 miles of new interurban line has either been put into operation or construction has been started.

Many of the roads have been subjected to unfair automobile competition and this has been reflected in the companies' finances. However, by using modern merchandising methods and improving service by modernization of equipment, this competition has been considerably reduced, and in many cases entirely eliminated. Where local conditions permit, aggressive campaigns have been made to secure additional freight business, and this is proving a profitable source of revenue.

Bus operation, as a feeder for interurban lines, has been considered by many of the companies in this section, and several have already started operation of this class of equipment.

Subjects and Meetings

THE committee on subjects and meetings made the following recommendations with reference to the subjects that should be studied during the coming association year. Its report was presented at the final meeting of the old executive committee of the American Association.

Modernization — The committee on city operation and the committee on interurban operation in their joint report to the 1924 convention recommend the consolidation of these committees. This suggestion was approved and the committee recommended that this work be carried on. It is further suggested that the consolidated committee be designated during the coming year as the "Committee on Management and Operation."

Valuation—The committee on valuation in its report to the 1924 convention recommends attention by the Accountants' and Engineering Associations to certain phases of the valuation problem. The subjects and meetings committee recommended that a joint committee or sub-committee of the American, Accountants' and Engineering Associations be formed to handle the particular matters in which the accountants and engineers can assist the valuation committee. It was recommended that the valuation committee be instructed to continue its study.

Special Taxes — While this subject has been covered from year to year, special taxes are always with us and the public should not be permitted to forget their effort upon fares and service. Accordingly, it was recommended that the committee on special taxes be continued and that it review again the unjust burdens which railway companies have to bear.

Education — Recommendation was made that this committee be continued and that further efforts be made toward obtaining greater co-operation from technical and public schools and also greater attention on the part of the companies to the education of their employees.

Survey of Community Transportation Needs—The subjects and meetings committee recommended that a committee to be designated "Committee on Community Transportation Requirements" be appointed, and that this committee embrace in its activities the work heretofore performed and that recommended to be performed in the future by the committee on unification and co-ordination of all forms of local transportation. It is suggested that this committee consider the need for a survey of the transportation requirements in local communities and indicate general principles along which such surveys may be conducted. Such a survey should reveal whether transportation service and facilities are being provided in each community commensurate with the requirements in its various sections. The association has had three reports dealing with the place of the motor bus in mass transportation and the position of the industry on this question is well established. The subjects and meetings committee declared its belief that we now might go further and consider how all the various means of mass transportation may be used to best advantage.

Committee on Bus Franchises—It is recommended that a special committee be appointed to study the form of franchises or permits best suitable for the establishment of bus routes, having in mind the association's policy of coordination.

Committee on Co-operation with Manufacturers — This committee has beein doing very effective work in the assistance of manufacturers in telling the story of the electric railways to the public. It is recommended that the work of this committee be continued.

Committee on Rapid Transit — This committee was newly organized rather late in the association year and has not had a sufficient opportunity to complete its work as indicated in its report. It is recommended that it be continued and instructed to proceed along the lines heretofore suggested.

Committee on Mail Pay—The work of this committee is limited to its presentation of the application for increased rates before the Interstate Commerce Commission, which is now pending. It is recommended that the committee be continued.

Insurance Committee—This committee has in individual instances been able to assist companies in securing reduction in rates. It is recommended that the committee be continued.

Committee on Uniform Regulatory Laws—This committee was newly organized at the beginning of the year and has not had an opportunity to develop this subject. It is recommended that it be continued.

Charles A. Coffin Prize Committee—It is recommended that this committee be authorized for the coming year.

Committee on National Utility Associations—It is recommended that the work of this committee be continued.

The report was signed by H. L. Brown, J. K. Choate, H. C. Clark, F. W. Doolittle, E. C. Faber, G. H. Harries, C. S. Howley, W. H. Hyland, H. A. Johnson, C. W. Kellogg, J. K. Punderford, A. S. Richey, E. M. White and F. R. Coates, chairman.

Canadians Discuss Next Convention

THOSE members of the Canadian Electric Railway Association who attended the Atlantic City convention held a meeting Oct. 7, which was attended by 21. The meeting was called to order by Walter R. McRae. After the minutes of similar meetings held at Atlantic City last year were read by Secretary Eustace Smith, Jr., the following committees were announced:

Valuation, Maintenance and Depreciation of Street Railway Assets.—H. E. Weyman, manager Levis County Railway, chairman; W. S. Hart, Quebec; W. G. Hewson, Toronto; L. Tait, London; G. E. Waller, Hamilton; H. R. Mallison, Montreal, and H. C. Patten, Toronto.

Safety.—W. R. Robertson, general superintendent Hydro-Electric Railways, Toronto, chairman; W. H. Darracott, Winnipeg; W. R. McRae, Toronto; R. M. Reade, Quebec; J. F. H. Wyse, Toronto; G. E. Waller, Hamilton, and A. Gaboury, Montreal.

Motor Truck and Bus.—Maj. F. D. Burpee, manager Ottawa Electric Railway, chairman; C. H. Dahl, Winnipeg; G. Gordon Gale, Hull; W. G. Murrin, Vancouver; W. R. Robertson, Toronto; I. S. Fairty, Toronto, and A. H. Foster, Brantford.

Legislation. — Maj. F. D. Burpee, manager Ottawa Electric Railway, Chairman; W. L. Weston, Halifax; J. A. Olive, St. John; N. B.; G. E. Tanguay, Quebec; C. L. Wilson; Toronto; E. Anderson, Winnipeg; D. W. Houston, Regina; C. J. Yorath, Edmonton, and V. Laursen, Vancouver.

Standards. — D. E. Blair, superintendent of rolling stock Montreal Tramways Company, chairman; E. P. Coleman, G. Gordon Gale, Hull; H. T. Gibbs, Hamilton; W. G. Gordon, Toronto; Hugh Millar, Montreal; W. G. Murrin, Vancouver, and W. R. McRae, Toronto.

At this point W. R. Robertson entered and took the chair. The resignation of C. J. Yorath, city commissioner for Edmonton, who acted on the association's legislation committee for that province, was announced unofficially.

Chairman Robertson called attention to the questionnaires which have been sent out to member companies, one dealing with the testing of hearing and eyesight of employees, and the other dealing with the practices in effect in regard to exterior advertising on street cars. He desired to impress upon member companies the importance of getting answers to these and other questionnaires as early as possible on account of the value of the information to the association.

The meeting place for the 1925 convention was discussed. Invitations have been received from Niagara Falls, Windsor and Winnipeg. Charles Currie, president London Street Railway, London, Ont., extended an invitation to the association to hold the meeting there next year. The question also arose as to whether the convention would be held in connection with the Canadian Electrical Association. It was the sense of the meeting that a joint convention would be desirable and the members present expressed themselves in favor of London. This information will be given the executive committee for its use.

The chairman announced the resignation of C. B. King as auditor of the association, following his resignation as manager of the London Street Railways. Mr. Fairty moved that the secretary draft a letter of regret to Mr. King on the occasion of his resignation.

J. F. Neild moved that the thanks of the Canadian Association be extended to the American Electric Association for the courtesies extended in connection with this convention and in placing facilities at its disposal for today's meeting.

Broad Economics of Employee Ownership[*]

By T. N. Carver

Professor of Economics, Harvard University

Labor and Capital Now in Process of Economic Evolution — Employee Stock Holdings in Their Companies Now Runs Into Millions—Modern Business Improves by Increasing Rather than by Decreasing the Supply of Capital

THE World War produced a number of political revolutions in Europe. It has not yet produced an economic revolution. A number of old governments have been overthrown and new ones set up in their places. In some cases this resulted in a temporary economic débâcle, but wherever industry has begun to function again it looks so much like that which existed before the revolution as to be difficult to distinguish from it. No significant improvement over the old forms of industry has yet been produced in any European country by any of these political revolutions. Their ultimate effects go no deeper than those that follow the ousting of one gang of politicians from the government of an American city and the substitution of another.

The only economic revolution now under way is going on in the United States. It is a revolution that is to wipe out the distinction between laborers and capitalists by making laborers their own capitalists and by compelling capitalists to become laborers of one kind or another, because not many of them will be able to live on the returns from capital alone. This is something new in the history of the world.

The labor movement in this country is passing out of the stage in which leadership concerned itself mainly with the immediate tactics of battle. It is passing into the stage where it is concerning itself with the higher strategy of labor. This higher strategy takes account of the permanent economic forces and puts labor in a position where these forces work for it rather than against it. Instead of fighting capital they are beginning to recognize its power and to use it as an implement for their own improvement. There are at least three kinds of evidence that indicate roughly the extent to which laborers are becoming their own capitalists in this country: first, the rapid growth of savings deposits; second, the investment by laborers in the shares of corporations; third, the growth of labor banks.

T. N. Carver

Some idea of the financial power of laborers may be gained by a reasonable interpretation of the statistics regarding savings deposits, the assets of building and loan associations and the premiums of insurance companies. The total figures as given by the Department of Commerce are:

For savings deposits of all kinds on June 30, 1923	$15,260,959,300
For total assets of building and loan associations	3,342,530,953
Add to these the total amount of life insurance premiums paid during the year of 1922	2,336,444,586
Total	$20,939,934,839

Of course, these savings are not all made by manual workers. Probably a relatively small proportion of the life insurance premiums are paid by them; but it is known that a fairly large proportion of savings deposits and payments to building and loan associations are by working people. Discount this as much as we dare, it is still a fair inference that the share of working people in the twenty billions of savings will at least be somewhere in the billions. Any day the laborers decide to do so, they can divert a few billions of savings to the purchase of the common stock of industrial corporations, railroads, and public service companies, and actually control them. This is not necessarily a good policy, but it is within their power to do so if they decide that it is to their interest.

As to the investment of laboring people in the shares of corporations, some interesting figures are available, though the half has not yet been told. The *Financial World* recently sent a questionnaire to 1,000 of the leading corporations of the country for the purpose of finding out how far the movement had progressed. Only 129 replies were returned. Of these 104 showed that employees below the grade of officials owned stock, though 118 of the replies stated that the management favored the plan. Of those that showed employee ownership, only 54 had offered special inducements to persuade employees to buy stock. What are known as public utility corporations showed the strongest tendency toward the plan.

The largest number of employee stockholders in any single industrial corporation is 50,020, owning 689,703 shares. Two others show 15,000 employee stockholders each, owning in one case 450,411 shares and 200,000 in the other. One smaller corporation reports that all its common stock is owned by its employees, but does not tell how it is distributed between the official class and the manual workers. Another reports that 12,000 of its 18,000 employees own stock. Still another reports that 3,000 of its 6,000 employees own $2,500,000 worth of stock. A number of corporations that did not reply to the questionnaire are known to have a considerable number of employee stockholders.

Of the 171 public utility corporations listed, 33 replies were received, 32 of which report employee stockholders. One reports that 94 per cent of its employees own from 1 to 50 shares each; another that 149 of its 151 employees own stock; still another that 510 of its 543 employees own 5,211 shares. The most striking case, however, is a well-known traction company all of whose 11,500 employees own stock amounting to 120,000 shares. One company reports that none but officers own stock.

Among those that did not reply to the questionnaire, the Southwestern Bell Telephone Company has published in its annual report the statement that

"The Employees' Stock Purchase Plan, under which employees may subscribe for capital stock of the American Telephone & Telegraph Company on favorable terms, continues in effect. On Dec. 31, 1923, more than 5,900 employees were subscribing for 17,496 shares. Since the introduction of the existing plan in May, 1921, more than 14,000 employees have exercised their privilege of participation and a large percentage of employees of your company already are shareholders of record. The plan provides not only a means for acquiring a high-grade investment stock but as well a means for promoting systematic saving."

A report on employee thrift and savings plans, prepared by the policyholders' service bureau of the Metropolitan Life Insurance Company, mentions a number of other companies in which the plan is in operation, in one of which—a large motor company—94 per cent of the employees are participating in the plan for employee stock ownership. In a large soap manufacturing company, 60 to 85 per cent of the employees own $1,600,000, par value, of stock. This report shows that a considerable number of companies that did not reply to the questionnaire of the *Financial World* are making use of the plan.

In the chapter on The Workman as Stockholder in "Labor's Money," by Richard Boeckel, the following information is given:

"Twenty-one thousand of the employees of Swift & Company, constituting more than one-third of the total number of men and women employed by the company, hold Swift shares with a total par value exceeding $21,000,000.

"Ninety-four thousand of the employees of the American Telephone & Telegraph Company are making payment in installments upon stocks subscribed under the company's profit-sharing plan. Of this number approximately 46,000 hold shares upon which payment has been made in full.

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[*] Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

"The E. I. du Pont de Nemours Company has distributed stock valued at $20,765,999 among its employees since the inauguration of its plan. The total distribution in 1923 amounted to 14,484 shares with a total par value of $1,448,400.

"Six thousand employees of the General Motors Corporation, one out of every 12 employed, hold 270,000 shares of common stock in that corporation, valued in excess of $4,000,000.

"Employees of Sears, Roebuck & Company own 55,700 shares in that enterprise, purchased through the employees' profit sharing fund, and 77,600 shares purchased outside the fund.

"Seventy per cent of the workers employed by the International Harvester Company hold common stock in the company, the aggregate value of their holdings exceeding $5,000,000.

"Practically every workman employed by the Procter & Gamble Company is a shareholder in the enterprise. Ninety per cent of the employees of the Firestone Tire & Rubber Company are stockholders. Every third man in the employ of the Goodyear Tire & Rubber Company holds one or more shares of stock.

"Other corporations in which employees hold large blocks of stock include the Standard Oil companies, the General Electric Company, the Westinghouse Electric & Manufacturing Company, the Eastman Kodak Company, the J. B. Stetson Company, the National Lead Company, the National Biscuit Company, the Republic Iron & Steel Company, and the Studebaker Corporation.

"The United States Steel Corporation, called by Samuel Untermyer 'the greatest enemy to industrial peace in America,' was a pioneer in employees' stock distribution. The corporation was chartered in 1901. Its stock subscription plan was put into operation in 1903. In every year but one since 1903 the corporation has offered large amounts of its stock, bought in the open market, for subscription by its employees. In the beginning only preferred stock was offered, but offerings since 1916 have all been of common stock. Employees are allowed three years in which to pay for stock subscribed. An annual bonus of $5, in addition to the regular dividends, is paid to each employee holding his stock for a period of five years. In recent years all the corporation's offerings to employees have been largely oversubscribed.

"Owing to the meager reports it is impossible to give any satisfactory figures as to the total amount invested by American workingmen in the stock of the companies that employ them. About all that can be said is that it clearly runs up into billions of dollars."

THE LABOR BANK AN IMPORTANT NEW FACTOR

In addition to the accumulation of savings by working people and the investment in the stock of corporations we have in this country a strikingly new phenomenon in the form of the labor bank. The general facts regarding them are well stated in "Labor's Money," by Richard Boeckel. According to a recent statement of Warren S. Stone of the Brotherhood of Locomotive Engineers, there are thirty labor banks now in existence in this country and many more are organizing. They already have resources of $100,000,000 and are doubling these resources every year. The movement has already developed far enough to have its own organ, a well edited and prosperous journal, called the *Labor Banker*. Its editorials and articles compare favorably with those of other financial journals, and it shows a practical common sense, worthy of a disciple of Benjamin Franklin.

Where else in the world is it possible today to find anything corresponding to these labor banks?

If we add to the savings of laborers their investments in the shares of corporations and the funds in the labor banks, the large funds already in the treasuries of the labor unions, we will begin to see that the financial power of the American laboring people is a factor to be reckoned with. All good citizens who are interested in the expansion of American industries should take account of this. Here is a new source of capital that may be so directed as to increase the productive power of the country and to create an additional demand for labor. Every time the laboring people of this country materially increase their savings and sound investments, they are helping themselves in two distinct ways. In the first place they are gaining a new source of income. In addition to this, and perhaps more important, there is the effect upon the labor market. The more capital there is seeking investment, the more easily can new and productive enterprises be financed. The more new productive enterprises that are properly financed and put in operation, the more jobs there are calling for men, the higher the wages of labor will be, and the less unemployment there will be. Laborers are beginning to appreciate this and to engage in what may be called the higher strategy of labor.

ECONOMIC STRATEGY DISPLACING PRIMITIVE FIGHTING

At this point we should stop to notice the essential difference between primitive fighting tactics and the higher economic strategy. In primitive warfare you gain in proportion as you thin out your enemies. The more uncomfortable you can make it for them, the fewer there will be of them and the better it will be for you. All our ancestors for thousands of years had to think in these terms. It will take some time to breed this idea out of our people. The clear, cold fact is that in the modern economic world you gain in proportion as you increase the number of your enemies on the market.

Take the simple case of producer and consumer. When they are dickering over prices they are opponents. If they become irritated at one another, they are likely to fall back into the old way of thinking and try to treat each other as enemies. If the producers are dominated by this ancestral habit of thought, they will hate all consumers.

"Hates any man the thing he would not kill?"

It is, of course, obvious to the most elementary student of economics that what producers should do if they knew their own interest would be to try to increase the number of consumers. What they are very likely to do when they become angry is to try to thin them out.

SUGAR AND CRANBERRIES

During the sugar shortage of the war, the cranberry growers on Cape Cod had difficulty in selling their cranberries. The scarcity of sugar almost destroyed the demand for cranberries; the reason being that people do not want cranberries, they want cranberry sauce, and cranberry sauce is not made of cranberries alone; it is made of cranberries and sugar. If one ingredient in that delectable compound is missing, the other is not of much use.

Suppose the cranberry growers had been incensed because of the low price of cranberries and the high price of sugar, and had acted naturally, according to the principles of behaviorism. They would have started some sort of a war against sugar importers and refiners and would have made it uncomfortable for them, and probably driven some of them out of business. Every student of economics knows that while this might be a perfectly natural procedure, it would not do the cranberry growers any good; in fact it would do them harm. They would merely be engaged in the very common practice of biting off their own noses to spite their faces.

This is the principle that runs through all our economic life. Goods are not produced by labor; they are produced by labor and capital. If one ingredient is missing, there is not much demand for the other. In proportion as capital is scarce relative to the labor supply, in that proportion will capitalists be well off and laborers badly off. What the laborers really need is more capital. This is just as clear and definite as that the cranberry growers in the former illustration needed more sugar. When the laborers begin to think in terms of the higher strategy, they will be trying to increase the quantity of capital. They can do this both by increasing their own savings and by encouraging saving on the part of other people.

In terms of the higher economic strategy, every encouragement, of course, should be given to laborers to organize their own banks and to run those banks as banks ought to be run, by safeguarding the capital of depositors and financing real, productive enterprises. But it is also to the interest of labor that other banks should be started to do the same thing. The more banks there are performing these two essential functions, the more capital there will be available for the financing of new and productive enterprises.

If there is enough capital in the country and there are enough wise investors, no really productive enterprise will ever fail to secure adequate financial backing. When that happens, there will be so many productive enterprises in operation as to create a greatly increased demand for labor. This will put labor in a position of great strategic advantage. In other words, this is one of those cases where it is to the interest of labor to increase the number of its so-called enemies. In proportion as laborers learn to think in terms of economics rather than in terms of the cheap demagogics that is taught them by so many loquacious persons, they will begin to see the advantage of encouraging every possible accumulation of capital from every possible source.

If our labor leaders and those who are trying to become labor leaders will continue to think and act more and more in terms of the higher economic strategy, decreasing the supply of those forms of labor that are oversupplied, increasing the supply of capital and business management, favoring policies that will expand industry and so make it possible for laborers to become their own capitalists, there is scarcely any limit to the prosperity that may come to our laboring classes without a single essential or fundamental change in the institutions of the country or in the basic principles of the economic system. We can have what to all intents and purposes might be called a practical equality of prosperity without surrendering the principle of voluntarism under which we are now proceeding. We shall have much greater prosperity for all classes than can possibly be secured under any system of compulsion such as they are trying in Russia and such as the British Labor party, if it lives up to the previously published opinions of its leaders, will eventually try.

SHOULD LABOR OWN THE SHOPS?

It has long been the dreams of social reformers that laborers would own the shops and factories in which they work. There are reasons for doubting that this would be as desirable from the standpoint of the workers as some have imagined. It is true that the workers would get the profits, if there were any, but it is equally true that they would also bear the losses if there were any. On the whole, losses are almost, if not quite, as common as profits.

Granting, however, that it would be desirable for the workers to own the establishments in which they work, there are three ways—two dishonest or revolutionary, and one honest—by which they may acquire them. The first and most direct of the dishonest methods is to seize them by force. This is the method openly advocated by the so-called "direct actionists" and practiced by the Bolsheviki. Aside from the dishonesty of it, this method has serious drawbacks. The government must first be overthrown. Even then, the situation is not secure. Though this plan may put the present property in the hands of the worker, it cannot renew the property when it is worn out. There will be no new property to seize. People who never had enough thrift and forethought to buy and pay for property in the first place seldom have enough to keep the property up after they have gained it in some other way. When it runs down, there will be nothing to steal with which to keep up repairs. This the Bolsheviki have already discovered to their discomfiture.

Another dishonest way is to gain possession of the government and use its power to dispossess the present owners. This is frankly advocated by some of the Guild Socialists. It is to be done under the form of constitutional government, instead of in defiance of government. In the end, it will make little difference whether the force that is used to take property from one set of owners and give it to another is wielded by persons outside the government or by a perversion of government power.

If laborers want to own the shops in which they work, there is an honest way. It is the way by which they may own the houses in which they live, their clothes, their household furniture, or anything else that they have not themselves made. That is, to buy and pay for them as other people do. Even if they could take possession of the shops by force, they could only get repairs and replace worn-out plants by this method. There is no sound reason why they should gain possession of existing shops in any other way.

A FEW MISSTATEMENTS CHALLENGED

One of the strangest examples of the perverseness of the human mind is the tendency to misstate, or to accept without challenge, the misstatement of others, regarding the relation of the worker to his tools. One of these misstatements is that the industrial revolution of the eighteenth century deprived manual laborers of the ownership of their tools. Of course it is impossible to deprive a person of ownership of something which he never owned. The new tools that came into existence with steam-driven machinery never were owned by manual workers. For the first time in history they are in process of becoming in this country largely the property of those who work with them.

Another misstatement is that through government ownership the workers would become, in effect, the owners of the plants in which they work. The employees in the city hall do not own the city hall; the public school teachers do not own the school buildings. The employees of the federal government do not own the buildings or the navy yards in which they work. Moreover, the employees themselves in those publicly owned plants do not feel that they are working for themselves or show any more interest in their work than do the employees in capitalist owned plants.

A third misstatement is to the effect that property in tools, machines and industrial plants differs fundamentally from property in dwelling houses, furniture, clothing, cooking utensils and other things commonly classed as consumers' goods. If it is found desirable that any class should own its own dwelling houses, household furniture, or clothes, the method of purchase is open. If it is found desirable that another class should own the land, livestock, and farming implements with which it works, the method of purchase is alike open. If it is found desirable that still another class should own the factories, shops, tracks or rolling stock with which it works, the method of purchase is open in this case also. When these various people buy the property in which or with which they work, they acquire a genuine ownership, and they will at once realize a significant difference between this and government ownership.

Another misstatement is to the effect that modern industrial plants are too big to be owned by their own workers. The joint stock form of business organization was not designed primarily for the benefit of manual workers, but it would not have been much different from what it now is if it had been. Neither state socialism, guild socialism, sovietism, nor the ordinary co-operative society presents a plan of organization so well suited to the needs of workers who desire to own their own plants as does the joint stock corporation.

An interesting bit of practical experience with this form of organization was furnished many years ago by the Oneida Community. This community was formerly, as most of you know, a communistic society of the most idealistic sort, having been founded by a religious group who were known as perfectionists, and who believed that, for them, the Kingdom of God had already arrived. It continued as a communistic society for about thirty years and then changed over to a New York State joint stock corporation with a capital of $600,000, on a plan agreed to by all the members, whereby the shares in the new corporation were divided among men and woman equally and according to years of membership in the community. The business of the community has grown to such magnitude that only a fraction of the work is done by actual members. However, they have been selling common stock to employees for a number of years.

Here was a communistic society that was actually succeeding. Its business was growing and prospering. Yet its members decided that the joint stock form of organization fitted their plans better, and apparently fulfilled their ideals satisfactorily. It is mentioned as an illustration of the writer's belief that this form of ownership supplies the American laborer with all he needs if he seriously desires to share in the ownership of the plant in which he works.

EMPLOYEE OWNERSHIP IS ESPECIALLY DESIRABLE WITH PUBLIC UTILITIES

As indicated above, the public service corporations showed a higher tendency than any other single class toward employee ownership. One reason for this is probably because in no other class of business does good will count for so much; or perhaps it would be better to put it thus: that in no other class of business does the ill will of the public prove so dangerous. "Where the carcasses are, there will the eagles be gathered together." The politician, from this aerial lookout, is always watching for evidences of popular discontent. Absentee ownership, whether of land or other property, is universally a source of dissatisfaction and irritation. In the case of absentee landlordism, it has never yet failed to produce friction and hostility between the resident population and the absentee land owners, but this result and the conditions which produce it are not peculiar to agricultural people. They are found in the case of urban property and urban business, as well as in the case of rural property and rural business.

We may approve or disapprove but we cannot deny the fact that absentee owners of any business furnish the conditions on which the politician thrives. In the case of public service corporations he has a peculiar hold upon the business. In a democracy we cannot get rid of the politician. The only alternative is to substitute so far as possible resident ownership for absentee ownership. The form of resident ownership which is most disconcerting to the politician is that which is known as employee and customer ownership. When the employees of a traction company own a large part of the business, the politician cannot appeal to the feeling between capital and labor, because the laborers are their own capitalists. It there were no other reason in favor of employee ownership this would be sufficient to justify it. Customer ownership in other cases, such as telephone companies, accomplishes the same purpose. The attempt to combine employee with customer ownership may have its difficulties. The interests of customers and employees are sometimes in conflict. This may lead to complications and stimulate party politics among the shareholders, but we may well run the risk of this if we can only avoid the menace of that bane of every constructive business, the cheap politician.

Another reason why public service corporations are suitable for the experiment of employee ownership is that the product is locally consumed and the employees therefore can easily visualize the business problem of marketing. In a sense, every street car conductor is a salesman for the street railway company.

He is in direct contact with the customers of the company. If he is not only a worker but a part owner in the company, he can be expected to become a somewhat better salesman, or at least to be somewhat more eager to please the public with whom he is in daily contact. The workers in a shop who produce a commodity that is not consumed locally but sold over the entire world are not likely to visualize quite so clearly the strictly business problems which confront the company.

There is some slight danger that employee ownership in a case of this kind might result in short-sighted policies unless the employees are unusually intelligent. Even this danger could probably be overcome by taking somewhat greater pains to acquaint the employee shareholders with the possible problems involved in marketing the product than would be necessary if the shares were all held by a few expert or far-sighted business men.

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*Railway Securities Can Be Sold Locally**

By C. W. Kellogg

Stone & Webster, Boston

Discussion of Paper by Prof. Carver Points Out Three Reasons Why Quality of Electric Railway Securities Has Been Re-established—Believes Railways Have Advantages Over Power and Gas Companies in Customer Financing

UP TO this time the sale of securities by public utilities to their customers and employees has been confined principally to electric light, power and gas companies. The reason for this has been that by and large in recent years the companies in question have been better able than the electric railways to make a financial showing that would give their securities an attractive appearance as investments.

Looking at the electric railway industry broadly, it is clear that the developments of recent years have been such as to place railway companies in a much stronger financial position. Three major factors have contributed to the improvement, each of which is of fundamental importance to the industry:

First—The constant increase in traffic in the face of the enormous increase in the use of automobiles proves that the electric railways fill a definite public need for transportation. Census figures show that from 1912 to 1922 the revenue passengers of electric railways increased 35 per cent, while the population of cities of more than 25,000 inhabitants increased 27 per cent. From 1912 to 1923 the automobiles registered in this country increased from 1,010,000 to more than 15,000,000, an increase of 1,385 per cent. The fact that the railways, in spite of this enormous competition, have increased not only their passengers, but even their passengers per capita, is certainly most promising to the future of the industry.

Second—The progressive increase in fares proves that the public through its regulating bodies realizes the necessity of electric railway transportation, and is willing to compensate the railways for the cost of furnishing such transportation. The 5-cent fare habit has been definitely broken except in a few cases. According to the fare index, a record of which is kept by the association, the average rate of cash fare charged by electric railways in cities of more than 25,000 population, as of Sept. 1, 1924, was 7.44 cents. This was somewhat less than the highest point reached by the index of 7.46 cents in November, 1921, but the fact that fares tended downward after November, 1921, and then turned slightly upward again later shows that the charges for transportation are following costs as closely as is the case with electric light and power rates. This flexibility was conspicuously absent from the street railway situation before the war.

Third—The operating economies effected by the electric railway industry prove it to be an alive, progressive business, able and willing to apply brains to its transportation problems. Necessity is the mother of invention, and hard times have made electric railway people ingenious and resourceful. They have met the changing conditions with great adaptability. It is not so easy to show this in figures, but we find that the average cost of operation per car-mile has increased since 1914 about 85 per cent, and the cost of operation per passenger about 90 per cent, while the cost of labor has risen 121 per cent. This shows that the more frequent and comfortable service which we are furnishing today is being furnished with 6 per cent less labor per unit.

These favorable factors are not in my judgment a mere catching up with the handicaps which the war placed on electric railways, but represent a definite, tangible advance over the basic condition of the industry ten years ago.

Ten years ago the electric railways were (though many in the business did not then recognize it) ground between the upper and nether millstones of a fixed 5-cent fare on the upper side, and definite limits in operating methods on the lower side. In those days, any specific change in operating costs like a raise in hourly pay to trainmen or a boost in coal price was likely to mean a corresponding cut in net earnings due to the inflexible fare and stereotyped operation. When the war-produced prices came to jump basic costs, the first effect, before the relief of higher fares could be shown to be necessary, was devastating to electric railway net earnings.

Now, with the past 10 years behind it, the electric railway is a stronger investment than it was before, with a public need demonstrated, in the face of what was probably the most sudden and vigorous competition any public utility ever had to face and with a responsiveness of rates to costs now equal to any other form of public service.

I have gone into the above detail in discussing the financial stability of the electric railways because it is useless to discuss ways and means of obtaining customer or employee ownership until the question of what quality of securities we can offer is definitely disposed of. With this question favorably settled, however, it seems to me the electric railways are better situated than any other utility in the matter of presenting their securities to their customers and employees.

In the general experience of other utilities in local securities sales, the appeal to the individual, whether customer or employee, has been about as follows:

> The investment is a sound one because it serves a universal public need.
>
> It is a satisfactory one because you see the property at all times and patronize it yourself.

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*Abstract of discussion on a paper presented at the annual convention of the American Electric Railway Association, Atlantic City, Oct. 6-10, 1924.

You keep your money at home.
Thrift is encouraged by the sale on partial payments.
The rate of return is satisfactory—as a rule much higher than obtainable from savings banks.
You help develop your city by helping to finance its utility service.
Employees find satisfaction in having their savings invested in the property for which they work.

From several years work on the subject and the observation of the work of others, I think it safe to say that all of the advertising and circularizing and sales talk in connection with local securities sales can be covered by one or more of the points above outlined.

On each of these points the electric railway is the equal of other forms of public utility service and in some it seems to me superior. It is superior in being constantly before the investor as the other utilities are not. It may require some imagination on the part of the customer to visualize the universality of the electric or gas service, but the street cars are always before him and he is much more conscious of their constant use by himself and others. For the same reason, the appeal through street car advertising to the prospective investor can be made when he is actually using the property.

A valuable additional interest in their jobs can be given to the trainmen by enlisting their help in distributing printed information on the cars to those who, as the advertisements suggest, "Ask the Conductor."

Again in raising money for extensions to the system these can be made much more real and tangible to the prospective investor than is the case with most electric or gas extensions for which new capital may be needed.

In general, my feeling is that the proved success of electric light and gas companies in selling securities to their customers and employees is a sure indication of what electric railways can accomplish along the same lines, and that taking the industry as a whole the financial aspects are such as to warrant the effort at local distribution of the railways' securities.

Financing of Street Railways*

By Allen G. Hoyt

Vice-President National City Company
New York City

Fairer Conditions for Electric Railways Would Reduce Cost of Capital and Be Beneficial to Company and Public Alike—Market for Traction Securities Getting Better

Allen G. Hoyt

STREET railway fares to be just and reasonable at the present day cannot be predicated upon conditions which obtained in the past. A very large proportion of the operating expenses of the electric railway consists of direct payments to labor. Wages of platform and other employees during the past decade or two have doubled or more. Taxes and the prices of materials and supplies have greatly increased. In the transportation business high wages cannot be offset to any material extent by the increased use of automatic machinery, by mass production or by increased efficiency of generating units. The industry does, of course, enjoy from time to time economical developments, such, for instance, as the use of the one-man car, and it also benefits from the tendency of the traffic to grow in density. But generally speaking, it cannot pay the wages of today which, where fairly comparative with those obtaining in other industries, should be maintained, and give good service unless the rates of fare are materially higher than those which were established years ago.

There is little doubt that if the street railway industry were permitted to operate under conditions which would thoroughly rehabilitate its credit, the public would receive adequate urban transportation service at lower cost than it can hope to enjoy under any other policy. Inadequate fares mean restricted service, inability to finance needed improvements or extensions and a situation unsatisfactory to the riding public and the investor alike.

While these facts are obvious enough to those who come in contact with the industry from either the operating or financial side, they have not been obvious to the public. The car rider has been led to believe that somehow and in some way he can have service without paying for it. He has been fed a lot of hokum about the traction interests, and, not understanding the nature of corporate finance, is very suspicious of all arguments showing the necessity for adequate rates of fare. He does not appreciate that if the credit of an industry is destroyed it is a slow and expensive process to revive it. The plight of the street railways during the past years will mean relatively high cost of capital for some time to come, a condition which will tend to increase the cost of service. The quicker the situation is remedied the greater will be the gain of the car rider.

PROGRESS BEING MADE

However, while progress has been slow, the effort to make the public realize the false economy of a niggardly policy toward the transportation agencies is making headway. Unremitting antagonism to the traction company is getting a little shopworn as a political formula. There seems to be a growing demand for a more constructive policy. A number of resettlement franchises have been or are being negotiated which recognize the necessity of allowing the railway to earn at least a moderate return upon the value of its property.

With a better understanding of the railways' side on the part of the public, there have been other favorable developments. Fares have generally been readjusted, and, while seldom entirely adequate, they are now more in line with present day costs. In most communities the menance of the jitney has been removed. The street railway, in many instances, has met the problem created by the entry of the motor bus into the passenger transportation field by adopting this agency for supplementary or co-ordinated service.

While, for a time, there seemed to be a tendency to question the essential character of the service rendered by the traction companies, it is now generally recognized that for handling surface passenger transportation in large communities there is no satisfactory substitute for the electric railway.

MARKET BETTER FOR TRACTION SECURITIES

The attention being devoted by railway management to the cultivation of public relations, not only through the medium of improved service but by various means of publicity, is having its effect in developing good will.

With the encouraging trend in the industry the market for traction securities has somewhat strengthened and it has been possible for bankers to underwrite a number of street railway bond issues. During the current year the volume of electric railway financing, while still very moderate, at least shows a material increase over that of former years. During 1923 the amount of strictly electric railway securities sold, according to records published in the *Commercial and Financial Chronicle*, approximated $28,000,000. During the first seven months of the present year the electric railway financing exceeded $69,000,000. The total public utility financing during this period amounted to more than $1,000,000,000, and, therefore, the financing by electric railways amounted to 7 per cent of the aggregate of public utility financing. This is not an imposing percentage, but it is at least an appreciable one.

While the recent flotations have indicated that interest in traction securities is reviving, the terms and conditions surrounding the offerings show that the prejudice on the part of the investor against electric railway obligations has not been entirely eliminated. The financing has been largely confined to the senior securities of important companies serving relatively large centers of population. The bonds were amply protected as to property values and the issuing companies enjoyed favorable records of earnings. Notwithstanding the apparently sound character of the securities, it was necessary, in order to find buyers, to offer them at prices yielding an exceptionally liberal return. It is inevitable that for some time to come the unfavorable experience of the past will be reflected in the prices at which even well secured traction company bonds can be marketed.

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

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Customer and Employee Ownership*

Investors Should Purchase Railway Securities Because Electric Railways Are a Fundamental Necessity—Enthusiasm and Confidence Must Radiate from Electric Railway Men Themselves

By Fred Scheel
Vice-President Utility Securities Company
Chicago, Ill.

THIS is the first electric railway convention I have ever attended. Up to two years ago, when I had to make it my business to know something about electric railways, I looked upon the electric railway industry as a business that appeared to be step by step passing out of the picture. What I may have to say about electric railways has the advantage, or the disadvantage, of having the perspective of the man on the street.

I was more or less astonished this year with my study of how I might best sell electric railway securities to find that the electric railway is indispensable to growing communities. Nothing can take its place in mass transportation, but in many instances they have nowhere reached their maximum possibilities of usefulness. I have a feeling that those railways that are operated in conjunction with other utilities have had certain advantages in securing new money and, therefore, in keeping a more optimistic point of view toward the whole industry. This is quite natural for two reasons:

1. They have had more profit, better credit and consequently more money to work with.
2. They have had the encouragement of seeing other utilities make a decided turn in 1920 and 1921.

Yet in spite of these facts, how often have you seen the financial prospectus of a combination company setting forth in large type the facts in figures about the gas and electric business, and down at the bottom of the page hidden in small type you read, "This company also operates an electric railway between Oshkosh and Manhattan and local lines in the 'City of Despair.'" Other companies have gone further and have dropped the words "railway" or "transportation" from their titles.

Here is an industry with upward of $5,000,000,000 invested and it now needs more money.

What has all this to do with customer ownership you ask? Gentlemen, this is the heart of customer ownership. The enthusiasm, the confidence, the faith in this business must radiate from you. It cannot come from the outside. The story of what your industry has done in spite of all adversity, the real economic need of your business in modern life, and your plans for the future should be shouted from the housetops. It is not the job of a single convention or a single committee. The work requires the best thought and the full-hearted support of the entire industry. Much can be accomplished by directing facts at the men who shape financial opinion. I mean the local banker, the investment banker and the broker.

BANKERS STATE THEIR VIEWS ON TRACTION SECURITIES

Last week I attended the American Bankers' Convention in Chicago. I frankly asked not less than six bankers who do business in widely separated parts of the country what they thought of electric railway securities. Briefly, I summarize their replies.

Two of them modestly said they were not well enough informed to give a definite opinion. Two expressed the opinion that the situation had turned for the better and two said they would not buy electric railway securities with Russian rubles.

These are harsh words. If this is a fair cross-section of opinion throughout the country, consider what great good could be done by presenting the story of the electric railways interestingly to this group.

Other utilities have no monopoly on customer ownership. Customer ownership is essentially a public utility instrument of finance because public utilities are surrounded by certain safeguards not found in other industries. Are not electric railways public utilities? Why should they be separated from the others?

Other utilities did not start customer ownership through vision and foresight. Customer ownership resulted from: (1) Diminishing net returns; (2) high prices for money; (3) attractiveness of tax-exempt securities; (4) wider national distribution of income.

In 1920 most of the companies had very definitely reached the point where the banker required larger junior equities. The position of your industry today differs from that of other utilities only in the fact that you have organized the customer ownership movement. As a matter of fact you have the good fortune to be able to capitalize the experience of others by formulating the most satisfactory and productive plans to accomplish results.

I need not expatiate at this time on the advantages of customer ownership. Your interest is in the question: What actual steps should be instituted to start campaigns throughout the country? Individuals will stoutly maintain that some specific local condition makes it undesirable for them to go ahead. The picture of the cross-section of the electric railway business, however, makes it appear fair to say that customer ownership will work in any section.

AN EXAMPLE

It was my good fortune to be identified just a year ago with the sale of $1,500,000 of the prior lien stock of the Chicago, North Shore & Milwaukee Railroad. In this sale, all of the stock was sold to approximately 3,500 shareholders. Let me say that at the start of this sale the president of your association, Mr. Budd, who happens to be the president of that road, gave this matter of stock selling his very serious consideration. He made it the first order of business of that railroad and gave to the sale that inimitable punch which characterizes the things he does. I say this because you cannot expect to put this thing over for electric railways unless it has the attention of the very biggest executives on the property.

The follow-up of this sale was in the hands of C. E. Thompson, assistant to the president. Again in June this year we started the sale of $5,000,000 of prior preferred stock of the Chicago Rapid Transit Company. Mr. Budd again made this the first order of business, and in this instance his assistant, E. J. Blair, devoted his time to the follow-up of the sale. In spite of the fact that every one was willing and anxious to do all he could, no one could fail to note at the time of the start of the sale a feeling of misgiving among the people charged with this job. Since that sale we have as good a market in Chicago for that stock as we have for the securities of some of our well-known gas and electric companies. It may be of interest to note the progress of that sale by months:

May	8,227 shares
June	9,137 shares
July	7,213 shares
August	5,330 shares
September	4,351 shares
Total	34,248 shares

Out of this sale came the happy phrase "Passenger partnership," as more fitting for electric railways than customer ownership, and we offer it to you for your national use if you approve of it and see fit to adopt it. Aside from the very great good that comes in the way of better public relations as the result of passenger partnership sales, there is nothing which has given the employees a better appreciation and understanding of their business, in all its ramifications, than this sale of stocks to the public. In the judgment of B. J. Fallon, vice-president of the Chicago Rapid Transit Company, if nothing else were accomplished, that in itself would justify the expenditure of money that has been made.

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*Abstract of discussion on a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

COMMITTEE PROPOSED

Permit me to suggest that your organization establish a passenger partnership committee to:

1. Outline a definite policy and a standard of practice for member companies.
2. Support local traction sales, by the use of national mediums, selling the fundamentals of the industry.
3. Establish uniform practices in the manner of secondary markets.
4. Prepare and distribute to bankers and brokers interesting data, curves, charts and facts about business.
5. Collect and compile sales methods, advertising and campaign methods for all companies.
6. Assist wherever possible in launching new sales.
7. Establish a code of ethics as to securities sold and methods of advertising.

Electric railways will find from the experience of other utilities that it is wise:

1. To keep advertising conservative.
2. To avoid high pressure methods.
3. To sell only on an investment basis.
4. To remember you are talking to the small investor.
5. To remember the secondary market as your responsibility.

SMALL INVESTOR OF TODAY WILL BE LARGE INVESTOR OF TOMORROW

Electric railways today are institutions not only of transportation, but they will become through passenger partnership institutions for the investment of funds by people in all walks of life. Many railways will take on a new aspect in the eyes of their customers. It is not uncommon for a man selling preferred stock of a local railway to be consulted with reference to the value of securities, real estate, bonds, mortgages, etc. It is important that the information he gives be reliable and that his counsel be worth while, because in the last analysis the man who to-day is an embryonic investor, tomorrow is genuinely interested in corporate finance. He reads the financial page. He follows the security prices. His income grows and he becomes a bigger and more frequent investor. If you are going to keep him in line as a subscriber to the electric railway industry, it is necessary that he be served in an intelligent fashion.

In closing, I wish to point out that the success of "Passenger Partnership" depends upon the industry going to the general public confident of its own future.

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*The Financing of Electric Railways**

By J. P. Harris
Vice-President Union Trust Company
Cleveland, Ohio

No Need to Worry Over the Future of the Electric Railway Industry—A Personal Experience in Rehabilitating an Interurban—The High Calling of the Railway Industry

J. P. Harris

I HOPE as a banker and from the standpoint of a banker, I may present some fundamentals to you tonight which may point to a solution of the problem in the electric transportation industry. As we all know, electric railway transportation has been in very low repute in the minds of the investing public, and I am going to cover as briefly as I can what to my mind appear to be the chief reasons for that condition.

You have got to restore public confidence in the electric railway and interurban before you are going to induce the private investor to put his money in electric railway securities. Optimistic as I am regarding the future of the electric railway in this country, I am going to take a positive stand that the electric railway finances are on a sound basis, and among the electric railway securities are now some of the best bargains in the investment market. I think I may speak with some experience in that regard as an officer of an institution with some $280,000,000 of deposits, representing nearly 250,000 separate depositors, with $40,000,000 invested in securities; a good portion of them in electric railway and interurban railway securities. I want to, if I may—if I can—convey to this audience here the feeling of assurance and optimism which I feel and we all feel at the Union Trust Company with respect to this great industry.

Among the obstacles, or rather among the reasons, which have perhaps contributed as much as anything to the ill repute among investors in which the street railway industry has been held in the last few years particularly is probably the bugaboo of municipal ownership. Now, I am not a bit worried about municipal ownership and operation of public utilities such as we have in our own town of Cleveland—in the municipal lighting plant which we all know now is a fraud upon the citizenship of Cleveland. We need only to point to Seattle, where we had the amusing and amazing spectacle this summer of the committee coming to the banks and asking the banks to take script issued for payment of street railway men's wages, and the banks to take their chances on the community levying taxes sufficient to make up the deficits—a city operation netting a deficit of about $4,000 a day. We need only to point to the experience which Detroit is now having, and we could go down the list in a multitude of cases to show that municipal ownership, which is equivalent to political ownership and political operation, is bound to be a failure and a burden upon the tax-bearing community.

I have absolutely no fear, with the intelligent citizenship of this country, that we have any grave danger to fear from confiscation through municipal ownership campaigns. I am not worried a bit, for instance, in New York City, and every time I think of New York City I think of the words of Cicero to Catiline, "How long, O Catiline, wilt thou abuse our patience?"

The Mayor of New York is standing as probably the greatest handicap in the development of New York City that can be found today. He is absolutely blocking the expansion of transportation facilities in that great center, but still I have absolutely no fear with respect to the securities of transportation companies in New York City which we hold in the Union Trust Company, and I have a half million of Interborough Rapid Transit bonds of 5s and 7s there. I am not concerned a bit about them. I am not concerned a bit about the municipal ownership campaign in Chicago. We have a large amount of Chicago securities. I know they are absolutely good and I know that they will ultimately be paid.

I am not concerned about any of these situations because I know that fundamentally public interest demands that public utilities shall be operated by private resources under public regulation, and I know that that principle is becoming more widespread throughout the entire country as we are gradually returning to days of sanity.

JITNEY MENACE DISAPPEARING

Another thing that probably has caused lack of confidence in the street railway industry as much as anything else has been so-called jitney competition. I am not a bit worried about jitney competition either, and I speak from a little experience in that regard, but before coming to that point I want to point out the general principles on which I base optimism in that particular respect.

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

If we are abreast of the time we must recognize that motor bus transportation is a mode of transportation which has come to stay. The street railway and interurban railway companies must recognize this addition to their facilities as probably a necessary auxiliary more and more in the future, to feed the existing lines of transportation operated by them. But the illegitimate and promiscuous competition of irresponsible operators, I believe, is a thing of the past or very rapidly is becoming so. We have already, as you know, in 25 states and also the District of Columbia laws regulating illegitimate competition of that nature, where the transportation companies already existing are giving satisfactory service, and it is a matter of public policy, becoming recognized more and more so through public utility commission decisions and supreme court decisions, that transportation is a natural monopoly to be regulated and protected from illegitimate competition and to be handled only by those who are expert in handling transportation.

That I believe is a fundamental issue which is becoming more and more widely recognized throughout the entire country.

A PERSONAL EXPERIENCE

All of this may sound like theory, but I am going to tell you now how it all has been suggested by one personal experience which I happened to go through: The bank with which I am connected, through some circumstances which it is not necessary now to detail, came into possession some years ago, along with two other institutions in Cleveland, of the entire issue of underlying first mortgage bonds on a certain interurban line serving two large cities and several smaller cities in one of the states of our Union. That line was a portion of the consolidated system on which there were other bonds, but we were early told by the representatives of the junior bonds and the consolidated system that they were glad to resign the equity they had in our portion of the system and give the property over to us to work out our own salvation. The property, as it was handed over to us as the underlying bond owners, represented a mileage of about 75 miles with no franchise in any city in which it operated. The equipment was 28 years old, practically obsolete. The right-of-way was very much worn down; there was no transmission line and no power house. Otherwise we had a fine property.

You may smile, but just stop and think a moment. That was the only property that could render service to those communities, and knowing that fact I was not at all disturbed as to the ultimate outcome of our venture. I knew those communities had to have transportation. I knew there was no other transportation system on the ground to give that service, and it was merely a matter of negotiation to amend all the defects I have just related.

The first position that I took with the mayors of these several communities was that this line was fundamental to the prosperity of those communities and that if we operated in them we would have to be welcomed with the same degrees of co-operation and support as any other industry in those communities. I was told in a typical way of the value of franchises, and how I ought to pay for them. My answer was that a franchise is not worth a nickel unless it contains terms whereby it may be operated with a profit. Unless I was welcomed with the same degree of cordiality that was extended to others, I would prefer to tear up the tracks and go out of business. I was threatened with city-owned buses, but I reminded them of Akron, Saginaw and Toledo and the futility of that threat.

Well, to make a long story short, we executed a new power contract. We built new transmission lines and bought a half million dollars' worth of new street cars, and today that road is being operated by its present owners on a basis to yield twice the interest on a $4,000,000 investment as against $1,546,000 which we had in the property, and we received back all of our interest and principal and interest on the interest, as well as our cost. In other words, there was a situation which I think I would have had difficulty selling to this audience. But I was absolutely sure from the beginning it was going to work out profitably and satisfactorily because of the fundamental reason that it was the only property capable of giving transportation facilities to those communities. I mention the case merely to suggest this fundamental principle of electric railway and interurban railway operation in this country. It is a natural monopoly and has to be protected as such. It is in the public interest. It should be protected and regulated under proper auspices. As long as we have the citizenship of our country leaning in that direction, I say again we can feel assured as to the future of this great industry, one of the greatest lying at the basis of our whole national prosperity.

I want to get this point across because you people have charge of one of the greatest fundamental industries in this country, and no business is sound which is not based upon sound morals and sound ethics. No financial structure can hope to survive which is not based on those foundations. In conclusion, I want to urge you and call you to a new sense of the dignity and high calling of your profession to the end that you will not submit to bludgeoning from unscrupulous officials or submit to unfair burdens in franchise, and that you will demand the recognition due your great industry, which lies at the base of our national prosperity.

Relation of Municipal Officers to the Utility[*]

By Hon. William A. Magee

Mayor of Pittsburgh

The Problems of the Municipal and Utility Officials Largely the Same — Both Have a Taxing Power and Both the Same Master — They Can Help Each Other by Co-operating

William A. Magee

I HAVE been asked to speak here this evening on the relations between the public utility officer and the municipal public officer, two kinds of officers that nearly all people believe have some sort of antagonistic relation. I have been both of these. I have represented public utility corporations as counsel, I have been and I now am a municipal officer, and I had the good luck one time to be invited to serve on the Public Service Commission of Pennsylvania. So I have had the good fortune to have a somewhat broader experience than most persons with the utility problem.

The public official looks upon himself as a public servant, one who is responsible to the public and must do directly or indirectly what the public wants him to do, and he looks upon the public utility corporation and the utility executive in the same light, i.e., as one who must do what the public tells him to do. He is perfectly right in that viewpoint, but he is not broad enough. He forgets that the owners of the utility company have put their capital into the public service. He either has forgotten or he does not know that the Supreme Court of the United States and of all of the states have said that to deny that capital a fair return on what is invested is the equivalent of confiscation of that property. Therefore, when a question of service or a question of rates arises, he thinks only of the duty of the company to the public, and he does not think of the reciprocal duty which the patron owes to the owner of the property.

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[*] Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

Now, having said that about the municipal official, I must say something of a similar nature about the utility executive and the utility director and the investor in the utility securities. He is concerned primarily upon the return to his capital, but he is short-minded if he thinks that is the first, or the sole, consideration that should be in the minds of the management of that property. It isn't. It has been given franchises by the public authorities to perform a public service. The first thing it must do is to prove its right to earn this return, and that proof lies in the service that it renders.

I wonder whether the owners of utility securities have any idea that they are just as truly tax-masters of the people as the public officers are. They are indeed. The average American family pays far more to his local utilities for railway, gas, telephone and electric light service than he pays to the public treasury for all of its police service, its fire protection service, its street cleaning, its street lighting, its poor and health and all of its other public services.

REASONS FOR BOND OF INTEREST

There should be a great bond of sympathy instead of antagonism between municipal officials and utility officials, firstly, because, as I told you, they both levy the taxing power, and secondly, as I told you, they both have the same masters. But there is more than that to it. They have an identity of interest and identically the same problems. I don't mean now in the large way I mentioned as to educating their public; I mean that they have the same identical individual special problems.

Imagine a public official who gave the public all the police protection it wanted, as clean streets as it wanted and all the fire protection that the city needed, yet was denied an adequate tax rate. That is the same identical thing that you have. The public wants good, ample, frequent and comfortable service, yet sometimes is unwilling to pay an adequate fare. You must do what the municipal official has to do—explain to the public what your troubles are, show it that the same thing pertains to your business that pertains to its, and to the woman of the house that it pertains to her business—the maintaining of the household.

If you can make the people stop long enough to think that they are paying now almost twice as much as they were for all the necessities and luxuries of life, but are paying you only about 50 per cent more now than they were in 1913, and that when they are depriving you of a reasonable rate, they are denying themselves the service that they want from you, just as if they refuse an adequate tax rate. I believe they will understand your position more clearly.

Fortunately, the worst factors in the problem have already been removed. The unlimited and unconditional franchise has been nullified by the creation of the public service commissions which have authority to regulate these utility companies. In the last 25 years the courts have developed the doctrine of confiscation, namely, that a denial of fair rates is attacking of property and the constitution denies the taking of property without compensation.

Those are the two worst things in the whole business, and they are eliminated. The only other thing that I see is that this public, which is no longer hostile, is suspicious and not fully informed about the present status of the situation. The public must be more enlightened, and here is where the public officer can do a very great good. He stands between the utility company and the public, at least so far as concerns knowledge of the problem. The public officer does not know your problems as you know them, but he knows them vastly better than his public. He could undertake, if he would, a process of public education, which, however, he cannot do, and I presume would not do if he knew that he could not, unless the public utility companies themselves take the lead.

There are one or two things that I believe public utility companies might begin on. I think it would be to the interest of the utility company as well as the public (I don't know which one more; I say both of them) if these interminable proceedings before public service commissions could be shortened in some way.

Thus, having been on the public service commission, I have a vivid recollection of a great number of proceedings that lasted two or three years. I have seen the utility companies actually starve while their lawyers and the public lawyers were fighting out a rate case.

The other thing that I wanted to mention, and it is in the same nature, was something that we are trying in the city of Pittsburgh at this present time. The principal point in our contract is that we have provided a board on which there is representation both by the public and by the company. Every member of it is entitled to go into every department, into every book, into every record and to have access to every executive official of the railways company so that the public representatives on that board will know just as much about the affairs in detail of their company as the men know who are operating it.

My theory about this question is that the trouble between people is due to misunderstanding or, to put it another way, to lack of understanding, to ignorance. It is because the public has not known the facts about the Pittsburgh Railways that the railways company has had trouble with the people of the city of Pittsburgh. From now on there will not be that state of affairs. The city of Pittsburgh, through its representatives, will know everything, and those representatives will be able to advise the public whether or not this demand or that demand or the other can be met.

Muscle Shoals[*]

By Robert G. Gordon

Bruce, Bullit & Gordon, Louisville, Ky.

None of the Methods Now Under Consideration for the Disposal of This Undertaking Will Provide the Best Result—Congress Should Appoint a Commission to Negotiate

Robert G. Gordon

DURING the war it became of the utmost importance that facilities for the manufacture of nitrogen in this country should promptly be provided, because the government could not afford to rely for its supply of this commodity upon the ability or the caprice of any foreign country. After a thorough study, it was determined to construct nitrate plants near Muscle Shoals on the Tennessee River in the northern part of Alabama.

At that point, there existed an available site for the construction and operation of a large hydro-electric power plant. The site was owned by the Alabama Power Company, having been acquired by it several years prior to that date at a cost in excess of $500,000. The government undertook to negotiate the purchase of the site, but its representatives and those of the company were unable to agree. Rather than accede to the terms offered and being unwilling to impede the war activities, the company donated the property to the government, and making a deed therefore in consideration of the sum of $1, which was actually paid.

The government immediately began the construction of the "Wilson Dam." Some months after the termination of the war Congress declined to make further appropriations. At that time the dam was about 30 per cent completed and approximately $17,000,000 had been expended thereon. In the meantime, the government had completed the construction of two nitrate plants, which cost, including an adjacent limestone quarry, approximately $80,000,000.

At the beginning of its construction work upon these projects the government, under a contract with the Alabama Power Company, and at a cost of about $5,000,000, installed electric generating equipment of 40,000 hp.

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[*] Abstract of a paper presented before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

capacity at the Black Warrior steam station, about 90 miles south of Muscle Shoals, with a transmission line between those points. This power was used for the purposes of construction work at the dam and at the nitrate plants. Recently, in accordance with the terms of the contract with the power company, the government sold that equipment to the company at a figure slightly less than $3,500,000.

Within the last two years Congress has authorized the completion of the Wilson Dam and power plant. Work has been resumed with a present force of more than 5,000 laborers, and it is anticipated that the project will be completed during the year 1925. The capacity of the plant will be 600,000 hp., of which, however, only approximately 100,000 hp. will be what is known as primary power. The cost of completing this plant is estimated at $25,000,000 over and above the $17,000,000 expended by the government before work was discontinued.

Situated 14.7 miles up the Tennessee River from the Wilson Dam is another site for a dam and plant, with a capacity of 250,000 hp. This is known as "Dam No. 3." The estimated cost of that project is $25,000,000, exclusive of the cost of the necessary lands and flowage rights. The effect of the dam at that point will be to render the Tennessee River navigable for a distance of 65 miles above the dam.

Prior to the discontinuance of the work in 1920, the government had actually expended a little more than $100,000,000 on the whole undertaking. In 1921 it became apparent that unless the Wilson Dam should be completed, and the nitrate plants either actually operated or maintained in operating condition, all the money theretofore expended would soon be dissipated in disintegration and waste. The government made it known that it desired to work out some satisfactory arrangement with private capital for handling the situation. A number of offers were received, including one which was made by Henry Ford and which has been the subject of bitter controversy both in and out of Congress.

In its final form this offer was equivalent to offering $1,500,000 for the two nitrate plants and the quarry. The Ordnance Department of the army estimated that the salvage value of that property as junk was at least $8,000,000, but that it could probably be sold at more than $12,000,000.

Among the principal objections to the Ford offer are these: The price offered for the purchase of the physical properties is ridiculously inadequate. Mr. Ford expects to use for his own manufacturing purposes any electrical energy generated. In that event, he will be in a position to manufacture any commodity which he may choose at far less than any competitor because he will have an $80,000,000 investment in manufacturing plants and houses and equipment which will have cost him $1,500,000.

This great natural resource should be developed for the residents of that section of the country. The full value of the hydro-electric development at Muscle Shoals cannot be obtained except by connecting those plants into a super-power system, for the reason that such a large proportion of the capacity of these plants consists of secondary rather than primary power. This can probably not be accomplished through Mr. Ford.

In March of this year the House of Representatives by a decided majority passed the bill authorizing and approving the Ford contract. The matter is now before the Senate, and the Senate committee has reported that bill unfavorably, recommending as a substitute a bill providing for government ownership and operation of the dams and electric plants through a government corporation and authorizing the operation of the nitrate plants by the government through the Secretary of Agriculture.

Offers of other private interests which appear to be more favorable to the government than the Ford offer have apparently been discarded, and, as the matter now stands in Congress, the issue is whether the Ford offer shall be accepted or whether we shall have government ownership and operation of these facilities.

Thus far, the matter has been handled by taking bids. That is not the method by which business people consummate big transactions. If the Muscle Shoals projects were owned by a private corporation desirous of disposing of them, it would not advertise for bidders nor undertake to reach an agreement by correspondence. Its executive officers would hold personal conferences with the parties interested in the purchase or lease, at which all details of the proposed transaction would be the subject of full discussion. In order for the government to secure the most advantageous terms, it must conduct its negotiations in a similar manner. This can be accomplished by the appointment by Congress of a commission, whose duties would be similar to those of the executive officers of the private corporation.

Co-ordination of Railway and Bus Urged by Manufacturer[*]

By *A. J. Brosseau*

Secretary and Director
National Automobile Chamber of Commerce
President Mack Trucks, Inc.

Alfred J. Brosseau

Place for Both Types of Vehicles—With Proper Co-operation the Transportation Company, the Rider and the Public Will Benefit — One Organization Should Furnish All Forms of Mass Transportation

I DO not pretend to know anything about the electric railway business. It is not my intention to propose anything new, or to find fault with the old, but rather to review the situation from the viewpoint of an industrialist who has had some experience in analyzing business problems, and to ascertain to what extent the new element—the bus—may be used to advantage in your business.

I am told that several years ago one of the partners of Stone & Webster, in an address to his organization, said he wanted them to quit thinking they were in the street car business. He told them they were in the transportation business.

That is in accord with my idea of the street car business—that it is really engaged in manufacturing and selling a commodity called transportation.

If so, your problems are comparable to those with which other industrialists have to reckon.

If you agree with me that we are fellow manufacturers, with similar problems, it will not be necessary for me to try to "sell" the bus to you.

The public has accepted the bus. Your job, and mine, is to find its proper place in the transportation business.

If the electric railway operators do not grasp the opportunity to furnish a co-ordinated trolley and bus service, others will furnish the bus service.

The day is past when electric railway companies can buy a bus or two and expect the public to believe that its demand for a more mobile and comfortable type of service has been satisfied. The merchant who displays attractive goods in his shop window must carry them in stock for sale.

I believe one organization should furnish all forms of mass transportation—whether subway, trolleys, or buses. The time has come when existing transportation systems must be rounded out to meet the demands of the public for efficient and satisfactory facilities. "The public be served" is a sound business policy which has stood the test and applies equally to all merchandising operations—whether in transportation or other commodities. The situation which confronts the electric railway operators of today is not a new one. When the horse car was introduced 90 years ago it was not welcome and there were many objections to its use.

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[*] Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

The transition from horse to cable and cable to electric railways was not accomplished without argument.

Dire prophecies of bankruptcy have invariably been made whenever a change has been proposed. I have a history of the street car industry prepared by Henry W. Blake, the veteran editor of the ELECTRIC RAILWAY JOURNAL, that is most interesting. I have, also, a book of clippings from the publications of your industry.

From the beginning you have had "die hards"—those who view with alarm any change, whether of method or of practice. And yet changes and improvements have been made.

Until now the changes have been confined to different forms or types of equipment operating on rails.

The most revolutionary change you have ever made is now going on. I refer to the motor bus. I believe it will do more to stabilize the industry and earn the good will of the public than anything else you have ever done.

I do not believe the growing popularity of the bus justifies the prediction that it will displace the trolley. Neither do I believe that as the bus comes more and more into use it will take away so much of the revenue of the electric trolley cars as to bankrupt the traction companies and make their securities worthless.

There is a place for both types of vehicles and if they are properly co-ordinated the result will be to the advantage of the transportation company, the rider, and the public. Perhaps the following analysis of the traction situation will illustrate the advantages of co-ordinating the trolley and the bus.

It is quite generally known that the cost or valuation of existing trolley lines is often four, and sometimes five, times the amount of annual gross revenue. No one will deny that the capital invested in traction companies is entitled to a fair return. If the capital invested is four times as much as the annual gross income, and 6 per cent (surely little enough) is a fair return, we find that 24 per cent of annual gross income must be set aside to pay interest and dividends on invested capital. Out of the remainder must be paid taxes, which I am informed average 7 per cent of annual gross income—depreciation and maintenance and operating costs.

If this is the condition of existing lines, it is obvious that the traction companies cannot extend their tracks into new territory, or engage in expensive reconstruction of tracks in thin traffic territory.

The cost of the extensions would be prohibitive and result in a loss to the traction companies because the patrons cannot be expected to pay sufficiently high fares to cover interest on investment, taxes and operating costs. Even though the traction companies did extend their tracks into newly developed and thin traffic territories, the lines would be far apart, and the service so infrequent as to cause dissatisfaction. And again, it has often happened that the trend of development has been away from trolley lines. What seemed a promising territory has turned out to be unprofitable. The trolley is there and cannot move. Such conditions as I have mentioned obtain to some extent, I believe, in nearly every city in this country.

If I am right in thinking that you are transportation merchants, you will solve your problems as any other industrialist. How is it done?

The wise merchant finds out what sort of merchandise his customers want. He then provides plant, machinery and equipment to produce the product at the lowest possible cost. He does not attempt to force the sale of goods his customers do not want.

This is what has been done by the traction companies who have taken the bus into their system of transportation. They are meeting with a wide public appreciation which is reflected either in added income or lowered costs. Those who have used the bus as a defensive measure are finding that the public is demanding broader policies.

I have spoken of extensions in thin traffic territories—but the bus has a place in densely populated, congested territories. I have given the subject much thought; have conducted many studies, and have very definite ideas on the subject.

BUSES HELP IN PROVIDENCE

Perhaps my ideas may not appeal to you now, but if there is any merit in my belief that we are fellow manufacturers and merchants, some day my theories will be given consideration. In the meantime I will quote from what we laymen consider an authority on trolley transportation to illustrate the place of the bus in co-ordinated transportation—namely, the ELECTRIC RAILWAY JOURNAL, March 15, 1924, page 411.

> By the unusual expedient of inaugurating bus service parallel to and on the same street with its regular car service, the United Electric Railways, Providence, R. I., has increased its net income and gained much public good will. For several years there was a persistent demand from the residents of suburban communities, particularly in the district beyond Olneyville, for more rapid transportation. At that time the company was operating both local service in the city and through service to outlying communities via Broadway. The complaint was that the many stops made to care for short-haul passengers was a source of serious delay to the through passengers. Complaint was made also that on an inbound car the local passengers had no chance whatever of securing seats, because they were all occupied by the through passengers boarding at points beyond Olneyville before the car reached the city limits.
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> One way that was suggested to remedy this was to build passing tracks alongside the existing double tracks to permit the operation of express cars which could then get ahead of the locals. It was felt by the company, however, that such a solution of the problem would involve considerable expense and would present serious operating difficulties. Instead of installing passing tracks, therefore, the railway decided to carry the local passengers by bus and operate all electric cars express to Olneyville Square.
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> A combination of two favorable circumstances made it possible to do this successfully. In the first place, the width of the street was sufficient to permit bus operation alongside the track without interfering in any way with the rail operation. In the second place, there is only one heavy traffic street crossing Broadway, so that the express cars can operate reasonably close to their scheduled speed and are not frequently delayed by traffic at intersections. The result has been to reduce the running time between the center of Providence and Olneyville Square, about 1⅜ miles, from 15 minutes to 10 minutes, and also to provide vehicles which have empty seats available for the short riders.
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> Bus operation was commenced in May, 1923, and the number of motor buses in service has been augmented from time to time as the traffic has increased.
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> The former headway with street cars alone was never as short as the present 2½-minute schedule and was somewhat irregular, because the cars of the several through lines and the short line cars did not divide the intervals evenly. There are 7,013 scheduled seats on the buses both ways each day, and the number of passengers averages 5,500. The outbound bus terminal is about 1,000 ft. short of Olneyville Square, to prevent the crowding of the local buses by passengers to whom the express service is available. The latter people take the cars from Olneyville Square to Providence rather than walk the 1,000 ft. to the bus terminal and the entire bus-carrying capacity is therefore available for the short-haul riders. The express cars run between Olneyville Square and Exchange Place, stopping inbound for passengers to alight, but not to board, and outbound to pick up, but not to discharge.
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> In the morning the first inbound trip of the buses starts at 5:40 and the last trip at night leaves the center of the city at 1 a.m. The railway express service is operated during the same hours. Between 5:40 a.m. and 11:40 p.m. there is a starter at the inbound terminal. Two men, each working a 9-hour shift, regulate the bus service. They are solely bus men, however, and have no responsibility whatever for railway operation.
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> The bus stations are closely spaced, averaging only about 300 ft. apart. They are marked by twin yellow bands on the trolley poles, in contrast to the ordinary white band used to designate a car stop. In spite of the frequent stops, however, the buses' average speed for the section along Broadway is slightly over 10 m.p.h. Cars average about 16 m.p.h. through this territory. The company feels that it is undesirable to operate buses at too high a speed, and hence no attempt has been made to shorten their running time. As a result, 995,848 persons were carried by buses on this route during 224 days of 1923 without injury to a single passenger. The bus-miles per accident have been nearly double the average car-miles per accident.
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> A 6-cent fare is charged on the buses. Nine metal tickets are sold for 50 cents, the same as on the cars. Payment is made by inserting the ticket in a Rooke register, or when cash fares are paid a nickel is inserted and a penny handed to the operator. Each operator must turn in as many pennies as there are nickels rung up on his register. Transfers good on car lines other than those operating on the same street are issued by the bus for 2 cents.
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> Financially, bus operation has been very satisfactory. The withdrawal of local cars from Broadway saves the railway considerable money. Against this economy the cost of bus operation to supply the local service is less than similar rail operation would be. As a matter of fact, more passengers are now being carried by the cars alone. . . .

Speaking as an industrialist who has enjoyed the opportunity of analyzing many business problems, I would say that the United Electric Railways qualifies as an able manufacturer and salesman of the commodity called transportation.

There is still another field for the bus. I am told there are individual lines of many trolley companies that are unprofitable and promise to continue to be unprofitable. Such a situation existed at Everett, Wash. In order to avoid a paving expense on certain lines of approximately $400,000 the owners of the franchise elected to abandon the trolley and install buses. I understand the public is well served and satisfied and the bus operation profitable to the owners of the transportation company.

Another instance of the tendency on the part of far-sighted operators to reduce capital expenditure follows:

In Allston, Mass., the Boston Elevated Railway replaced one of its single-track car lines with bus service because the city was about to repave the street, which would require a heavy expenditure for paving by the railway company. It replaced a car line in Malden with buses in order to avoid laying new tracks, the cost of which traffic did not justify. It later replaced its Highland Avenue car line in the same city in conformity with its announced policy to replace non-paying rail lines with motor bus service whenever the plans of the city authorities require reconstruction of streets and tracks.

So far I have confined myself to what a layman would call street car territory—transportation within cities and towns.

There is another field in which the bus, while not in every instance competitive to the trolley, may well be considered—if we are to cover the subject in a comprehensive manner.

I refer to the so-called interurban zone. It is in that field that the bus has had its greatest development. The reasons are obvious and need not be gone into in any great detail. It is only necessary to mention less capital requirements, flexibility, and the fact that it gives the rider the equivalent to individual motor car transportation as nearly as can be done.

One of the most successful operations of this sort, from the standpoint of co-ordination of bus and trolley, is that of the Pennsylvania-Ohio Electric Company, Youngstown.

I understand the buses were put on, originally, as a defensive measure, to eliminate independent competition, but proved so satisfactory that they have been continued, and the operation extended.

The ELECTRIC RAILWAY JOURNAL, Sept. 13, 1924, gives a very comprehensive description of this operation from which I quote:

"Before bus operation was attempted, conditions on the interurban lines were bad" and "figures indicate that the interurban bus operation as conducted by the Pennsylvania-Ohio Electric Company is successful and satisfactory from the standpoint of operating income."

The answer, as I see it, in all such situations is the bus. It can be installed at a fraction of the cost of the trolley. It is flexible. It is not tied to a track. It can cruise over a thinly settled territory, and can accommodate itself to a peak load demand. *And it's what the rider wants.*

Perhaps some of you will deny this. If so, I shall not argue the question except to say that, quite generally, when the traction companies refuse to operate buses—where adequate trolley facilities do not exist, or as a supplementary service—buses are operated by independent operators and often at higher rates of fare than that charged by trolley companies.

I have found it difficult to obtain accurate detailed information as to capital expenditures and operating costs of trolley companies, but the information I possess convinces me that neither the cost of installation nor the operating costs can possibly justify opposition to the bus.

If the installation of buses in place of trolleys in thin traffic territory will cut down capital expenditure and reduce cost of operation, if there is any merit in the Providence and Youngstown operations, if trolleys can be abandoned, as in Everett, Wash., and if the buses offer a more satisfactory form of transportation—what stands in the way of the widespread use of the bus by the electric railways?

Are the dangers they see real, or just partly or wholly imaginary? Is it the fear that the use of the bus will depreciate the value of the property which is pledged to the owners of the bonds and the stockholders?

THE BUS PROTECTS THE RAILWAY

Some electric operators, and others, seem to think so. Again, others insist that the electric trolley car is the only vehicle that should be used to transport passengers on our streets and highways. It is my firm conviction that the bus, if given its proper place, will protect and safeguard, rather than destroy, the security back of the bonds and stock outstanding. Instead of imposing burdens on the riders and the public, it will benefit them to the extent that it reduces the amount of capital required to provide adequate and satisfactory transportation facilities. If the bus is accepted wholeheartedly by the electric railways and properly co-ordinated with the trolleys it will serve the public to a greater extent than will obtain under competitive conditions.

Let us analyze the problem item by item:

If the traction companies—

Adopt the policy of laying no more rails in new and thin traffic territory and use the bus in all such operations, in place of the trolley, and when the cost of repairs and replacements is prohibitive, and as supplemental to the trolleys, in order to reduce congestion and to give the public a more satisfactory form of transportation—what will happen?

Equipment. As the trolley cars wear out or must be repaired at a considerable expense, they can be discarded and replaced by the bus—those remaining used for mass transportation in congested districts where electric railway operators insist the trolley is more economical than the bus.

Power. No street car company will change its method of transportation overnight. As the demand for current to operate street cars decreases, a market can be found for power and light at a profit as great as or greater than is obtained on the current used in street car operation.

Franchises. As to franchises, I am sure that any student of public utility operations will agree with me that the *value* of a franchise is not based entirely on physical assets, but rather upon the good will or earning power of the business, and as to traction companies, this means the opportunity to secure the monopoly of all forms of transportation.

Good will does not exist, if the company does not provide the service the public wants. Unless that service is given, I say to you, in all frankness, that no investor acquainted with the facts will buy bonds or stocks whose value is predicated upon the value of the franchise. The traction company may retain the franchise, but it will not keep out competition.

If these arguments do not dispose of the objections to the adoption of the bus, what are the reasons that have caused many of you to hesitate to go into the business of selling transportation, instead of selling only street car service? Perhaps the answer is contained in a report by one of your own committees which had asked several companies why they had gone into the bus business.

Some of the reasons are significant—"compelled by prohibitive cost of new paving"—"confronted with serious competition from buses"—"demand of public authorities."

It seems to me this is another way of saying "We were forced" because public utility commissions, backed by public opinion, are granting franchises for bus operations—whether to the traction companies, or to independent operators.

The fact that these steps have been taken in defense seems to indicate that your industry is aware of the growing public demand for buses.

Will you meet it, or will you let it overtake you?

Why not profit by the experience of the companies who *have* met it?

The experience of the Public Service Corporation of New Jersey illustrates what I have in mind.

Because of conditions and circumstances which made it difficult, if not impossible, for that corporation to install buses at the time the demand developed, jitney cars, makeshift buses, and finally, high-grade modern buses, were installed in large numbers by independent operators.

Many of these buses paralleled the trolleys, others established routes on streets where trolleys did not run and extended their service into territories beyond railheads.

The bus service, while not wholly competitive, nevertheless, materially reduced the income of the trolleys.

When the management finally realized that there was a widespread demand for buses it very wisely decided to give the public such transportation as it wanted—trolleys, buses, or both.

The change in policy has in large part regained the good will of the public, and I am convinced will bring in greater financial returns to the corporation and better service to its patrons.

While not disposed to criticise trolley companies for not sooner adopting the bus, the fact remains that their refusal to do so has resulted in a large loss of income—and much ill-will on the part of the public.

If the trolley companies who have not already adopted the bus will do so at once, they will get into the business at far less expense than will be incurred if they wait too long.

It is my privilege to know Thomas N. McCarter, president Public Service Corporation of New Jersey, and while I may not know him as well as some of you, I want to say that in my humble opinion the policy adopted by his corporation, and by many others as well, will (if accepted by the industry generally) put mass transportation, both urban and interurban, on a sound financial basis.

Such a policy will create good will and confidence on the part of the public. It will protect the capital invested in the business. It will insure a fair return on the capital invested in the business. And it will bring about co-operation between the utility and its patrons.

Do not think because I am laying stress on the public demand for a more complete transportation system that I see the motor bus taking the place of the electric trolley car. Four years ago George M. Graham, and again last year Alfred Reeves, of the National Automobile Chamber of Commerce, explained our position to you better than I can now. It is enough to say that what I have in mind is the use of *each* form of transportation in its place and in the way which best suits the public's convenience and necessity.

There may be routes where buses should be ruled out entirely and the field left to the electric trolley. There are others, such as the Providence and Youngstown operations, where bus and trolley may operate on the same street; the bus taking care of the local traffic, the trolley operating as an express, or vice versa. There may be other routes where, at a higher rate of fare, the bus will offer de luxe service, with comfortable seats for all riders, on a fast schedule. In still other instances the bus may act as a feeder to the electric lines, in territory beyond railheads where cost of extensions would be prohibitive.

I believe that the bus should be regulated as any other public utility. I do not think it should be relieved of taxation because it is a new agency. All agencies of transportation should contribute to the cost of government, as in California, where buses are taxed on their gross earnings as the railroads and trolleys are taxed.

I do not ask for special favors for the bus. It will rise or fall on its own merits and not because of special privilege. It should be granted no better and no worse treatment than is accorded to other forms of transportation.

I believe many of you in the electric railway industry will agree with me that the above are sound principles.

I know many master salesmen in your industry.

These men are giving the public not one but several kinds of transportation service. By so doing they are creating good will for their companies.

They are protecting their bondholders and their stockholders. They are converting frozen into liquid assets, and mobilizing their resources to meet changing conditions.

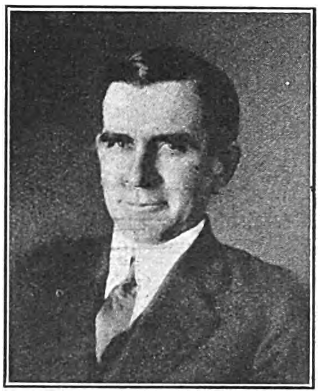
They are splendid business men and good citizens. Their success points the way!

I tender the wholehearted support and co-operation of our industry to help solve the problem of "Co-ordination of Motor Vehicle and Electric Service by Electric Railway Companies"—the subject assigned to me.

*Co-ordination of Other Forms of Transportation with the Electric Railway**

By Paul Shoup

President Pacific Electric Railway,
San Francisco, Cal.



Paul Shoup

Essential Utilities Must Be Protected from Destructive Competition—Railway Is Indispensable—Eventually Buses Will Have to Carry Same Obligations as Traction Companies—Duplication of Service Impairs Efficiency and Results in Higher Fares

THE very fair and able presentation of Mr. Brosseau on this subject of the co-ordination of other forms of transportation with the electric railway leaves a great deal less to be said than perhaps under different circumstances would have been deemed necessary by an electric railway man.

Certainly the principle enunciated by Mr. Brosseau to the effect that there should be a co-ordination in ownership and management of both the electric railway and motor bus operation in any given territory where they might otherwise come in conflict or in competition, and that each should find its own sphere according to its need as developed by the public demand or the public use (which is sometimes a very different thing from the public demand) is something that we all must accept.

There is nothing in the electric railway situation that justifies us in presuming that we have any God-given right to exist unless we justify that existence by performing necessary public service. If it should be in the cards that through the advancement of science and art the electric railways are to be superseded by some other form of transportation, then they must go, just as the ancient horse car had to yield to the electric railway.

However, there is, I may suggest, nothing in this situation at the present time to indicate that the electric railway is to be superseded by some other form of transportation. Indeed, it seems to me that to get a clear understanding of this situation we must deal with certain principles or certain statements of fact, as I see them, in discussing a problem of this kind.

I want to put forth this view—that if the electric railways are essential to the public of the United States, essential as their chief transportation agency outside of steam railroads, then they must be protected, if any competition or destructive agency tries to destroy that public service, even though the public may itself not have everything else desired in the way of service.

To get at this subject directly, I am going to state certain propositions which I believe to be fundamentally sound. These are:

1. The electric railway is not to be superseded as a public utility by any other form of transportation. It is not only useful; it is indispensable. The development of the motor vehicle has not resulted in providing a carrier that in any way takes the place of the interurban or street car. The question, then, is one of co-ordination and not of supersession.

2. Where a very considerable part of the public transportation service is being given by electric railways, it is desirable almost to the point of necessity that if motor bus service be introduced into that same section, the services of the two should be co-ordinated in the fullest degree under one ownership and one management.

3. In determining the share of the traffic each is to take care of, that is the motor bus and the electric railway, now and hereafter, whether under one management or operated independently, it is necessary to consider the two forms of transportation under like conditions, for eventually the motor buses will have to carry as great a share of public obligations as do the railways.

4. The necessity for co-ordination in the public interest is, indeed, very great and it is the duty of the electric railway industry to emphasize this fact in every section of the country; wastefulness of the competition now existing between the electric railways and the motor buses is not only unfair in itself to the electric railways, but is imposing a heavy burden on the public.

All those engaged in transportation business are agents of the public. We derive our rights from the public through charters and franchises. We are devoting private capital to a public service, and it is just as much our duty to do everything that we can to make that service economical and efficient in the interests of the public as it is our business to protect the private capital invsted in that service.

I should like to repeat my first statement: "The electric railway is not to be superseded as a public utility by any other form of transportation. It is not only useful; it is indispensable. The development of the motor vehicle has not resulted in providing a carrier that takes the place of the interurban or street car. The question, then, is one of co-ordination and not of supersession."

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*Abstract of a paper presented before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

I think you all know that, and yet the figures which have been presented are worthy of presentation again. I have been particularly impressed by Mr. Murphy's statement as to the operations of the electric railway companies of this country in 1923, when, as he put it, we carried more passengers, earned greater gross revenues, operated more passenger car-miles than ever before in any one year in the history of this industry.

It is true that certain added burdens in the way of operating expenses came upon us. Increases in taxation, for one thing, made our net revenue somewhat less than we had had in some previous years, yet as an agency for the public service the electric railway companies of the United States were in greater demand, were more essential to the welfare of this country in 1923 than in any previous year in the history of this country.

Now the fact that we carried, according to Mr. Murphy's figures, some 36,400,000 passengers per day on the 400 principal electric railway lines of this country, allowing for other companies about 44,000,000 passengers per day—illustrates the magnitude of the obligation that electric railways of this country have assumed and are carrying on successfully.

These 44,000,000 people represent about the working population of the United States. The majority of these passengers probably are carried in the two hours in the morning and the two hours in the afternoon. Certainly a very large proportion of them are. No one can imagine any form of vehicle other than the electric car that would perform this service. Why, it would take at least 15,000,000 automobiles, assuming that street surface would permit, to carry these people morning and evening to and from their work. I am, therefore, in entire agreement with my friend, Mr. Brosseau, that the electric railway is not to be superseded.

Now when a thing is as essential to the public welfare as this electric railway service, it is obviously entitled to public protection. That brings us to this second point that I would deal with, and that is that where a very considerable part of the public transportation service is being given by electric railways, it is desirable almost to the point of necessity that if motor bus service be introduced in the same section, the service of the two should be co-ordinated in the fullest degree under one ownership and management.

Unfortunately that has not been the case, and it is because of the necessity of this co-ordination that both Mr. Brosseau and I are addressing you on this subject today. We find a very unsystematic competitive and destructive condition throughout the United States, one that requires co-ordination, one that requires regulation, just as Mr. Brosseau has said, so that both the electric railways and the motor bus companies shall be subject to like consideration from the viewpoint of the public.

It is true that the electric railways in 1923 demonstrated in greater degree than ever before their necessity to the public in the service rendered. Yet it is also true that in many sections of the country, through the unbridled competition of the motor buses, they have been hampered in that public service, hampered because out of their somewhat narrow net revenues the motor buses have been able to take a considerable part of that dollar that is left after paying operating expenses, taxes and some necessary interest, to the end that the electric railways have not been able to command the necessary credit to extend their operations, build new lines, even if such lines were justified, to acquire additional equipment and to meet the many obligations of a public nature that are being constantly put upon them.

Out on the Pacific Coast we have had a good deal of experience in that direction. We are fortunate in California in having a courageous and experienced State Railroad Commission with adequate powers, but even that commission is being subjected at all times to a tremendous pressure by motor bus operators to parallel these necessary lines of electric railway transportation.

It is very natural of course that the motor bus operator should seek to parallel these lines. The electric railway development is not so far in the past but what nearly everybody recognizes the fact that those communities that are served thereby have been in large degree created by this electric railway service, and today for the value of the homes and for the value of the industries along these lines are dependent upon that service.

Naturally with this population along these lines a motor bus operator does not seek to pioneer (we can put ourselves in his place), but prefers to go along that line and take the established business. It is true, as Mr. Brosseau has said, that in some instances the population has developed away from these electric lines, but in the territories with which I am most familiar on the Pacific Coast, this is true in only a very, very limited way.

The electric railways have been the pioneers—whether street car companies or interurban companies—and the development of population of homes and industries has been along those lines. And so we have the situation confronting us throughout the United States of the paralleling of a necessary and essential service to the public by motor bus lines. This should not have occurred, and should not be permitted in the unregulated and unbridled way in which at this time it is being permitted in many states.

In the State of Oregon, for example, the number of passengers carried by the electric railways has dropped since 1919 from some 83,000,000 down to 72,000,000, notwithstanding the increase in the number of city fares collected. We find that the lack of regulation is responsible for a great number of what we might call itinerant motor buses, many of them without any financial responsibility, in taking from the interurban lines the necessary support to continue their existence. As a matter of fact, the principal interurban line running south out of Portland today is having a very hard struggle to live, notwithstanding its steam railroad backing. It is a well-known fact up in that country that there is a very considerable discussion as to whether or not its abandonment will not be necessary in the next twelve months.

We (the Southern Pacific Company) operate some electric lines out of Portland, and they do not meet their operating expenses and taxes. Yet there would be a very great public outcry if we attempted to abandon them.

In Oregon, as I have said, there is no regulation. The Public Service Commission there has no power. As a matter of fact, one of the railway companies, grown desperate over the situation of competition with its railroad down to Astoria, has established a motor bus service of its own to compete with a motor service competing with its steam lines. The result is that we have three forms of transportation when one would do. Certainly that is a cutthroat situation that ought to be eliminated by some systematic regulation and some form of co-operation.

And Oregon, after all, is only an example of what is going on elsewhere. There isn't a much better situation in Indiana, where there has been a falling off in the number of passengers carried by the interurban railways, a very large falling off according to the figures furnished me by the Indiana commission. Indeed, comparing 1920 with 1923, notwithstanding the growth in the city business, there has been a decrease in the total number of passengers carried in Indiana from 273,000,000 down to 263,000,000.

The Public Service Commission of Illinois directs my attention to the statement that in Illinois from 1920 to 1923 there has been a decrease in the number of interurban passengers carried from 75,000,000 to 62,000,000, though the number of fares in the state has increased from 1,118,000,000 up to 1,219,000,000, due to the increase in the city traffic. In Ohio you have no better situation.

We find throughout the country that this unregulated competition with the electric lines by motor bus companies is very seriously interfering with the public service. And along with this regulation that must come there should of course be the co-ordination as set forth by Mr. Brosseau.

In southern California the Pacific Electric Railway, with which I am associated, has had a very considerable experience in the matter of what we might term unregulated motor bus competition, for the reason that these various motor bus lines were established before the State Railroad Commission had jurisdiction. We keep close track of our losses from this competition. We don't try to determine these losses from the viewpoint of the business carried by the motor bus companies, but only by a careful estimate as to the cost of the service we give, and the extent that that service is not availed of by the traveling public because the motor bus takes passengers away from us.

That meant about $1,300,000 loss in gross revenue to the Pacific Electric in the last 12 months. If those services were co-ordinated this business would be carried almost entirely on the electric lines, and the motor buses would be used where they would take the passengers not otherwise cared for. That would mean that allowing $800,000 net out of the $1,300,000 (because after all the Pacific Electric would not be called upon to increase its facilities, except in a very limited way, and it would not have to add a great many cars to its service) we would be able to make an investment on a 6 per cent basis of some $12,000,000 or $13,000,000 to help take our tracks off the streets, and build terminals in the city of Los Angeles. We operate almost entirely on private rights-of-way outside the city. Perhaps we would be able to furnish more buses in some sections that needed them, and in every way we would be able to give a more efficient and economical public service.

Steam Railroad Experience Similar

You may be interested in a similar careful estimate with respect to the Southern Pacific Company, its lines in western Oregon, south of Portland, and west of El Paso, Tex., where we furnish service which would be availed of and which would meet the situation if there were no motor buses, and where our losses amount to about $4,000,000 per annum. A very large part of this is net, and you can capitalize the amount that would be saved if we had a co-ordinated service, and which could be devoted either to reduction of fares or, what is more essential out in that territory, to an increase of facilities. If $3,000,000 of that would mean added net revenue, and capitalized on a 5 per cent basis, because steam railroads so far have a better credit than the electric lines, we would have perhaps some $60,000,000 that could be put into facilities devoted to useful public service. That country out there with its great growth needs all of the railway capital that it can get.

Illustrations of this kind exist pretty well all over this country and indicate conclusively the need for this co-ordination, if the public is to have its necessary railway service maintained and developed according to the growing need. If we had this co-ordination we would then have removed that fear on the part of the public as to the safety of its investments. Transportation companies would be able not only to command capital but would be able to command that capital at a lower rate of interest.

Let me repeat my third statement. "In determining the share of the traffic each is to take care of that is the motor bus and the electric railway, now and hereafter, it is necessary to consider the two forms of transportation under like conditions, for eventually the motor buses will have to carry as great a share of public obligations as now do the electric railways." I think Mr. Brosseau substantially made that same statement, and that all that the motor bus can expect is fair treatment.

The electric railways, repeating something that is known to you all, have to pay taxes on their properties. They usually have to pay 2 per cent or more of their gross income in connection with the franchises they have secured. They have to pave the streets between the tracks and 2 ft. outside, sometimes for the use of their neighbors, the motor buses. They have to pay costs of grade separations; sometimes have to light the streets. They are involved in a great many expenses and contributions, and some so-called investments that don't bring any revenue to them.

The motor buses must expect (and I am speaking now from the viewpoint of an operator of motor buses) to have their burdens increased. Out in our state there is a tendency on the part of the public to look upon the motor bus as something that should rent its roadbed, that is, the public highways, as long as it does not have to create and pay for that highway as the railway companies have to do. Nearly all of the interurban railways in our state are on private rights-of-way and of course the street car companies do have to pay for the right-of-way, the roadbed occupied in the streets.

The Private Right-of-Way May Come

We find another difficulty out there. The operators of the private automobile, and the ownership of private automobiles is increasing all the time, look upon the motor bus as something of an interloper. They feel that the highway was created for citizens generally and not for common carrier purposes. It becomes more and more difficult to maintain schedules, and the greater the obligation the motor bus operator feels to maintain these schedules, the greater public resentment he creates among the owners of the private machines. It may be that in time private rights-of-way will have to be created, and will be found purchased by the motor bus operators. This would be especially true if any attempt were made to hand over to the motor bus for transportation any very large part of the traffic now carried by the steam and electric railways.

Further, there is no financial problem greater in importance with the states at this time than that of creating and taking care, of their public highways. Tremendous use of these highways involves the necessity of building very much more permanent and much more expensive highways than heretofore and this same use makes the maintenance of the highways far more expensive. The result is that these states are seeking all the time for new sources of taxation to take care of this tremendous burden, and they look upon the motor bus as one of the coming sources—I was going to say "something more to be plucked," but it seemed hardly fair. Nevertheless, if anyone goes out and examines the magnificent exhibit of motor buses at this electric railway convention, he must realize that a tax collector, if he should happen to stray into that hall, would feel that there was wealth unparalleled. I had to explain that to one of my friends last night. He said, "Where are the electric railway cars at this convention and why all these motor buses?" The best explanation I could make was this: That all the electric railway cars were in use.

Finally, I should like to repeat "that the necessity for co-ordination in the public interest is very great indeed and it is the duty of the electric railway industry to emphasize this fact in every section of the country, that the wastefulness of the competition now existing between the electric railways and the motor buses is not only unfair in itself to the electric railways but is imposing a serious burden upon the public."

Bus Operation Not Profitable

This subject I have already discussed quite extensively. Obviously anything that threatens in any considerable degree the transportation of 44,000,000 people per day is something of very great interest to the American public, and in our position as agents for the American public in carrying on this transportation we ought to do all that we can to show the necessity for coordination and for regulation to keep this essential service of the electric railways from being in any considerable degree destroyed.

We are trying out this matter of coordination in southern California. Perhaps we have been a little slow about it, but after all I am not so sure as to that, judging from the results. The Pacific Electric Railway is perhaps one of the largest interurban, yes, and city bus operators in the United States. We have 160 buses in operation at this time. We have over $1,000,000 invested in them. Most of these have been put in service in the last twelve months. We expect to increase that number. In some other sections of California and Oregon we are putting buses into operation. I don't mean the Pacific Electric, but other companies with which I am associated. The Los Angeles Electric Railway in southern California, operating some lines jointly with us and some independently, has, I believe, now over 80 buses in service. These two companies therefore have about 250 buses in operation in and around Los Angeles. We are getting some first-hand experience. We are trying to do just what Mr. Brosseau suggested; that is to say, to supplement the service of the electric railways with the automobile business, to take care of those sections of the community that have been built up away from the electric lines, and where construction of electric lines under the present conditions, with the tremendous expense of street paving, heavier rail and so on, is not justified.

Well, we are getting a good deal of experience. It is costing the Pacific Electric now about $20,000 a month; that is to say, we are falling short to that extent in getting a 6 per cent return upon the investment, depreciation and operating expenses. We are hopeful (we are still in the pioneer stage) that expense will be materially reduced in time to come.

In any event we are willing to take on this obligation; in fact, the people of Los Angeles by a very decisive vote decided that the Los Angeles Railway and ourselves should take on the obligation, rather than have Mr. McAdoo come in and help us out in carrying on transportation in that city. We are trying to fulfill that obligation. It may be that we will not realize anything net out of it, but I would just say, by way of caution in that connection, that it is very easy to over-extend the use of a motor bus in the way of supplementary service. It would be very easy indeed for the Pacific Electric to multiply this loss of $20,000 per month many times over.

RAILWAYS ARE ENTITLED TO PROTECTION

We are giving an essential service down there, and our point of view is that we are not called upon under threat of having that service paralleled by some motor bus line to go into a territory with an extension of motor bus service where eventually that motor bus service will not pay its way, or at least justify itself in connection with the operations of the electric railway. Certainly the electric railways are entitled to protection where they are giving an essential public service, and no threat of what will be done to their paying revenue lines should induce anybody to put on a motor bus line, or for that matter, any other kind of transportation, in some outlying section that they do not feel directly or indirectly is justified. If a situation of that kind comes about, then we ought to take our case to the public and point out the nature of the threat and what is attempted in the way of destroying this essential service to the public, because of the desires of a comparatively small number of people or perhaps of real estate owners to secure a service that is not justified.

I haven't said anything much about the motor trucks, but the same arguments that apply to the motor bus apply likewise to the motor trucks. In fact, where the electric railways have been giving a freight service they have probably been more seriously interfered with by this itinerant and unregulated motor truck service than they have by motor buses in passenger service, proportionately speaking.

TRUCK COMPETITION HELPFUL

It is very hard indeed to regulate the motor truck service in California; we find that there are a great many motor trucks operating as public utilities that are not responsive to the law, evading it in every way they can, and with their door-to-door deliveries they have caused a very serious loss of revenue to the steam and electric railway companies. Of course, you appreciate that these losses, even though they be not very large relatively in dollars and cents, come out of our net revenues to such an extent as seriously to affect them. This motor truck competition must also be co-ordinated, must also be systematized and regulated and be obliged to carry the same burdens that we carry in connection with our freight traffic on the electric railways.

In closing permit me to suggest this. We find from examination of the reports of the motor bus and motor truck companies to the State Railroad Commission of California that they are not as a whole making much money. One of the largest ones (I think it is the largest one) is just about breaking even and giving no return upon its investment. We find, on the other hand, that the electric railways are not making what you would call any exorbitant profits and we find that the steam railroads aren't having the easiest and best time in the world.

It does seem therefore from an economic viewpoint, from the public viewpoint, from the viewpoint of the owners of all of these properties, that the sooner we get systematically and carefully at this problem of co-ordination, to the end that we may all receive some return upon our capital invested and still give an efficient and economical public service, the better off all of us will be.

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*Electric Railways from the Realtor's Standpoint**

By L. F. Eppich

Past-President
National Association of Real Estate Boards

L. F. Eppich

Established Rail Transportation Is the Surest Means to Secure Real Estate Development — Buses May Serve Until Such Time as Traffic Growth and Ability to Finance Warrants Construction of Rail Line

IN ORDER to get the realtor's view on the subject of electric railway transportation I wrote to a number of them in various parts of the country. To the question, "If you had a choice of the form of transportation, which would you consider would add most to the real estate values of your subdivision, street car extension or bus line?" the reply came emphatically, "street car extension," except in one case, and from the press of that city I learned that the first two of a small fleet of buses had just arrived, so the reply was probably based on expectation rather than performance. The reasons for the preference for street car extensions were: (1) Assurance of permanency to the residents—bus lines may be easily diverted or abandoned and the value of property substantially reduced; (2) regularity of service throughout the year. We are all familiar with the difficulties borne by the electric railways in keeping traffic open during winter storms. Such determination is not to be expected from motor bus owners.

REAL ESTATE VALUES DEPEND UPON STABLE TRANSPORTATION

To the question, "What would be the effect on, or shift in, real estate values if electric railways were eliminated and bus lines substituted," the consensus of opinion was that such a change would have a very detrimental effect on values because in large cities the bus is not suitable for mass transportation. The value of business centers is dependent on the presence of large numbers of people, and if they cannot be transported conveniently business is bound to suffer and real estate values decline.

And to the third question, "Should motor bus transportation be operated with, or supplement the electric railway system, or should it operate in competition," the opinion is that there should be one responsible organization and that the electric street railway is best qualified to perform that service.

ELECTRIC RAILWAY ESSENTIAL

Bus line extensions with transfer privileges are vitally necessary to the appropriate development of a city where it is not possible, nor advisable, to extend the car line. This deduction is reasonable because it gives the electric railway the opportunity of supplying the requirements as needed. When the population justifies the construction, and capital can be secured for it, the permanent extensions will follow.

Therefore, the electric street railway is the modern transportation agency most essential to the real estate man. We are unable to spend the time traveling from homes to business areas that old methods used to consume. Quick and adequate time-saving service is the demand of the day. Safety must come first, but speed and assurance of delivery follow closely behind. The trackless vehicle does not procure these three qualities so assuredly as does the rail car. But where the rail cannot reach, the rail-less motor will take the field and flourish while it meets the need for service.

I believe that the hostility of former years toward public service institutions is giving away to a realization that the interest of these utilities and the community are interdependent. Because it is a public utility is no reason why it should furnish service at, or below, cost. The war taught us all to analyze our investments more accurately. If the electric railway could be saddled with a large proportion of the cost of paving and other items which will readily occur to you, it was considered good municipal business. The fact that such charges at the present high prices must be included in operating costs reacted upon the unthinking citizen with accelerated force when he was asked to pay an increased car fare.

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

The growing realization of interdependence is suggested by another evidence of the willingness of the community to bear a share of the cost of construction of new lines. The city of Detroit is an outstanding example. In the election held last month the voters by a substantial majority assessed themselves for 68 per cent of the cost of a rapid transit system, 51 per cent to be assessed to adjoining property for benefits accruing and 17 per cent to the city at large.

COSTS OF EXTENSIONS ASSURED

The state of New York, in 1909, officially recognized this principle of assessing property owners for the cost of street railway construction, but it has not been put into practice. The property owners on Sixth Avenue are agitating the removal of the elevated road and the construction of a subway, they to bear the cost upon the assumption that the property will increase in value with commensurate rental returns.

In the past an occasional owner of a new subdivision indicated a willingness to stand a portion of the cost of a street car extension. These examples serve to indicate a growing disposition on the part of communities and individuals to assist in construction costs, and this principle will meet with general acceptance when it becomes universally recognized.

That real estate is enhanced in value by reason of transportation facilities is too evident to require more than a passing statement. The report of the investigation of the City Club, New York, in connection with the increase of property values adjacent to the subway from 135th Street to 230th Street in Manhattan, shows that the increase due to the new extension was 104 per cent. This was the percentage of increase allowed even after deducting the normal increase of values had no extension of the transit lines been contemplated. In the case of Detroit, pending the adoption of the charter amendment, no routes were selected at least partially, for the reason that it would cause a speculation in real estate in the affected districts.

VALUES BOOSTED BY TRANSIT PROSPECTS

In new subdivisions, it is generally conceded that land values increase from 100 per cent to 300 per cent as soon as transportation facilities are provided, and there is the added advantage that the owner finds a market for his property which might otherwise remain dormant, or at best take on only a normal increase in value.

These conclusions therefore definitely indicate the justness of the principle that those who profit by reason of street car extensions should bear a part of the cost. I believe that the future will witness an increasing co-operation between communities and public service corporations. Their interests are identical in many respects and contined effort to bring about this result will lead to a closer and happier relation for all.

John N. Shannahan, the New President

IN THE public utility field John N. Shannahan, the new president of the American Electric Railway Association, has done about everything there is to be done. He has been confronted at one time or another with practically every problem that ordinarily comes to the public utility operator and has scaled the ladder of responsibility from engineering assistant to public utility president. Most important, however, he is keenly alive to the sense of service which his position as the head of a public utility demands. Hs is gracious almost to a fault and is possessed of a deep charity, which has been put to some hard tests. Not only is he a very capable executive, but he has the happy faculty of getting along well with others. Strange as it may seem these attributes are not always concomitant.

IN SOUTHERN CITY SINCE 1912

As was explained in the Convention Daily edition of the ELECTRIC RAILWAY JOURNAL, Mr. Shannahan down at Hampton, in 1912 took over a lot of junk masquerading under the name of a public utility. It was public all right, much too public, but it was hardly a utility at that time. That it is both of these things now is due largely to Mr. Shannahan. He is an owner-manager. Moreover, as president of Peck, Shannahan & Cherry he is head of an operating organization responsible for the management of five public utility properties, all in the East, of which four are railways, suburban or interurban in character.

As its name implies the property in Virginia of which he is the head combines railway lines, electric light and power and gas. To them all, Mr. Shannahan has applied his skill and has worked out a winning combination—winning for him and for the residents of the communities his company serves. If there were any market for the securities of the companies which Mr. Shannahan and his associates took over in 1912 it didn't amount to much. The story is different today. Not only is there a market for them, but the record of that market has been spread before the public from time to time as small lots of the common stock have come into the market. The preferred stock has from the very beginning been on an investment basis.

WITH MANAGEMENT FIRM FOR SOME TIME

The territory down in Virginia has not been one that has grown fast. It is true that there was an influx and a bloom growth at the time of the war, particularly at Newport News, but any possible benefits therefrom to the Newport News & Hampton Railway, Gas & Electric Company were more than offset by the problems which the war-time period imposed. All these Mr. Shannahan surmounted successfully.

Before Mr. Shannahan became connected with the Newport News properties he was railway manager of the operating department of J. G. White & Company, Inc., New York, doing the multifarious jobs that a man working for a company controlling a large number of widely separated properties is called upon to do. He went hither and yon, applying all the knowledge that he had previously gained, learning many things and absorbing about all he saw that was worth while. And on the J. G. White properties, as they are constituted, Mr. Shannahan had a good chance to listen and learn. This he did.

Before that, from 1907 to 1911, he was vice-president and general manager of the Washington, Baltimore & Annapolis Electric Railway, the high-speed line connecting the cities named in the title of the company.

For three years before his connection with the W. B. & A. interurban, Mr. Shannahan was president of the Adirondack Lakes Traction Company in New York State, and from 1899 to 1903 was with the Edison Electric Light & Power Company and the Fonda, Johnstown & Gloversville Railroad, both controlled by the same interests, which he served first as chief engineer and later as general superintendent and general manager. The Fonda, Johnstown & Gloversville Railroad, by the way, is part steam and part electric. He entered the service of these companies in 1899.

A CIVIL ENGINEER BY PROFESSION

After his graduation as a civil engineer from Rensselaer Polytechnic Institute in 1894, Mr. Shannahan was connected with the Watervliet Arsenal for a short time, but his real business career dates from the time that he entered the employ of the signal department of the New York Central & Hudson River Railroad. In 1895, Mr. Shannahan was made inspector of signals on the Western division of that railroad. So the picture is fairly complete of the career of Mr. Shannahan from the time of his graduation from college. He was born in Troy, N. Y. in 1872.

Mr. Shannahan's association activities have been no less complete and diverse than his general business career. The record of his work in this connection is extensive. He was president of the New York State Railway Association in 1906-07 and has rendered valuable service to the American Electric Railway Association at all times, notably as president of the Transportation and Traffic Association in 1911-12, as a member of the executive committee of the American Association and as a vice-president of that body since 1920.

P.A.'s and Storekeepers Have Session

Good Will and Co-ordination of Effort Stressed—Backing of Management and Operating Departments Needed to Effect Real Economies—Purchasing Agent Should Be Fair in Dealings with Salesmen

MEETING for the second year as a separate organization, the purchases and stores committee of the Engineering Association held its meeting Tuesday afternoon, Oct. 7, in the Marlborough-Blenheim Hotel. The discussion pertained to the value of the stores department to the railway property. Co-operation of various departments, particularly the engineering department with the stores department, was stressed in several of the papers and the subsequent discussions.

President H. A. Johnson of the Engineering Association welcomed the delegates and expressed the confidence which the Engineering Association has in the committee's work as a separate unit. He reviewed the reasons and benefits to be derived by a separate organization, but invited and urged the members to attend the meetings of the parent association. That he felt sure the executive committee of the A.E.R.A. would approve the action of the purchases and stores committee in co-ordinating with similar committees of other public utilities was the closing remark of Mr. Johnson.

The question of a co-ordinated committee composed of members of the purchases and stores committees of the National Electric Light Association, the American Gas Association and A.E.R.A. was formerly presented in the committee's report as read by Chairman Jackson P. Dick.

Purchases and Stores

There were three subjects assigned, including review of existing standards. On Subject No. 1, which was classification and sale of scrap materials to increase the revenue therefrom, the classification prepared by the committee was recommended for adoption as a recommended practice and the committee concluded that the subject does not warrant further study.

Subject No. 2 covered a study of the proper place for the purchasing and stores department in a company's organization. The committee recommended that the stores department should be under the supervision of a general storekeeper responsible for the custody, care and distribution of all materials and supplies not actually in use, and that the stores department and the purchasing department should report to the same executive officer. It concluded that the subject does not warrant further study.

No changes were recommended in any of the existing standards.

It was requested that the committee be allowed representation on a committee composed of purchasing agents and storekeepers of the National Electric Light Association, the American Gas Association and the American Electric Railway Association in order that questions of mutual interest to the purchasing and stores departments of the three associations may be studied.

It was further recommended that an afternoon session be regularly included on the calendar of the Engineering Association for a meeting of purchasing agents and storekeepers at all future conventions and that the personnel be increased to 15 members.

The report was signed by W. C. Bell, J. F. Fleming, C. A. Harris, H. Lloyd, A. A. Ordway, W. S. Stackpole, W. H. Staub, C. Thorburn, A. C. Kennedy, R. H. Dalgleish, sponsor; N. Ford, vice-chairman, and J. P. Dick, chairman.

After commending discussion by several members, the report was accepted with the recommendation that it be submitted to the Engineering Association at its regular meeting Thursday, October 9.

How good will for the company could be built up through the purchasing department was explained by W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill. Mr. Sawyer's address appears elsewhere.

Following this serious address, E. F. Wickwire, Ohio Brass Company, added ginger to Mr. Sawyer's pep by reading a pertinent paper on how the "pencil sharpeners" could be a help to the A.E.R.A. publicity committee. Delivered in true Wickwire style, seasoned with many appropriate stories, the talk drove home the desirability of "friendlyizing" the public. As the presence of a salesman in the purchasing agent's office indicated the manufacturer's interest in the company, the purchasing agent should endeavor to sell good will to the salesman.

Co-ordination between the purchasing agent and the operating department from the engineer's standpoint was urged by L. C. Datz, in the next paper. The purchasing department, no longer a necessary evil, should be represented in all departmental meetings. By proper co-operation with other departments each would appreciate the value of the other. When the purchase entails technical description, the engineer should deal directly with representatives of the manufacturer. However, the purchasing agent should be the one to close the deal. Mr. Datz ended his remarks with a plea for standardization in purchasing.

That the purchasing agent may maintain good feeling throughout the organization, was the gist of Harry M. Lloyd's address. Mr. Lloyd's paper appears in abstract elsewhere.

Perfect harmony between stores and other departments, with the purchasing agent as the dutiful servant of all departments, was urged by C. A. Harris, chief of stores Philadelphia Company. An abstract of this paper appears elsewhere.

Harry M. Lloyd and C. A. Harris were suggested for the offices of chairman and vice-chairman for the coming year. These selections were later approved by the Engineering Association.

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Importance of a Well-Regulated Supply Department*

By C. A. Harris
Chief of Stores
Pittsburgh Railways, Pittsburgh, Pa.

C. A. Harris

ONE of the outstanding facts which impresses itself on my mind continuously is the principle that the stores department when properly functioning is a perfect servant of the operating and executive departments. After all, however, the economic importance of a supply department can only be measured in the manner in which other departments use it.

I am reminded of an old story culled from Æsop's Fables in which he describes the vicissitudes of a miller and his son and a jackass on the way home from market. Both the miller and his son rode the ass separately and then together, yet could not escape the criticism of people whom they met. Finally, after tying the ass's legs together and hoisting it on a pole carried between them, they came to a bridge over a river, where the ass, frightened by the noise and his unusual situation, kicked and struggled until he fell into the river and was drowned.

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*Abstract of a paper before Purchasing Agents and Storekeepers' meeting at the annual convention of American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 6-10, 1924.

Far be it from me to suggest a close comparison between a jackass and the stores department, although I have heard it called worse names. Yet I do believe there is some basis for considering their situations analogous. The supply department does carry a burden, and while it may at times be refractory and kick, it can by proper treatment be made to go on steadily and smoothly performing the work that is expected of it, but it cannot please every one.

Of the various barometers which show the success or failure of the supply department, the material turnover, taking all angles into consideration, is an important criterion. In studying the turnover of different companies there are two classes of material to be considered: First, regular maintenance material; second, construction material or special equipment and supplies which are not necessarily standard. This second group usually is more than half of the entire investment in unapplied materials.

The storekeeper usually knows the requirements of his property on maintenance material and can gage the requisitioning. But when it comes to construction or special material he is merely an agent of the department asking for that material and is responsible only for its receiving, storing and issuing.

At one of our committee meetings a gentleman representing an electric light company in New York State addressed us and mentioned among other things an evident tendency on the part of operating officials to exclude the purchasing agent and storekeeper from deliberations at staff meetings, treating them both as more or less a necessary evil. It may be the fact that on some systems the supply departments do not get the recognition that is due them and it seems that in a good many cases they are working in the dark. I do not want this construed as a plea to tie a clean bib around these fellows' necks and let them sit in at the big table, but I want to bring home the fact that the storekeeper should be considered as having sufficient brains to use the information so gleaned for the more intelligent management of his own department to the best interest of his company. He should sit in at staff meetings or gatherings where operating questions are discussed; in other words, do not let him be an outsider. For even if a storekeeper were a wizard with uncanny knowledge, he is not a specialist or an engineer and cannot serve his company in the very best way without being in touch with current operating decisions.

The stores department cannot dictate how much money should be spent for materials and supplies, but it should control the requisitioning of ordinary standard maintenance material. While technically the storekeeper is responsible for all materials purchased, he has absolutely no control over the requisitioning of half the material which goes into his stock.

How then can this be remedied? By co-ordination between the stores and the engineering departments. When plans are made by the latter, they seldom take cognizance of the material on hand and order whatever they think is necessary for the completion of a job.

Should the storekeeper take it upon himself to make substitution? Should he correspond voluminously about each item that he thinks might be eliminated by substitution or to conform with what he has on hand? He is not technically fitted to do so, and I believe that it would be a great step toward economy through retrenching purchases, if an engineer were assigned to the stores department. If provision were made for such a specialist in the stores department, fully in touch with existing standards and designs, a good many purchase requisitions for construction would be unnecessary.

Usually the storekeeper is the last one to know if a design has been changed or abandoned. At the time such change is decided upon large amounts of material are sometimes on hand or on order. If he had a live engineer constantly with him I believe half of the material scrapped through obsolescence could be used up. I do not advocate holding back on modernization just because present equipment is still going. But most roads are confronted with disposing of repair parts for equipment which become obsolete because the storekeeper was not informed of a change, and, acting on his past consumption records, replenished his stock.

By cutting down the number of forms required in connection with the requisitioning and handling of materials, a saving of many thousands of dollars can frequently be made. But that saving is only incidental to the time saved the operating departments which have to fill out these forms. In other words, a great step toward economy can be made by the elimination of red tape.

This brings me to another subject which vitally concerns economy, and that is standardization. Bearing in mind the rapidly changing designs, there are some things commonly known as standard material, which do not change frequently. I believe it is just as necessary for utility companies to have a standardization committee as it is to have an operating committee and I believe that the storekeeper should be present at such meetings.

In many ways, therefore, technical assistance and moral backing by the managements and operating departments can be made to raise the supply department to a higher efficiency and to a level whereby real economies may be effected.

Purchasing Agent Should Have Dignity and Fairness*

Good Will May Be Spread by the Purchasing Agent in Dealings with Salesmen—Manufacturer Is Interested in Railway Not for Selfish Reasons

By W. H. Sawyer
President East St. Louis & Suburban Railway
East St. Louis, Ill.

WHEN I first started as a purchasing agent for a large holding company, I was inclined, as are practically all young purchasing agents, to believe that the purchasing agent's duty was to get the very most possible for his company. I had a tendency to believe that I was magnanimous because at times I did not buy based on price only but took into account quality; in other words, I rather prided myself upon securing for the company the most possible for the money paid. I say I had that tendency. I will not admit that even back in those days I believed in that doctrine. I know that toward the latter part of my years as purchasing agent I came to a full realization of the fact that it was essential and necessary from a good business standpoint so to treat the manufacturer or salesman that he believed beyond question that he had received from me a fair and a square deal regardless as to whether he received the order or not. I am, of course, referring back many years to a time when it was not the recognized policy of all purchasing agents to feel that it was their first duty to play fair and square with every man with whom they dealt. I do not believe there is a purchasing agent here today who does not recognize beyond question that this is the first essential of a successful purchasing agent, but you may not all fully appreciate just how essential it is that we so conduct ourselves. It is, of course, the duty of every employee of every public utility so to conduct himself that there can be no insinuation but what the company's intention and policy are to treat everyone fairly and squarely. I do not believe that the executive has any more important duty than so to conduct himself that the public will have confidence in him and in his company. There is nothing so important from an executive standpoint, to my mind, as the public relations problem. The executive cannot alone secure public confidence. The executive backed up by only a major portion of his organization cannot secure public confidence. We must have the support of every man in that organization.

There are two classes of men who

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*Abstract of a paper before Purchasing Agents and Storekeepers' meeting at the annual convention of the Engineering Association, Atlantic City, N. J., Oct. 6-10, 1924.

if they do not believe in us, can and may do the most harm. One class is the employee himself, who, if he does not believe in us, does us the most harm of all because the public cannot believe in a company if it is told by employees that the company is not doing right. The employee is assumed to be prejudiced in favor of the company, and if he is not in favor of the company the public will naturally think that there must be something wrong with the company itself.

Now, the other men that are in position to do inestimable harm are the manufacturers and salesmen who deal with us, who sell us goods. If they in talking with their neighbors confidentially, as it were, make the statement that the company is not doing right, that statement is accepted, because the manufacturer is in a position where he should be prejudiced in our favor. The manufacturers and salesmen know whether a company is doing right. They really know better than the employees themselves, and far better than the public. The manufacturer and the salesman get their closest view of the company through its purchasing agent, through the man with whom they come in contact. Never let a manufacturer or salesman go out of your office with the impression that your company is not doing right.

There is something in purchasing other than mere bargaining, other than mere horse trading, other than mere "jewing" a man down to the point where he takes the least profit that he can eke by with. That is not purchasing, that is harmful business. The manufacturer and the salesman must live.

They are just as honest as you and I and sometimes more so. We must all so conduct ourselves that the manufacturer and salesman are for us, not from a selfish standpoint alone, not simply from the standpoint that they must be for us in order that they can sell their goods, but we must so conduct ourselves that the manufacturer or salesman are for us because they believe in us, because they believe we are trying to do right, because they believe that we are entitled to a full measure of support from them. Now the manufacturer and salesman are human. It is their business to know and understand men. You cannot often fool them. They may let you think you are fooling them, but understand, when you are dealing with these men you are dealing with men whose business it is to know and study and understand you, your company and its wants and position.

I have spoken primarily of the manufacturer and the salesman, not because the manufacturer and the salesman are not strong allies of our electric railway company, but because they are. The manufacturer and the salesman of electric railway material and apparatus are doing just as much today for the electric railway industry as are the bankers and the operators. They have the railway's interest just as much at heart. I have spoken of them because they are the men with whom you come mostly in contact; they are in a position to do the most harm if you cannot sell yourself and your company to them.

I admit that, try as you will, a salesman will sometimes leave your office feeling sore, but he should never leave your office without a feeling of respect for you and your company. Therefore, when we come to the question of discussing what a purchasing agent can do in building up the good will of the company I say that he can do everything toward building up good will, and I say further that there are few, if any, men in the company that can do more toward wrecking good will than a purchasing agent. He is admittedly in a position that requires delicate handling, a position where it is impossible for him really to satisfy all men. That makes his duty doubly hard.

A purchasing agent also does more than purchase. He talks, he gossips, he is human. He tells people what he understands his company stands for. He tells people what the desires and ambitions of his company are. He keeps before his acquaintances the facts in regard to his company, or he should do that.

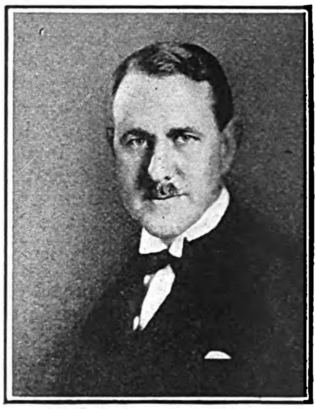
First of all, a purchasing agent must be fair to every man. If perchance he has to take action which does not appear to be fair he should tell this salesman what the facts in the case are. I do not believe in purchasing agents or any one else giving excuses when there are real reasons which can and should be given. If you buy your goods from one manufacturer due to the fact that he has helped you and co-operated with you and has been of real service to you, I believe that the thing to do is to tell the man who lost the order why the order was given to some one else. I do not believe in making a practice of lying to the man and giving him some phony excuse instead of a reason.

No purchasing agent can, of course, expect to promote good will if he is going to buy on a cold-blooded price basis. No purchasing agent can secure the most for his company if he is going to take advantage of a salesman whenever he gets an opportunity. In order that he does his full duty to his company the purchasing agent must at all times keep in mind that he (the purchasing agent) is the salesman for his company. He must keep in mind that he is a salesman selling service and good will; that he is a salesman selling the very name and future of his company. Purchasing agents are known to be analytical. Purchasing agents cannot, or at least should not, jump at conclusions. Therefore, statements made by a purchasing agent are not taken lightly as would be statements of some uneducated men or men who may be considered of a temperamental nature.

Co-operation from the Purchasing Agent's Standpoint[*]

By Harry H. Lloyd

Purchasing Agent Indianapolis Street Railway and Terre Haute, Indianapolis & Eastern Traction Company



Harry H. Lloyd

WE HAVE all heard and read much of the wonderful results of efficiency and co-operation and probably many have had expert advice on the subject. You have to experience co-operation to explain its good points and benefits. The chef who prepares the dinner may tell you all the ingredients, but the man who eats it can better tell you how good it is. Diversified temperament and make-up of different people makes it possible to cover the subject of co-operation from the purchasing agent's standpoint by one terse statement—*"Use diplomacy."*

Meetings of all department heads called periodically by an executive officer are beneficial in securing a co-operative spirit and give opportunity for expression of thoughts and ideas which might otherwise never be developed. The purchasing agent is the only departmental official who daily comes in contact at some point or other with all other department heads, and he can do much to promote good feeling, not only as relating to his own department but among other departments. If it is the policy of a company to have department heads specify materials or sources of supply, the purchasing agent may insure a congenial atmosphere for himself by buying whatever type or make of material the various departments ask for, but this practice is not in the best interest of the property, at least from a purchasing standpoint. In your home you wouldn't buy a different brand of coffee for each member of the family, but would select one which would be most agreeable to all who used it. If the purchasing agent can obtain co-operation and maintain good feeling by diplomatically showing the various departments, whenever necessary, that materials from other sources than those specified are either better or as good and cheaper, then the company is deriving benefit from that co-operation. If the purchasing agent takes the attitude that he can arbitrarily buy certain materials which he thinks are best or can be purchased at an advantageous price, or the department heads feel that the purchasing agent must buy only what they may have designated, they are both wrong. There is a middle ground where they must get together and harmonize, and it is by this method the property usually gets the best material at the lowest possible price. Bear in mind, we all have our pet ideas, and while we are sold on them, they don't always look so good to the other fellow. Josh Billings said, "There is always two sides to every question, the wrong side and our side."

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[*] Abstract of a paper before the Purchasing Agents and Storekeepers' meeting at the annual convention of American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 6-10, 1924.

REALIZE AND SYMPATHIZE WITH THE OTHER FELLOW'S TROUBLES

Probably in a great number of cases the underlying cause of lack of co-operation between the purchasing and other departments can be traced to a lack of effort to appreciate that the other fellow has troubles and difficulties to overcome which are as important to him as those of any one else. The engineering or mechanical department head seldom is interested in the trials and tribulations of the purchasing department—doesn't even think it has any. I don't mean to say that he is selfish, but he has plenty of troubles of his own, and when he is responsible for keeping things moving he wants the best he can get and as quickly as possible. He usually does not pay a visit to the purchasing agent unless he has some difficulty which he wants to unload. At times he feels that he can designate just what he wants and should get it exactly as specified, without considering that the purchasing agent may have experienced difficulties regarding that particular source of supply, which the other department is not familiar with or interested in. Department heads should always consider the results which will be beneficial to the property as a whole and not limit their vision to the particular department they represent, and this should be considered in any effort toward the betterment of an existing condition.

PURCHASING AGENT NEEDS TO BE A GOOD SALESMAN AT TIMES

I have come to the conclusion that if he can do it diplomatically, the purchasing agent should get around once in a while and know something about the other fellow's troubles, but it must be done in such a manner that he will not create the least impression he is trying in any way to help run the other department. He can learn a great deal by getting away from his desk occasionally, and I believe in practically all cases the various department heads are glad to receive such visits and discuss the results they are now obtaining, and are open to suggestions as to possible changes which might effect an improvement, or at least would not change conditions in their department, and yet would be of advantage from the purchasing standpoint. If you are trying to secure 100 per cent co-operation, don't stop—you'll never get it, but you'll get your share. The hen doesn't quit scratching because the worms are scarce.

The purchasing agent has many times to be a salesman and sell some department head on a line which has appealed to him as a good proposition for the company. If his relations have been cordial and he has shown an inclination to work in harmony with the other department, they will usually get together and figure out something for the benefit of the company, and the personal status is submerged in coordinated effort.

We have already heard this afternoon of the opportunity of the purchasing agent to promote good will by his contact with sales representatives, and I think it applies particularly to representatives of local companies who, after having received courteous treatment and consideration and having been given an insight as to the company's side of any question, go out and spread the gospel that the traction people are a pretty good bunch and ought to have a square deal. There are some who feel that the personal element should not exist between the purchasing agent and salesmen, but I am convinced that in proper moderation this is one of the greatest assets in promoting the good feeling and satisfactory business relationships which many electric railway companies have. If the purchasing agent is the point of contact, then the impression which he makes is largely taken as representative of the company as a whole. He can be equally useful as a point of contact between the various departments of the property. If in your dealings you don't show proper consideration for your own associate and his job, what impression have you cast abroad as to your company and its organization?

THINGS FOR THE PURCHASING AGENT TO AVOID

Just as an example, it wouldn't engender good feeling in the family to tell Tom Jones, the master mechanic, that you were going to buy a certain class of material because Bill Smith, the engineer, had used it and said it was absolutely all right, but you could tell Tom Jones that you had asked Bill Smith to test a certain material and would like him to try it also, so that you could ascertain if results were equally satisfactory or otherwise. Then Tom won't think that you have placed Bill's judgment in a higher plane. That's diplomacy.

To establish a reciprocal relationship is the keynote. If we show an inclination to be of service to others they will gladly give us aid when we need it. In reading "David Harum" years ago, two of his aphorisms stayed in my mind; one, "Do to t'other fellow like you want him to do to you—but do it fust!" and the other, "A reasonable amount of fleas is good for a dog—keeps 'im from broodin' over bein' a dog." We don't have to worry in the electric railway game about not having a reasonable amount of troubles, and if we try to share the other fellow's and do it first, we will often lighten our own. That's co-operation.

If a purchasing agent seems to be antagonized in any way by other department heads, the chances are he has so conducted his affairs and failed in service as to give them cause for not wanting to deal through him, and the company as a result will probably suffer with a multiplicity of varying materials for similar needs which should be simplified or standardized for all departments. Remember this, you can't win a heavy-weight title by doing light-weight stunts!

FINE FELLOWS IN THE RAILWAY GAME

I think, however, that many of you are as fortunate as I am in being connected with a property where the cooperative spirit is highly developed, and yet we have no orthodox rules or regulations. We like to talk things over at times in an informal, friendly way, and we are always willing to take advice from the older and more experienced heads. It's just a family affair, and, as happens in the best-regulated families, some day Jack may take Fred's bicycle or air rifle without permission, but you know how soon they have things all fixed up again. So one department may occasionally tread upon another's toes, as must always happen in your "rush-hour travel," but in a short time the load has lightened and you are all comfortably seated again. You can't find a better bunch of fellows than there are in this electric railway game—both sides, operating and supply—and there is no reason why we can't show other industries what co-operation really is.

Luncheon of Educational Directors

A LUNCHEON of educational directors of electric railway companies in attendance at the convention, with some others interested in the program of the educational committee, took place on Tuesday in one of the private dining rooms at the Marlborough-Blenheim Hotel. Myles B. Lambert of the Westinghouse Electric & Manufacturing Company and a member of the committee on education presided in the unavoidable absence of Edward Dana, chairman of the committee.

For the benefit of those present, Mr. Lambert outlined the work done by the committee on education during the past two years. Those engaged in educational work then told of the methods followed by them, and there was general discussion of educational problems on electric railways.

Those in attendance included Myles B. Lambert, W. W. Holden, educational director San Antonio Traction Company; H. M. Robinson, educational director Northern Texas Traction Company; C. S. Coler, educational director Westinghouse Electric & Manufacturing Company; F. N. Catherman, department of Engineering Extension, Penn State College; L. A. Armistead, librarian Boston Elevated Railway; E. J. Murphy, statistician American Electric Railway Association; George A. Barnes, Galena Signal Oil Company; H. W. Blake, ELECTRIC RAILWAY JOURNAL, and Henry H. Norris, McGraw-Hill Company, Inc., New York.

Engineering Association Proceedings

Among Outstanding Achievements of the Year Are the Publication of the Manual in a Bound Volume and the Co-operative Work with Other Organizations—Many Important Recommendations Are Embodied in the Reports of the Committees—Technical Work Done Shows Progress of Modernization

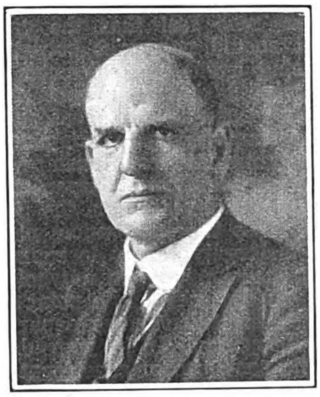
THE first meeting of the Engineering Association at its forty-third annual convention was called to order Monday afternoon, Oct. 6, by President H. A. Johnson, who opened the meeting by presenting his annual address.

Address of the President

In his presidential address to the Engineering Association H. A. Johnson called attention to the fact that more than 200 of the foremost electric railway engineers in the country have been actively engaged during the past year in the work of standing and special committees or in looking after the interests of the association before other national organizations and governmental bodies. Among the subjects emphasized was the publication of the Engineering Manual in a bound volume to replace the previous loose-leaf form. In addition to the cloth-bound volume, containing the entire Manual, paper-covered sections have been printed which contain all the specifications and recommended practices in each of the eight main subdivisions. For some time it had been apparent, Mr. Johnson said, that the mechanical construction of the Manual was wrong. It would not lie flat on the desk for convenient reference. Many drawings were large and cumbersome and very few volumes were being kept up to date by the proper elimination of obsolete sections and the insertion of new sections. After several years of study, therefore, it was decided to publish the Manual in a bound volume which would be republished every third year.

The work in connection with the American Engineering Standards Committee has more than doubled during the past year. Fifty-two men are now representing the association in various ways on the American Engineering Standards Committee. At times it has been rather difficult to obtain engineers of standing and reputation to undertake this work, in spite of its importance. Mr. Johnson, therefore, urged the members to accept appointments upon A.E.S.C. committees whenever possible.

During the year the interests of the member companies have been protected by co-operation with other national organizations in the study of problems of mutual interest. Committees have worked with the National Fire Protection Association in the development of tentative regulations for the wiring of electric cars and carhouses, with the American Bureau of Welding in the study of welded track joints, with the American Society of Mechanical Engineers in the formulation of rules governing the manufacture of air reservoirs, with the Society of Automotive Engineers in studying details of motor coach design, with the American Society of Heating and Ventilating Engineers on the ventilation of automatic substations, with the American Railway Engineering Association on a number of maintenance of way matters and with the Division of Simplified Practice of the United States Department of Commerce.



Charles H. Clark
President-elect

There is no doubt that the electric railway industry, as a whole, is in a more healthy condition than it was one year or two years ago. Some say the electric railways have "come back," but there is a great amount of improvement still to be made before the industry will be in the best condition to give the kind of service which the public demands. There is too small a difference between the gross receipts and the cost of operation and maintenance. One of the most satisfactory ways of increasing the net receipts is to decrease operating and maintenance expenses, and the Engineering Association can undertake no piece of work which would be more valuable to the companies than in finding some way to reduce these expenses and thus increase the net receipts.

It has generally been conceded that most of the rapid industrial progress which we have enjoyed during the past two decades is due to engineering accomplishment. Many operating companies are without sufficient engineering talent to obtain the best results, Mr. Johnson said. There may be an engineer of maintenance of way and an engineer of power who are specially trained in these subjects, but very often the shop and car equipment departments are getting along with a personnel of trained practical men only, without any technical assistance. The car is the instrument of service around which all of our effort is planned and many costly mistakes in its design and maintenance can readily be made when the proper technical skill is lacking. Many companies would do well to provide more engineering skill in their rolling stock departments.

The operating of the cars and the construction of schedules to meet the conditions is just as much an engineering problem and should receive just as close attention as the design of track, cars and power houses, according to Mr. Johnson. Few engineers have been attracted to this branch of the work and on many railways the schedules are made without a careful scientific analysis of the requirements. On such properties there is a great need for a type of engineer who might be called a "transportation engineer," who would have a general working knowledge of all of the engineering problems on the system, including power, distribution, track, cars, schedules and operation and would devote his time to co-ordinating the work of the different departments so that there would be the maximum amount of co-operation within each organization.

In closing, the president mentioned the work of the committee on foreign operation. He called attention in particular to the fact that railway operation is so much more quiet in Europe than in the United States. For that reason he recommended that the various committees of the association, especially the equipment and way committees, undertake a study of methods for the elimination of noise in electric railway operation.

At the conclusion of the address the association moved to extend a vote of thanks to the manufacturers who assisted in arranging the instructive exhibit of standards.

The reading of the report of the executive committee was dispensed with, as it is to be printed in the association's Proceedings, but the report of the secretary was read by G. C. Hecker, special engineer of the association. In his report the secretary referred to the various committees that have been co-operating with other societies in work of mutual interest, and said that the association now has representation on 25 sectional committees and three special committees of the American Engineering Standards

Committee. The work of revising the Engineering Manual was referred to, together with a statement as to the value of this accomplishment. In the statement of membership presented, a net increase of 10 member companies was shown. The report of the secretary was adopted by the association.

The president appointed the following committee on resolutions: Charles R. Harte, chairman; Morris Buck and Daniel Durie.

No report was presented by the special committee on unit basis for voting on standards, but a recommendation was made by the committee that the work be continued. The report of the special committee on Engineering Manual was presented by R. C. Cram, chairman, as follows:

Engineering Manual

The Engineering Manual has been published in its revised book form, having been distributed to the membership in July, 1924.

The principal changes, aside from that of form, are in the arrangement into eight sections of classes covering the several phases of Engineering Association work and the scheme of documental identification. The sectional arrangement permits publication of any one of the classes separately, for use where the entire book would be inconvenient.

The work of revision has been no light task, but the several standing and special committees have actively cooperated with the committee. The actual compilation was made by G. C. Hecker, special engineer of the association and the committee expressed its appreciation of his invaluable assistance in the work.

Future revisions of the Manual will be made easier if the standing committees will endeavor to present new or revised matter in the form governing the style of reports and specifications and it is believed that the committee on standards should place more emphasis upon the need for closer adherence to style before new or revised matter has its approval for insertion in the Manual.

The future work of the committee will consist in editing material presented for supplements and for periodical revisions of the book.

The committee recommended (1) That the standing committees be directed to consider the subject of "revision of existing standards and recommendations" as of first importance, taking precedence over all other subjects assigned. (2) That the committee on standards be requested to pay particular attention to the form of reports and style of specifications as presented by the several committees, with the view toward requiring adherence to form, in so far as practicable, before giving its approval to matter presented for insertion in or revisions of the Manual.

The report was signed by Charles R. Harte, Daniel Durie, and R. C. Cram, chairman.

The committee on engineering symbols presented no report, but a recommendation was made that the work of the committee be continued. The report of the special committee on air reservoir specifications was presented by R. H. Dalgleish, chairman, as follows:

Specifications for Air Reservoirs

The committee reported that it had worked in co-operation with the boiler code committee of the A.S.M.E. and that the later committee had agreed to include in its specification for unfired pressure vessels a provision which allow street railway air tanks to be made of material ⅛ in. thick. In the original draft of the A.S.M.E. specification the minimum thickness was ¼ in. With the exception of a requirement which limits the length of tanks so that they cannot be longer than 2½ times the diameter, the unfired pressure vessel code in its present form was considered satisfactory in so far as it covers street railway air tanks. The committee held that the association's specifications for air tanks should be in accord with the A.S.M.E. unfired pressure vessel code and recommended that the committee on air reservoir specifications be continued for another year in order to allow it to prepare specifications after the A.S.M.E. committee has completed its code.

The report was signed by L. J. Davis, C. A. Ives, J. A. Luper, J. S. McWhirter and R. H. Dalgleish, chairman.

H. H. Adams moved that the report be accepted and that the ensuing committee be instructed to formulate a set of rules for the inspection of air reservoirs. This motion was adopted.

The report of the committee on heavy electric traction was presented by H. F. Brown, assistant electrical engineer New York, New Haven & Hartford Railroad.

Heavy Electric Traction

The first subject assigned to the committee on heavy electric traction was to revise, bring up to date and rearrange the bibliography of heavy electric traction for publication in pamphlet form. The actual compiling is being done by Professor Warner of Yale University. The revised bibliography should be available in stenciled form early in 1925. It is the aim of the bibliography to contain all important articles on heavy electric traction published subsequent to the year 1904. The major part is to be restricted to 15 American and 15 foreign publications, which have been selected as covering the widest field of this activity with a minimum amount of duplication. The committee believes this work will need further supervision and recommends that this subject be reassigned to the ensuing committee.

Data were collected and tabulated on (a) Branch line electrification, (b) self-propelled cars. The operation of passenger service with steam engines and two or more trailing cars on branch lines generally shows a loss. The electrification of branch lines is entirely practicable from an engineering standpoint, but in many cases the first cost may be so high as to introduce prohibitive fixed charges out of proportion to the receipts from a small passenger and freight traffic. Gas-engine drive is being tried out rather extensively with small single end operated cars, and to meet the demand for larger cars and locomotives, experimental equipment is being developed with multiple-unit control of two or more gas engine driven trucks. Gas-electric equipment is available for self-propelled cars and locomotives and apparently offers operating and economic advantages justifying its initial expenses under some conditions. Oil-electric drive, employing high-speed semi-Diesel engines, is being experimented with and apparently holds promise of ultimately providing a self-propelled car and locomotive adapted to use low grade oil, thus broadening the economic application of self-propelled equipment. The committee recommends that this subject be given further study.

On the subject of articulated trains the committee stated that articulated train design and operation in the United States is, at the present time, more or less in a state of experimentation. There are many features which will, no doubt, prove of considerable advantage in improvement on both rapid transit service and surface cars. In England and on the continent, articulated steam trains have been operated for some time. It is reported that the riding qualities of the cars are improved and that the strains on the trucks, bodies and rails are reduced.

In rapid transit service there is a tendency to reduce the number of men comprising the crew. Where cars have been operated with long overhangs on sharp curves it is impossible for passengers to pass freely from one car to another. With the articulated train the overhang is done away with and passengers may pass freely and safely from one car to another on account of the lack of lateral movement between cars, passage being provided through a drum or diaphragm.

To the patrons of rapid transit lines one of the most common criticisms is noise. The noise emanates largely from the trucks and brake rigging and is magnified by the general construction of the subway itself. Such noise can be improved greatly by the reduction of loose parts in the general car construction. It is quite reasonable to assume that by operating trains in articulated units with the reduced number of trucks, brake rigging and movable parts and side thrust, considerably less wear will be noted and marked reduction in noise be found.

Another cause for complaint is brought about by uneven acceleration and braking of trains. With trains of articulated units the tight lock couplings, reduction of the number of control units and braking units permits of closer adjustment of regulating parts and smoother operation is to be expected. As a third item to the credit of articulated train operation, where the crew is reduced it is necessary to control the auxiliary circuits from fewer points, depending on the train combination, and such reduction of course reduces the number of auxiliary devices such as lighting, switches, fuses, relays and supplies, the wiring all tending toward reduction of failures in service.

The committee recommended that the subject be discontinued until actual operating data from existing experiments is available for study and analysis.

A study was made of connections between cars used in train operation, including electric, mechanical and air couplers. This was handled through a questionnaire. The consensus of opinion was that M. C. B. couplers should be used only when cars from foreign roads or standard freight cars were to be handled. Chief among the suggestions for improving designs was the provision of a heavier anchorage, improvement in the uncoupling devices, to harden the wearing parts and make them removable, provide means to prevent kicking out of line in coupling and lubrication of the main draft swivel casting.

Practically all roads using automatic couplers felt that they are very successful.

Practically no data were secured on cost of maintenance of the various types of couplers, and such data as were collected varied so much that no definite conclusions can be drawn. However, it appears that the maintenance of automatic couplers is invariably lower than the maintenance of other types of control or bus-line couplers.

The committee felt that no definite recommendations as to standardization of any types of couplers should be made at this time, but that the data collected should be made available to manufacturers and operators to serve as a guide for the future. It is recommended that further study of this subject be discontinued, at least for one year.

The report was signed by A. H. Armstrong, J. M. Bosenbury, Morris Buck, H. W. Cope, J. H. Davis, J. V. B. Duer, E. C. Johnson, Norman Litchfield, J. O. Madison, L. S. Wells, H. F. Brown, A. H. Daus, C. R. Harte, sponsor; J. J. Sinclair, vice-chairman, and John C. Davidson, chairman.

In the discussion following the presentation of the report on heavy electric traction, J. H. Lucas, superintendent of rolling stock Milwaukee Electric Railway & Light Company, emphasized the value of continuing the study of the articulated train. Other speakers indorsed this view and C. R. Harte moved the acceptance of the report with the recommendation that subject No. 3, which included a study of train operation with particular reference to articulated trains, be continued by the ensuing committee.

N. W. Storer, Westinghouse Electric & Manufacturing Company, said that train operation is the logical means for increasing the capacity of city streets. Except for the actual space taken by the second car, he doubts if trains introduce any traffic complications. He believes the subject is a live one and should be continued.

J. C. Thirlwall, General Electric Company, was of the opinion that articulated trains are inflexible, since they cannot be split up. He considered them not suitable except on large units for rush-hour service. With regard to the electrification of branch line roads, he said, the plans for most electrifications contemplate handling all service with electric locomotives. In the case of the Missouri-Kansas-Texas Railroad, the Dallas-Denton line has been electrified for passenger service only, a light construction, with a comparatively small capacity power distribution system, being used. Freight is to be handled with steam locomotives as in the past. The advantage of the new plan is that it will give hourly passenger service with light-weight electric cars. Thus, the advantages of electrification are obtained at a much lower cost than if the system were of sufficient capacity to handle all the freight service.

F. H. Miller, Louisville, believed that the articulated train may have a field. He mentioned as an interesting point that in a case where there was an objection to the use of one-man cars no objection was raised by the city to the use of two-car trains operated by two men.

The report of the heavy traction committee was accepted with the understanding that subject 3, that of articulated trains, will be continued.

The report of the committee on way

Company Reporting	Ties Used	Number of Ties	Tie Spacing	Type of Construction	Rail Section	Ballast Depth	Subsoil
			Feet				
Denver Trm. Co., Denver, Colo.	IS	130	6	Bal. & Conc.	L 74"-331		
Chi. & Jol. E. Ry. Co., Joliet, Ill	IS, CS		CS.4 ; IS.6		100 lb. AR; L 80 lb.-335	6" Conc.	Gravel
Ill. P. & Lt. Corp., Bloomington Ill	DM	1,752	28" 36"		100 lb. AR	8", 12" Conc.	
T. H. I. & E. Tr. Co., Indianapolis, Ind.	Ickes Tie	12	24"	Ballasted	70 lb. AS	6" Gravel	Clay
Un. Tr. Co. of Ind, Anderson, Ind	IS	8,000	6	Conc.	7" 91 lb. and 80 lb.	8" Conc.	
Vin. El. Ry. Co., Vincennes, Ind	DM	2,045	3	Conc.	6" 72"-331	5" Conc.	Gravel
Cin. N. & C. Ry., Covington, Ky	IS	2,723	5-2"	Conc.	L, 97 lb., 80 lb	4" Conc.	Clay, Gravel
N. Or. P. S., Inc., New Orleans, La	CS	480	2½, 4	Conc.	80 lb., 100 lb. AS	6" Conc.	
U. Ry's & E. Co. of B, Baltimore, Md	IS, CS	2,535	5-9"	Conc.	100 lb.AR,7"-103lb.,7"-122 lb.	6" Conc.	
B. Elev. Ry., Boston, Mass.	IS, CS, LS, DM, Conc.		2, 6	Conc.	100 lb. AR. 7"-122 lb.	7" Conc.	Gravel
City of Detroit, Detroit, Mich	IS	53,600	5½, 6		100 lb. AR, 7"-91 lb., 7"-93 lb.	7½" Conc.	Clay
Mich. El. Ry. Co., Jackson, Mich	IS		5½	Conc.	100 lb. AR	6" Conc.	
Kan. Cy. Rys. Co., Kansas City, Mo	IS, CS			Conc.	100 lb., AS, 7"-91 lb. 80 lb. AS	6" Conc.	Clay
Hel. Lt. & Ry. Co., Helena, Mont	OR 30 lb	2,500	2	Conc.	60 lb. AS	9" Conc.	Gravel
Sou. N. Y. Ry., Inc, Oneonta, N. Y	IS	260	6	Ballast	80 lb. AS	6" Bal., 7" Con.	Gravel
Sch. Ry. Co., Schenectady, N. Y	CS	6,106	4	Conc.	7"-95 lb., 7"-116 lb.	6" Conc.	Sand
N. Y. State Rys., Syracuse, N. Y.	CS	15,431	4, 5	Conc.	7"-91 lb.	6" Conc.	
N. St. Pwr. Co., Fargo, N. Dak	IS, CS	6,838	5, 6		L 70 lb.-264	6" Conc.	
Co. Tr. Co., Toledo, O	IS, DM	9,686	3, 6	Conc.	100 lb. AR, 100 lb. AS	6" Conc.	
Cin. Tr. Co., Cincinnati, O	IS, CS, OR		3	Conc.	7"-91 lb., 7"-103 lb., 9"-140 lb.	6", 7" Conc.	Gravel
Okwd. St. Ry. Co., Dayton, O	CS	4,554	3	Conc.	7"-80 lb.	Conc. 12" Gir.	
Lan. Tr. & P. Co., Lancaster, O	Some, no data						
Buf. & L. E. Tr. Co., Erie, Penn	CS		7	Conc. B'm.	7"-94 lb.	6" Conc.	Sandy
York Rys. Co., York, Penn	IS	954	6	Conc.	75 lb. AS	7" Conc.	Sandy
Valley Rys., Lemoyne, Penn	IS		8-3"		80 lb. AS	4" Conc.	
Cit. Tr. Co., Oil City, Penn	IS	112	6	Conc.	80 lb. AS	4" Conc.	
N. Br. Tr. Co., Bloomsburg, Penn	DM		3		L.-73 lb.-291		
Alt. & L. V. El. Co., Altoona, Penn	IS, CS	8,650	4½	Conc.	7"-110 lb.,7"-103 lb.,7"-122 lb.	Conc.	Clay and Loam
N. Tr. Co., Easton, Penn	DM	3,300	3	Conc.	7"-96 lb., 7"-80 lb.	6" Conc.	
N. Tex. Tr. Co., Fort Worth, Tex	DM	395	2½	Conc.	70 lb. AS	6" Conc.	Gummy
San. Ant. P. S. Co., San Antonio, Tex.	CS, OR		2½, 8	Conc.	60lb.AS,7"-74lb.,87lb.,95lb.103lb.	5"-6" Conc.	Clay and Gravel
S. Mun. St. Ry., Seattle, Wash	IS	20	1½		7"-127 lb.	Conc.	
Mil. El. Ry. & Lt. Co., Milwaukee, Wis.	IS, DM, CS, OR	20,600	2, 6	Conc.	100 AR, 7"-95 lb., 7½"-102 lb.	6" Conc.	Clay
Wis. V. El. Co., Wausau, Wis	DM	3,197	2½	Conc. B'm.	6"-72 lb.	6" Conc.	Sand
E. Wis. El. Co., Oshkosh, Wis	DM		3	Conc. B'm.	65 lb.-AS	6" Conc.	
Mont. Tr. Co., Montreal, Canada	Chan. B. Angle	2,290	6	Conc.	7"-96 lb.	6" Conc.	
L. St. Ry. Co., London, Conada	IS, W-Block		2	Conc.	80 lb.-AS	6" Conc.	Sandy
S. Ry. & P. Co., Sherbrooke, Canada	DM, OR	730	4, 5		7"-70 lb. 264	6" Conc.	
T. Trans Comm., Toronto, Canada	CS, OR	3,997	2, 6	Conc.	7"-90 lb., 7"-70 lb., 7"-122 lb.	6"-12" Conc.	Sandy
Ham. St. Ry. Co., Hamilton, Canada	CS, IS	9,012	6, 7½, 10	Conc.	7"-94 lb., 7"-87 lb., 7"-76 lb.		Sandy
U. T. Co., Albany, N. Y.	IS, Chan., Conc. B.	8,251	3, 6	Conc.	7"-91 lb., 100 b. AR	6" Conc.	Clay
Los Ang. Ry. Corp., Los Angeles, Cal.	McDonald Conc.			Conc.	7½"-87 lb.	6" Conc.	

Total mileage, 12,659; 92 companies reporting. Key to abbreviations: AR, Am. Ry. Assn. AS, A. S. C. E. Asp., Asphalt. Blk., Block. Br., Brick. OR., Old Rail. Plt., Plate. PC., Pleasure Car. Reqd., Required. Std., Standard. Trks., Trucks. Var., Variable. WB, Wood Block.

The following railways reported that they do not use substitute ties:
Public Service Railway.
Atlantic City & Shore Railway.
Western Ohio Railway.
Lima Toledo Railway.
Indianapolis Columbus & Eastern Traction Company.
Scioto Valley Traction Company.
Stark Electric Railroad.
Toledo & Indiana Railroad.
Portland Railway & Power Company.
Philadelphia Rapid Transit Company.
United Electric Railways.
Memphis Street Railway.
Washington Virginia Railway.
Capital Traction Company.
Puget Sound Power & Light Company.
Willapa Electric Company.
Olympia Light & Power Company.
Seattle Municipal Street Railway.
Lake Superior District Power Company.
Mobile Light & Railroad Company.
Arkansas Central Power Company.
Pine Bluff Company.
Key System Transit Company.

matters was presented by Chairman H. H. George. Abstract of this report follows:

Way Matters

Ten subjects, including a review of existing standards, were investigated during the year by the committee, and were discussed in a comprehensive report 127 pages in length. An unusual amount of interesting and valuable data was collected. Definite conclusions were reached on four of these subjects, and it was recommended that their study be discontinued. It was thought that investigation of the other six should be continued by the ensuing committee.

Subject No. 1—*Standardization of Frogs.*—The work of the committee this year provides 8 frogs of each hand for car clearance branch-offs; 7 frogs of each hand for other branch-offs; and 3 frogs for turnouts and crossovers for ordinary conditions, a total of 33 frogs. In addition, 6 of the A.R.E.A. frogs are standardized for conditions similar to steam railroad operation. The adoption of the committee's recommendations will provide a complete system for the use of designers of street railway layouts comparable with that used on steam railroads and represents a tremendous reduction in the number of frogs required as compared with the original practice.

Subject No. 2—*Design of Substitute Ties.*—A list of users of various types of substitute ties was obtained from their manufacturers and a comprehensive questionnaire was prepared and sent out to all such users and to every member company of the A.E.R.A. as well. A large percentage of those to whom the data sheet was sent did not reply and the answers contained in many of the replies received were either very incomplete or indefinite. This appears to indicate, in the opinion of the committee, either an unwillingness to go on record as to the results of experience with substitute ties, a regrettable lack of records as to what has been done and what the results have been, or a complete indifference to the efforts of the committee to secure information on this subject. The committee heretofore did not feel justified in drawing any conclusions and recommends that further consideration of the subject be continued by next year's committee.

Subject No. 3—*Investigation of Welded Rail Joints.*—Since this committee had no funds for carrying on any research work of its own and because this was delegated to the committee on welded rail joints, there was practically nothing the way committee could do except to co-operate with the larger committee. The report is, therefore, only a brief review of what has been accomplished to date by the committee on welded rail joints. Nearly all of the test joints supplied by various railways have been tested to destruction and the results were embodied in a report which has been distributed to all member companies. In conclusion the committee recommends that the subject be continued and reassigned to the ensuing committee with instructions to co-operate with the committee on welded rail joints; that the latter committee be urged to adopt a definite program for future work and to proceed with it as rapidly as possible; that publicity of the work of the committee on welded rail joints be given as far as practicable through the official organ of the A.E.R.A. and the technical magazines supported by the industry, and that the executive committee of the committee on welded rail joints be requested to submit to every member of the general committee a monthly résumé of its activities.

Subject No. 4—*Design and Specifications for Solid Manganese Steel, Electric Over Steam Railroad Crossings.*—The committee submits two designs for solid manganese-steel crossings—steam railroad over electric railways for adoption as recommended design. These plans had previously been submitted to the committee on way matters by the track committee of the A.R.E.A. in 1923 and had been returned to the latter committee with certain suggested changes, which changes have since been approved by the track committee and the plans adopted as recommended practice by the A.R.E.A. last March. The committee also recommends that the subject of crossing design be continued by the ensuing committee.

Subject No. 5—*Standardization of*

Paving	Drainage	Length of Service	Type of Fastening	Effect of Substitute ties on			Effect on Noise	Experience with Reconstruction	Relative Length of Service	Relative First Cost	Do ties meet following requirements?	
				Rail Corrugation	Joint Maintenance	Paving Maintenance					Resiliency	Maint. Track Gage
		Years										
mc.		6	Std. Cl.	In Doubt	No Data	Higher	More	No.	In Service		No.	Yes
	None		Std. Cl.	None			More	No.		20% More	No.	Yes
		1	Std. Cl.	In Doubt	None	None	More	No.	No Data	15% Less	Yes	Yes
		1½	Cl. & Bolt					No.	None	Test Only	No.	No.
	4" Tile		Std. Cl.	None	None	None	No	No.	In Doubt		No.	Yes
	None	4	Std. Cl.	In Doubt	None	None	Less	No.	No Data		Yes	Yes
r., WB., Conc. Gr	4" Tile	1–6	Std. Cl.	More	More	More	More	No.	No Data		No.	Yes
lled		10–12	Std. Cl.	None				No.			No.	No.
r. Asp.	None	2–3	Std. Cl.	In Doubt	In Doubt	In Doubt	More	No.	No Data	No Data	No.	Yes
r. Cono	None	1–20	Std. Cl.	None	None	None				Same	No.	Yes
onc.	6" Tile	1–20	Std. Cl.	In Doubt	None	None	More	No.	In Doubt	No Data	No.	Yes
	None	1–7	Std. Cl.	None	None	Good	More	No.		Same	No.	Yes
onc. Gr	6" Tile		Std. Cl.	None	Little	Light	None	None	No Data			Yes
onc.	None	7	Welded		Less		More	None	No Data		No.	Yes
onc.	None	2		Yes	Less	Less	More	No.		Less	No.	Yes
r., Blk.	None	9–13	Std. Cl.	None	Less	None	None	None	No Data	No Data	Yes	Yes
r., Blk.	4" Tile	12	Std. Cl.	None	More	More	None	No.	Wood Ties Best	More	No.	Yes
	None	2–12	Std. Cl.	None	Less	Less	None	No.	No.		No.	CS., No; IS., Yes
	6" Tile	1–7		None	Less	Less	More	No.	No Data	AboutSame	Yes	Yes
r., Gr., WB., Conc.	4" Tile		Std. Cl.	Better	Same	Less	More	No.	CS. Ties Best	Less	No.	Yes
r., Gr.	None	8–9	Std. Cl.	None	None	None	More	None	No Data	Less	Not Req.	Yes
k.-Asp.	None	4	Std. Cl.	More	More	Less	More	Yes			No.	Yes
onc.	None	¼–¾	Std. Cl.	No Exp.			None	No Exp.	No Exp.	Same	No.	Yes
onc.	None	1–2	Std. Cl.	Good	Improved			No.				Yes
	4" Tile	2		None	OK	Good	Some	No.	No Exp.	Less	Yes	Yes
onc.	None	2–5	Std. Cl.				Less			⅓ Less	Yes	Yes
	None	8½–15½	Std. Cl.	None	Fair	Better	Some	Jt Ties Replaced	No Exp.	10% Less	No.	Yes
	None	1–2	Std. Cl.	None	None	None	No Difference				Yes	Yes
	None	¼	Std. Cl.	None			More	None	No Data	Same	Partially	Yes
r. Asp.	None	¼	Std. Cl.	None	None	Less	More	No.	2:1 Longer Life	Less	None	Yes
	8" Tile	20		No.	No.	No.	No Data	None	None	No Data		
r. Conc.	None	5	Std. Cl.	No.	No.	No.		No Data	None			
onc.	None	4		None	None	None	Some	No Data	No Data	Same	Yes	Yes
nc.	None	½		No Exp.			Some	No.	No Data		Yes	Yes
	None	8–18	Cl. & Bolt.	None	More	Bad	No Data	Yes	No Data	No Data	No.	Yes
	None	2–13	Bolt & Plt.	None	None	None	I.S.Ties Noisier	No.	Same	Less	Yes	
onc.	4" Tile	2–5	Std. Cl.	None	None	None	No Diff.	None	No Data	No Data	Yes	Yes
r. Br. ScB.	3" Tile	15	Std. Cl.	Slight	Heavy	Normal	Same	Yes			No.	Yes
r., Asp., WB.	None	1–15	Std. Cl.	None	Bad		Not Noticeable	Yes			No.	Yes
nc., Gr.	None			No Data	No Data	No Data	None	No.	No Data	More	Yes	Yes
p.	None	12	Special	Yes	More	More	More	No.	No Data	No Data	No.	No.

ng., Bearing. B'm., Bottom. CS., Carnegie Steel. Cl., Clip Conc., Concrete. DM., Dayton Mech. Gr., Granite. Is., International Steel. Jts. Joints.

Market Street Railway.
Chicago, Ottawa & Peoria.
Chicago Rapid Transit Company.
Chicago, Aurora & Elgin.
Illinois Power Company.
Illinois Power & Light Company.
East St. Louis & Suburban Railway.
Illinois Traction System.
Rockford & Int. Railway Company.

Beech Grove Traction Company.
Indianapolis Street Railway.
Arkansas Valley Interurban Railway.
Waterloo, Cedar Falls & Northern Railway.
Paducah Railway.
Shreveport Railways.
Androscoggin & Kennebec Railway.
Bangor Railway & Electric Company.
Union Street Railway.

Springfield Street Railway.
Grand Rapids, Grand Haven & Muskegon Railway.
Menominee & Mararinette Light & Traction Company.
Mankato Electric Traction Company.
Deluth Street Railway.
Great Falls Street Railway.
Lincoln Traction Company.

Switches and Mates.—In considering this subject the committee limited its study to the matter of tongue switches, as this was the original intention in suggesting the subject for assignment and the first step was the development of data covering switch tongue design. The committee made substantial progress and has every reason to believe that the subject will be satisfactorily concluded, and recommends that it be continued by the ensuing committee. For flangeways and gages on curves the committee has compiled a very definite set of specifications intended to replace former Manual Section Ws 2a, which was withdrawn in 1923 because of the adoption of a number of new standard wheel flanges. The committee recommends its adoption and that the subject be discontinued.

Subject No. 6—*Narrow Groove Guard Rail.*—This subject was assigned because of the adoption by the association in 1923 of two wheel flanges "C" and "D" having a thickness of 1 in., or $\frac{3}{16}$ in. and $\frac{1}{8}$ in. less, respectively, in thickness than the standard flanges "A" and "B" adopted in 1907. In making its analysis the committee checked its data by two independent methods, and as the result of its investigations concluded that there was not a sufficient number of requirements for a narrow grooved guard rail that could not be met by using the standard guard rails by changing the track gage, to justify rolling a new section with a narrower groove. The committee, therefore, recommends that the subject be discontinued.

Subject No. 7—*Standard Hook Head Railroad Spike.*—The committee considered a number of manufacturers' designs as well as that of the standard spike of the A.R.E.A., and finally recommended the adoption of the latter by our association as being in the best interests of standardization. The committee further recommends that the subject be discontinued.

Subject No. 8—*Surface Hardening of Rails at Mill and on Street.*—A considerable amount of information was collected covering three processes for surface hardening of rails which have been tried out on this continent and abroad of recent years. The committee presents these data to the association this year for the first time under one cover. While the committee did not feel justified in drawing conclusions, in view of the fact that the various processes are still more or less in the experimental stage, it is satisfied that further study of the subject is justified and recommends that it be assigned to the ensuing committee.

Subject No. 9—*Specifications for Tie Rods.*—In analyzing the requirements for tie rods the committee listed the controlling dimensions of 99 girder rails, 11 T-rails, 19 foreign rail sections, and one center bearing rail, a total of 130 rails. The analysis covers standard gage track only, since for any other gage it is only necessary to increase or decrease the length required for standard gage by the difference between gages. With the lengths of the threaded portions as given on plan W9701-24, the 61-in. tie rod will satisfactorily meet all girder rail requirements, while the 63-in. rod will satisfactorily meet all T-rail requirements. The committee feels that it is justified in recommending their adoption as a recommended specification, and further recommends that the subject be discontinued.

Subject No. 10—*Review of Existing Standards.*—The committee has submitted certain revisions of the specifications for the manufacture of open hearth steel girder rails for the purpose of providing for the rejection of rails under certain conditions, and also to cover the matter of drilling, punching and milling. It also submits certain revisions of the specification covering the matter of furnishing standard section T-rails in 62-ft. lengths. The attention of the ensuing committee is called to the necessity for revising the drawing of the standard girder guard rails so as to show the width of flangeway at the gage line.

This report was signed by C. A. Alden, V. Angerer, S. C. Baker, R. J. Custer, W. R. Dunham, Jr., E. B. Entwisle, G. C. Estill, R. B. Fisher, C. F. Gailor, A. E. Harvey, J. H. Haylow, J. S. Hyatt, B. P. Legaré, R. H. Pinkley, A. T. Spencer, J. B. Tinnon, C. L. Van Auken, W. W. Wysor, R. C. Cram, sponsor, E. M. T. Ryder, vice-chairman, H. H. George, chairman.

With regard to standardization of switch tongues, W. W. Wysor, Baltimore, stated that he believed the tongue should be made thinner than is generally used today. He said the value of this construction is that it is possible to obtain more bearing for the tread of the wheel than is possible with the present standard tongue. Others taking part in the discussion were E. M. T. Ryder and Victor Angerer. With regard to the proposed drive spike, Mr. George stated that this is already standard with the American Railway Engineering Association and that a number of manufacturers are now making them with automatic machinery.

The recommendations of this committee were received singly and then the report was accepted as a whole.

The joint research conducted by the committee on welded rail joints was reported on by Sub-Chairman Wysor. This report is the same as subject 3 of the way committee report. Mr. Wysor said that since the report was written the big Emery testing machine at Washington has been reassembled and that the work of testing has now been completed. In reply to a question, he stated that four strain gages are used: (1) On the lip, (2) on the web, (3) on the head, (4) on the base.

E. M. T. Ryder, way engineer Third Avenue Railway, spoke briefly concerning the tensile tests that had been made and called attention particularly to the report of the committee on foreign practice in connection with noise of operation. The possibility that differences in the top and bottom welds cause variation in the result of tests was mentioned by R. H. Dalgleish, chief engineer Capital Traction Company. In connection with this, H. H. George, engineer maintenance of way Public Service Railway, suggested that the Bureau of Standards could probably furnish additional details of interest.

The Market Street Railway of San Francisco has made 16,000 bolted joints since 1910 without a single failure, according to B. P. Legaré, engineer maintenance of way. These joints are on 9-in. rail, each joint having twelve 1-in. bolts. All joints are made by one gang, and in the opinion of Mr. Legaré the care exercised in making the joints is largely responsible for the success. W. W. Wysor, chief engineer United Railways & Electric Company, Baltimore, also emphasized the importance of care in the set-up of joints.

The report of the committee was unanimously accepted.

Tuesday's Session, Engineering Association

FIRST Vice-President Clark opened the Engineering Association meeting on Tuesday in the absence of President Johnson and introduced President White of the Accountants' Association, who presided during the presentation of the report of the joint committee of the Accountants' and Engineering Associations on engineering accounting. This report, which is printed below, covered suggested subdivisions of the standard classification of accounts for the way and structures department.

Joint Committee on Engineering Accounting

The report this year was a continuation of the report for 1923. Last year's committee recommended the adoption of a number of subdivisions of the standard road and equipment accounts and the operating expense account, as contained in the Interstate Commerce Commission's standard classification. The committee this year took the subdivisions recommended by last year's committee and divided them, after a few minor changes, into three groups. Each group is complete in itself, but the group for Class I is intended for those companies desiring considerable detail in their accounts, Class II, with fewer subdivisions, for those companies desiring less detail, and Class III, with the least number of subdivisions, for those desiring still less detail. The committee recommended that these sub-classifications, if accepted by the association, be submitted to the committee on standard classification of accounts for adoption, and that the work of the committee be continued in order that a subdivision of the equipment group of accounts might be prepared.

The report was signed by E. D. Dreyfus, Clifford A. Elliott, Herbert Jackson, L. J. E. Foley, J. E. Heberle, P. R. Jacques, C. R. Harte, sponsor; Leon R. Brown, and G. F. Dinneen, co-chairmen.

In the discussion of this report T. B. MacRae, general auditor Chicago Rapid Transit Company, said that the accountant was generally ready to give the engineers anything they wanted in the way of subdivided figures, if they would state their requirements. M. W. Glover, general auditor West Penn Railways, said that the chief question involved in the adoption of such a subdivision was whether or not the results obtained warranted the expense of the subdivision. He warned against sacrificing accuracy for detail and pointed out that it was very difficult to get maintenance men, particularly on trackwork, to make charges correctly to a detailed list of account numbers. He felt that the question of the degree of subdivision to be made should be left to the individual railways rather than to have the association determine this matter.

R. N. Wade, engineer maintenance of way Chicago Rapid Transit Company said that it was impracticable to carry out some of the divisions in charges called for in the report and cited the division of the cost of excavating various types of paving as an illustration of the difficulty that would be encountered. W. B. Tuttle, president San Antonio Public Service Company, felt that although individual companies might not find it possible or desirable to carry out the full subdivision as presented in the report any necessary combination of the various items could be made, but the general order of accounts would be the same, and some degree of uniformity would be obtained in the classification on various properties.

The report was accepted by the association for publication in the proceedings as a guide for member companies. It was also decided to continue the work of the committee and to carry out its recommendation for the preparation of a similar subdivision of accounts to cover the work of the equipment department.

Upon completion of the discussion on this report the accountants withdrew to their own meeting hall and President Johnson took charge of the engineering meeting. The report of the committee on unification of car design, was abstracted by Chairman H. H. Adams, Superintendent of shops and equipment Chicago Surface Lines. An abstract of the report on this subject follows:

Unification of Car Design

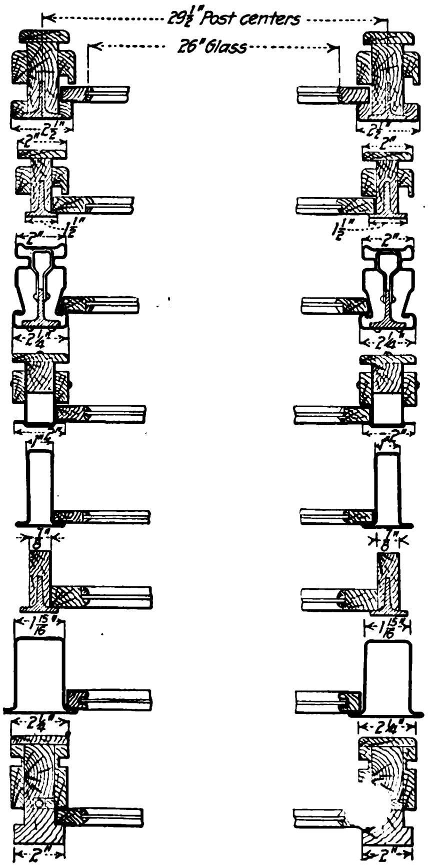
The committee on unification of car design reaffirmed the recommendations contained in the 1922 report of the committee, and to obtain information covering cars built during the year 1923 sent out a questionnaire to the companies that purchased cars.

A statement of the data obtained from the car builders, showing the dimensions used for recent groups of double-truck city cars in comparison with the recommendations of the committee, is shown in Table I.

The committee found that it was exceedingly difficult to arrive at a standard car that would meet all the requirements of the various properties throughout the country and, therefore, confined its efforts to the establishment of certain uniform basic dimensions for city cars which, it is believed, could be generally adopted.

A side girder plate depth of 30 in. could be used almost universally for this type of car and a 29½-in. dimension for center to center of posts. This would give an acceptable spacing of cross seats. With the depth of girder and the post centers established, the distance from the underside of the sill to the bottom of the top plate and the distance from the underside of sill to the top of the roof determine the size of the side sash and glass. The committee pointed out the desirability of using standard sizes of glass, which will not require cutting at shops.

With the 29½ in. center to center of posts established, a standard width of 26-in. glass can be used with the various constructions of posts and sash now being used by the different car builders. If the large companies will co-operate with the car builders to the end of obtaining general acceptance of the dimensions recommended, progress can be made along the lines as outlined. This is an initial and important step toward unification of car design.



Application of 26-In. Glass to Various Sash and Post Designs on Recommended Spacing of 29½ In.

The committee did not make any definite recommendations as to car lengths or general arrangements, believing that the first step should be to obtain general adherence to the dimensions recommended. If this is successfully carried out, further progress in the same direction can be made in the future.

The committee also considered the possibility of effecting a reduction in the number of types and sizes of miscellaneous parts, including general car body hardware, which are used in the construction of electric railway cars, and recommended that a committee be appointed to study this phase of the problem.

The report was signed by J. A. Brooks, C. Gordon, W. F. Graves, J. W. Hulme, G. L. Kippenberger, J. Lindall, V. Willoughby, R. H. Dalgeish, sponsor, and H. H. Adams, chairman.

As the discussion on the report lagged, Mr. Adams pointed out the need for suggestions and criticisms from the floor in order that the committee might be guided in its work. He said that members should express their views, stating whether or not they agreed with the findings of the committee, and if they did not agree, urged that the objections be brought out.

Some discussion of the possibility of carrying on this work in connection with bus body construction occurred, and P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, said that the subject of glass sizes was of considerable importance from the standpoint of bus maintenance. In many cases plate glass is used, Mr. See said, and the bodies are sometimes built so that this material has to be cut to odd sizes, including small fractions of inches.

R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C., said that he would like to see the recommendations of the committee followed by members of the association. Mr. Williams, assistant superintendent of equipment Department of Street Railways, city of Detroit, said that they were now following some of the recommendations of the committee, and expected to follow as many of them as possible on future cars. Walter Adams, chief engineer J. G. Brill Company, stated that his company would follow any of the dimensions that are specified by the railway companies.

Following the action of the Engineering Association on the report of the committee on unification of car design, Britton I. Budd, president of the American Association, addressed the engineers. Mr. Budd expressed his appreciation in very glowing terms of the excellent work which has been done during the past year by the various committees and members of the Engineering Association. He also extended thanks for the work on behalf of the executive committee and the entire association. He referred to the report made by the committee on foreign operation and said that he believed that this would be of material assistance in bringing American operation to a higher level. He said that he considered the engineer as the man who must be looked up to particularly for improvements in design and other essential developments necessary for furnishing better electric railway service. Many of the improvements needed, he said, must necessarily originate with the engineers of the various railways, and as the many departments must have efficient tools to do their work, untiring efforts of the different engineers should be exerted toward improving all essentials.

Following the address by Mr. Budd,

TABLE I—DIMENSIONS USED FOR RECENT GROUPS OF DOUBLE-TRUCK CITY CARS COMPARED WITH RECOMMENDATIONS OF A.E.R.E.A. COMMITTEE ON UNIFICATION OF CAR DESIGN, JULY, 1924

Railway Company	Number of cars	Post centers, inches	Width of post at bottom of sash groove, inches	Height from arm rail to bottom of top sash, inches	Height from underside of sill to bottom of top plate		Height from underside of sill to top of roof		Depth of girder, inches	Height of glass in lower sash, inches	Width of glass in lower sash, inches	Height of glass in upper sash, inches
					Ft.	In.	Ft.	In.				
Pacific Electric	50	30	1¼	25½	6	9	8	5	32	22	24	...
Los Angeles	25	29	2	29⅜	6	11¼	8	5¼	34	26	24	...
Memphis	40	29½	⅞	26⅛	7	1¾	8	9¾	31¼	24	24	...
Milwaukee	35	29⅜	1¼	26 11/16	7	3 1/32	8	9 11/32	34	26	26⅞	...
Fort Wayne	30	28½	⅞	24⅜	6	10⅜	8	1 15/16	29	24	26	...
Muskegon	4	28½	⅞	25½	6	10¼	8	3	29	22	24	...
Pittsburgh	75	30	1¼	24	7	9½	8	1 7/16	30	22	24½	14
Windsor	4	30	⅞	25½	6	10¾	8	3	29	22	25½	...
Detroit	75	29½	1⅛	22 11/16	6	10⅜	8	5 7/16	32⅜	20	24	...
Peoria	15	33	...	24½	6	6½	8	6⅝	34	22	28	...
St. Louis	50	30	1½	26	7	3½	8	5⅞	30	18	24	18
Johnstown	10	29	15/16	26 1/16	6	11⅝	8	6⅛	29¼	22	24	...
Philadelphia Rapid Transit	520	29	1 5/16	24 9/16	7	1⅞	8	5⅜	34⅛	22	25 11/16	13
Wilkes-Barre	10	29½	1 5/16	23¼	7	1⅛	8	3½	34¼	20¾	26 3/16	16½
Boston Elevated	50	29½	1 5/16	23¾	7	1⅛	8	3½	34¼	20¾	26 3/16	16½
Eastern Mass	50	28½	13/16	21½	7	4⅞	8	8¼	32¼	22⅝	24	...
Brooklyn	100	28½	1¼	25 1/16	6	10 5/16	8	1⅞	28½	22⅝	23½	...
Chicago	70	29½	1¼	26¼	6	11¼	8	8¼	30	24	26	14
Washington Ry. & Electric	30	29½	1⅜	24 5/16	7	1 1/16	8	11 11/16	33⅜	22	26	...
Plymouth & Brockton	1	28½	1 3/16	25½	6	10¼	7	10 7/16	29	22⅝	24	15
1922 committee recommendations	...	29½	...	*27¼	7	1¼	8	8¼	30	24	26	14

* Height from top of girder plate to bottom of top sash.

the report of the committee on equipment was presented by F. H. Miller, chairman.

Equipment

The equipment committee reported on five subjects. The first of these was a study of gearing, including long and short addendum tooth formation and web hole standardization. Questionnaires were sent out this year, following the practice of three years previous, and additional information was received. The majority of replies indicated that helical gears run more quietly both when new and half worn. During 1923 approximately 28 per cent of all gears sold were helical gears. The question of web hole standardization has been studied in co-operation with the American Gear Manufacturers Association, and a table for the size and location of web holes in gears was submitted as a recommended standard. Four holes are to be provided in each gear, and the diameters of these vary from 1 in. to 3½ in., by ½ in. steps. The diameters of the circles on which the holes are set vary from 10 in. to 19 in., by ½ in. steps.

The second subject reported on was various devices for trolley contact and their effect upon trolley wire. This was studied in co-operation with the committee on power transmission and distribution. The work of the two previous committees was extended and additional information secured on the life of current bearing and collecting equipment by replies to a questionnaire. Tests have been started by member companies on sections of trolley wire with all new equipment, to determine wear and periodical inspection and measurements will be tabulated for future study. The conclusions of the committee were:

1. That trolley wheels of manufacturer's standard compositions give mileage equal to those using special composition.

2. That solid wheels are preferable to built-up types.

3. That standard "U" or "V" groove is most satisfactory under normal operating conditions.

4. That the life of trolley wheels, contact devices and trolley wire can best be obtained by conducting life and mileage tests on sections of wire with regular inspection, measurement and tabulation of the equipment under test.

Subject 3 included a review of Manual sections on equipment under the heading of Miscellaneous Methods and Practices. The most important ones were revised and brought up to date and much valuable information was selected for including in these reports. The headings of the various miscellaneous methods and practices, which were submitted, are:

Rules for inspection of air brakes and brake rigging; air compressor maintenance; comparison of car weights with seating and carrying capacity; repairs of armature and field coils; construction and repairs of commutators; insulating materials for railway repair shop use; systematic inspection of car equipments; lubrication of car equipment; protective devices for car equipment; armature and axle liners; specifications for trolley wheels; systematic inspection of car equipment; car house organization; automatic slack adjusters for brakes.

Subject No. 4 included a study of spring supports for railway motors with a view to the elimination of undesirable types and the standardization of the more desirable ones. This subject was considered by the 1923 committee, and the 1924 committee has furnished additional information. This covers the amount of spring trouble that has developed and methods used to overcome it. The report is in the nature of a progress report and the conclusions of the committee were that there is a considerable amount of trouble with spring breakage, but a large part of this has been remedied through proper design of springs, which give ample movement to the motor without overloading.

Subject No. 5 included a study of existing practices in regard to the inspection period for car axles. A set of rules was developed for car axle inspection and limit of wear, and the committee recommended that this be included in the Manual under Miscellaneous Methods and Practices.

Subject No. 6 consisted of a study of the air-brake tests which were conducted under the auspices of the Central Electric Railway Association. The following conclusions were concurred in by the equipment committee:

1. There is no one best way to stop any car in an emergency. In general, the best way will depend somewhat on the type of brake and motor equipment.

2. As a broad rule, subject to occasional exceptions, it may be said that the best way to stop a car equipped with air brakes, is to throw the controller to the off position, applying emergency air and sand simultaneously.

age.

3. Electrical methods of braking—that is, reversing motors and bucking motors—subject the equipment to very severe strains because of the abruptness with which the braking force is applied. The value of these methods is more apparent than real except in those cases in which the air brakes from some cause are inoperative.

4. Of the two electrical methods, reversed motors and bucking motors, the reversed motors method is the most effective.

5. If the motors are reversed in conjunction with emergency air and sand, skidding invariably results, and even under very good rail conditions the results are not superior to those obtained by using the air brakes alone.

6. The electrical braking methods are more likely to produce erratic results than the emergency air brake, and for this reason should not be resorted to as a general practice.

7. Because the rail conditions, under which the tests above referred to were made, were better than those ordinarily obtained on city streets, the results should be regarded as better than aver-

8. The best way to stop the Birney safety car in emergency is for the motorman to raise his hand from the controller handle. This is true only when the car is running with brakes released. When brakes are applied the brake valve should be thrown to the emergency position.

The committee making the tests confined itself to an analysis of the best methods for making emergency stops and did not analyze in detail the results and the reasons therefor of any particular method.

Without a clear exposition of the fundamentals affecting the length and time of stop (which this committee was not considering in so far as a particular method was concerned) misleading conclusions may result from a consideration of distances and times for a stop developed from particular tests. It is therefore considered important that it be generally understood that the report of the committee should be confined to the subject investigated, namely, "what is the best practice for making emergency stops to avoid accidents?"

It is believed that attention particularly should be drawn to the fact that the Birney car as shown in Table No. 1 on page 14, Bulletin No. 13, Purdue University, was very much over-braked as compared with standard practice and that on this account the stops made with it were much shorter than would normally be expected with proper brake equipment and dry rail; with wet rail the over-braked car would cause dangerous skidding and excessive maintenance.

Mention should also be made that the discussion contained in Section 4, entitled "Theoretical Considerations" is based upon a uniform rate of retardation which does not exist in actual service, for the reason that the retarding force does not immediately attain its full value, and with the air brake the brakeshoe friction is continuously changing with a resultant change in the retarding force exerted upon the car.

The committee considered the foregoing conclusions as absolutely sound and represent proper practices to be followed. The results that will be obtained in any specific case, however, largely depend on a number of important and variable factors. In other words, no one can assume, from the results obtained in these particular tests, the definite stopping distance or time because of the variable factors encountered in each and every instance of stopping a car.

The committee considered that in general the best operating results from the safety standpoint can be obtained by the proper use of the air brake equipment; stopping by means of reversed motors or bucking the motors is not conducive to safety.

Subject No. 7 included a review of all existing equipment standards. The following revisions were recommended:

E1-21 (formerly Eb 1c)—*Standard Design of Brakeshoes, Brakeshoe Heads and Brakeshoe Keys*—The new wheel contours adopted at the 1923 convention made it necessary to change a few dimensions for standard brakeshoes. Revised designs were submitted as Figs. 1, 2, 3, 4 and 5. Fig. 6 showed a new design for a standard brake head, shoe and key for 3-in. tread wheels, contours A3 and B3 and 3½ in. tread wheels contour A3½. Wheels 21 in. to 26 in. in diameter.

E8-23 (formerly Em 3a)—*Limit of Wear Gages for Association Standard Flange Contours*—The length of the part of the gage for standard 1-in. flange which projects down on the back of the wheels was made 1 in. longer, and the standard limit of wear gage for 1 3/16 in. flange is to be used for the 1⅛ in. flange.

E14-23 (formerly Et 7b)—*Dimensions of A.E.R.E.A. Steel Wheel Designs*—In accordance with recommendations made by the Executive Committee, the tables for dimensions of steel wheel designs were expanded to bring them into conformity with the new wheel contours adopted at the 1923 convention.

Et 3a—*Specification for Refined Wrought Iron Bars*—The recommendation of the committee was that a specification corresponding to that of the American Society for Testing Materials be adopted as a standard specification. Copy of this A.S.T.M. specification was included in the report.

E5-15 (formerly Et 9b)—*Specification for Quenched and Tempered Carbon Steel Axles, Shafts and Similar Forgings*—In order to clear up a conflict in paragraphs regarding the nominal diameter or thickness of a forging, a revised wording for several paragraphs was submitted.

E103-21 (formerly Et 14b) and E104-21 (formerly Et 15-b)—*Specifications for Case Hardened Forged Steel Gears and for Quenched and Tempered Forged Carbon Steel Gears*—Considerable information in regard to desirable tolerances for the bore of gears was assembled, but the committee considered it had insufficient time to obtain the information necessary in order to make specific recommendations. The recommendation of the committee was that this be studied further by the ensuing Equipment Committee.

E10-19 (formerly Et 18a)—*Wheel Mounting and Check Gages*—A special study was made of this standard with a view of making changes which would define gage limits for the back of wheels as well as for the throats. A new wheel mounting gage was developed for consideration and is included in the report. The recommendation of the committee was that this subject be given further consideration by the ensuing equipment committee.

E12-20 (formerly Et 21a)—*Gages for Journal Bearings and Wedges*—A new journal bearing and wedge gage was made up for the 3-in. x 6-in. journal and was included in the report. A further recommendation was made by the committee that it is desirable to have a one-piece gage for the different sized bearings and wedges instead of several gages as at present.

Subject No. 8 included a study of motor coach design problems. Representatives of the equipment committee met with the Society of Automotive Engineers committee on motor coaches and considered nomenclature and controlling dimensions. It was agreed that a suitable standard nomenclature was desirable, and it was decided to confine this to fundamental types and their principal governing characteristics for the present. It was felt that many features, such as general dimensions, location of emergency door, separate compartment for driver, etc., should properly be left to the contracting parties until general practice becomes more clearly defined. The following tentative proposal was drafted for circularizing for comments and suggestions.

Motor Coaches

City Type

1. Single-deck, having cross or longitudinal seats.
2. Double-deck, having cross or longitudinal seats.

Intercity Type

1. Sedan, having multiple side doors and full cross seats.
2. Aisle, having front and emergency doors and cross seats.
3. Chair, having front and emergency doors and movable individual chairs.

CONTROLLING DIMENSIONS

It was felt that probably the formulating of dimensional standards will eventually be divided between the railway and automotive industries, depending upon which group is most directly interested, but that the beginning of the work should be confined to the list given below by making surveys of the following subjects:

1. *Size of Doorway*—Survey to be made to determine door width, number of panels, and whether folding in or out.
2. *Over-all Width of Body*—The maximum varies from 86 in. to 96 in. and is a matter of legislation in several states. There is a tendency, however, toward universal adoption of 90 in.
3. *Minimum Height of Body, Floor to Roof*—This should be left to judgment of customer, as it is dependent on their requirements.
4. *Overhang*—Not considered important enough to standardize.
5. *Width of Tread*—Survey to be made for treads from center to center of tires.
6. *Dimensions from Center to Center of Springs*—Not important in the program of the committee, as it does not affect interchanging bodies.
7. *Location and Size of Emergency Door*—Largely a matter of state legislation, but survey should be made toward guiding such legislation.
8. *Dimension, Dash to Center of Rear Axle*—One of the most important dimensions to establish and survey should be made to establish a standard.

It was decided that these surveys should be conducted by a committee of the S.A.E., on the basis of coach capacities as follows: (1) Seating 18 passengers, (2) Seating 21 passengers, (3) Seating 25 passengers, (4) Seating 29 passengers, (5) Seating 64 passengers for double-deck types.

As it was felt that not much more could be accomplished until the proposed surveys are completed, the committee recommended that a future committee be appointed to meet jointly with a committee from the Society of Automotive Engineers to develop standards and to co-ordinate the work between the two associations.

The report was signed by: Walter S. Adams, R. S. Bull, W. W. Brown, A. T. Clark, L. H. Fry, J. L. Gould, J. M. Hipple, J. H. Lucas, J. F. Miller, J. C. McCune, A. D. McWhorter, M. O'Brien, E. D. Priest, E. S. Sawtelle, R. B. Smythe, W. G. Stuck, C. W. Squier, J. M. Yount, Daniel Durie, sponsor, P. V. C. See, vice-chairman, F. H. Miller, chairman.

Following the presentation of the report there was some discussion in regard to further consideration of gages for wheels, particularly as the way committee is interested in this subject. The convention approved the action taken by the standards committee with the exception of E8-23, limit of wear gages for association standard flange contours. This, together with Et 13a, proof testing of forgings to determine their soundness after quenching and tempering, and E10-19, wheel mounting and check gages, were referred back to the ensuing committee for the purpose of further study and recommendation.

The report of the committee on wood preservation was presented by A. P. Way, chairman.

Wood Preservation

Five subjects were studied during the year by this committee and are treated in its report. The work followed the same general lines as that done by the special committee of the previous year.

Open-Tank Treatment of Wood Poles—The committee endeavored to obtain a detailed description of open-tank installations in use by operating companies, but the response was very disappointing. Brief description of two installations are included in the report. It is hoped that operating companies will respond more readily next year. It is realized that a joint treating plant for many properties covering a large area would involve too large handling charges, but it is felt that there are many localities where medium-sized properties covering a small area could use a small tank and local wood to advantage, either for their own use or in combination with neighboring companies. It is recommended that the subject be reassigned to next year's committee so that more small plants can be studied and a few general plans prepared from which operating companies may make a selection to meet local conditions. It is recommended further that a study be made of hot and cold treatment by quick temperature changes, as compared with slow change by natural cooling of oil in the tank. The committee is of the opinion that a new grade of heavy creosote oil suitable for open tank and brush treatment should be adopted as a recommended specification.

Brush Treatment of Wood Poles—Last year the association approved specifications for brush treatment of poles, included in which was a specification for treating poles in place, where decay had started at the ground line. This year the committee directed its efforts to making a further study of this phase by collecting information from pole-using companies. It was found that the practice is well under way, particularly among telephone and telegraph companies, with very promising results. It is felt that electric railways are not getting the full value from their investment in timber, and are not doing their share in conserving the timber supply. The report includes replies received from six companies that have had good results with brush treatment of poles, and the committee urges that these be carefully read. From results to date it is evident that the increased life attained by this means will more than compensate for the expense.

Pressure Treatment of Poles—In 1923 this committee submitted a number of specifications for pressure treatment of pine poles for purposes of information only. This year these specifications have been carefully studied along with specifications of other societies, especially those adopted by the American Wood Preservers' Association. From these the committee compiled specifications for treatment of pine poles. Although in some cases it was desired to make further changes, it was felt that the association, in a general way, should follow the practice of the large commercial plants where production is based upon requirements of larger interests, since to insist upon materially different specifications would result in a more expensive treatment. It is therefore recommended that this be adopted as a specification; that air-seasoned poles be used where possible; that the empty cell treatment be used where the public may come in contact with the poles and full cell treatment used elsewhere; that trained inspectors make inspection during treatment; and that the subject be reassigned to the ensuing committee for further study.

Perforation Process—Last year's report contained description of a number of perforating equipments in operation at large commercial plants, but the methods of perforating had not become sufficiently standardized to justify definite recommendations. There seem to be no material changes in methods of perforation other than minor modifications to make a more uniform pattern, and the selection of long and thin perforating teeth that will spread the wood fiber rather than tear it. It is recommended that this subject be discontinued as a separate subject, but included with open-tank treatments.

Review of Existing Standards—A few minor changes were recommended by the committee. These include raw material for creosote oils, and some modifications of apparatus and thermometers for making tests.

As an appendix to the report a discussion is presented concerning the treatment of blighted chestnut. A second appendix deals with the electrical conductivity of treated wood.

The report was signed by M. J. Curtin, J. L. Fritsch, W. H. Fulweiler, E. F. Hartman, W. H. Harwood, E. L. Morier, R. P. Woods, R. V. Achatz, M. B. Rosevear, sponsor; C. A. Smith and A. P. Way, chairman.

The recommendations of the standards committee regarding this report were approved.

The report of the building and structures committee was presented by N. E. Drexler, chairman.

Buildings and Structures

The work of the committee during the year was divided among three general subjects, including the review of existing standards. It was recommended that one of the other subjects be continued by the ensuing committee and that one be discontinued.

Terminals for City and Interurban Service (Passenger).—The work of the previous committee was continued and a number of representative layouts are presented in the report. It is thought that these may serve as a guide to member companies contemplating the erection of passenger terminals. The committee recommends that the manual section covernig urban and interurban passenger terminals be superseded by the corresponding portion of this year's report and that next year's committee study terminals suitable for motor buses.

Freight Terminals.—In continuing the subject this year, plans of a large number of freight terminals, including those obtained last year, were studied. The committee's investigations led to the conclusion that, as the type of building construction and material entering into the same have been pretty well standardized, information which will assist in determining the size and location of the building, ground space required and general track layout would be of greater value to the industry. As a result, plans of a typical layout have been prepared and are submitted. This typical layout is flexible and can be reduced or enlarged to meet requirements. It is recommended that the plans of the typical layout together with the fundamental data on design be adopted as miscellaneous methods and practices.

Combination Terminals.—The study of this subject was continued from last year. Plans of a number of layouts were studied and those shown illustrate modern types of combination terminals which may serve as useful information to member companies. The committee recommends that further study of this subject be discontinued.

Storage and Maintenance of Buses.—This subject has not been studied by any previous committee. Data for the report was obtained from questionnaires and from plans submitted by member companies who operate buses. Plans and description of the Connecticut Company's Grand Avenue garage at New Haven are shown in the report. As this subject is of growing importance to electric railways and is in a period of rapid development the committee feels that a further study of the subject is highly essential and recommends that it be continued by next year's committee.

Review of Existing Standards.—The committee has gone over the various sections of the Engineering Manual relating to buildings and structures. New rules relating to car and car-house wiring are recommended. Changes are suggested in the drawings for small bridges, culverts and trestles.

The report was signed by B. R. Brown, E. D. Eckroad, J. D. Kent, H. R. Stamm, S. J. Steiner, T. H. Stoffel, Judson Zimmer, C. H. Clark, sponsor; N. E. Drexler, chairman, and J. R. McKay, vice-chaiman.

In the discussion regarding the fundamentals that should be inserted in the Manual under subject 1 of the report, it was brought out that material beginning with the location of freight terminals and approximating two pages in length was intended for use. The recommendations of the standards committee regarding this subject were approved.

The report of the committee on car and carhouse wiring was presented by H. H. Adams, chairman.

Car and Carhouse Wiring

As a result of conferences with the National Fire Protection Association, the Western Electrical Inspectors Committee and the Western Association of Electrical Inspection, the committee on car and carhouse wiring formulated some regulations for the wiring and equipment of electric cars and carhouses. These were submitted with the recommendation that the regulations be adopted as tentative for the coming year and that the committee be continued in order to co-operate with the National Fire Protection Association in the preparation of final rules and regulations covering the subject.

In addition to information covering the sizes, current-carrying capacities, etc., of wiring, the tentative regulations included the wiring for operating motors, controllers and resistances; light wiring, electric heaters, signal wiring and storage batteries. The regulations for wiring of carhouses and auxiliary buildings operated by electric traction companies included provision for overhead conductors, third rails and wiring other than that for cars.

The report was signed by A. T. Clark, C. G. Keen, J. Lindall, P. V. C. See and H. H. Adams, chairman.

In abstracting the report of the committee Mr. Adams stated that it was practically the same as that which will be presented to the National Fire Protection Association for its consideration, and that discussion of any points which needed changing would be transmitted to this committee for its consideration in making changes before definite recommendations could be made.

R. S. Beers, General Electric Company, presented a written criticism of a number of paragraphs which his company considered should be modified. These related particularly to the installation of control equipment and which the engineers of his company thought would help to clear up certain portions of the report that now appear misleading.

G. M. Woods, Westinghouse Electric & Manufacturing Company, called attention to some additional points which the engineers of his company thought should receive further consideration before definite rules were established. These related particularly to equipments employing voltages higher than 600.

N. W. Storer, Westinghouse Electric & Manufacturing Company, said that he thought that definite information should be obtained to substantiate each ruling and that very careful consideration should be given to make certain that no definite rules were adopted which might hinder the advance of equipment design. He said that he concurred with the committee's recommendation as to the desirability of establishing some definite rules and giving consideration particularly to conditions which might prove dangerous and result in accidents or fire.

At the conclusion of the discussion the association approved a recommendation that the regulations as presented by the committee be adopted as tentative, with the understanding that the various paragraphs would be elaborated in line with points brought out in the discussion so as to clarify certain sections and that this subject would be given further consideration during the coming year through co-operation of this committee with one from the National Fire Protection Association.

Thursday's Session, Engineering Association

AT THE Thursday afternoon session the report of the committee on power generation and conversion was presented by L. D. Bale, chairman, except subjects 2 and 3, which were abstracted respectively by C. A. Butcher, Westinghouse Electric & Manufacturing Company and F. W. Peters, General Electric Company.

Power Generation and Conversion

The executive committee of the association assigned four subjects for consideration:

1—*Continue the study of a uniform scheme of recording failures of power apparatus and interruptions to service originating within the generating station and substation.*—The assignment limited the scope of the report to failures originating within the plants. After careful consideration of the subject, the committee became convinced that such a study should include all troubles on the system resulting in discontinuance of power supply. In view of this, the committee did not feel in a position, at present, to submit a report on the subject.

It was recommended that the subject be continued through joint action of the power generation and conversion committee and the power transmission and distribution committee, or by a special committee, composed of representatives of the above two committees.

2—*Continue the study of existing practices in design and operation of automatic substations, including the subject, "Remote supervisory control."*—This assignment was divided into four classifications covering the most pertinent questions involved. These classifications are as follows: (a) Application of shunt-wound and compound-wound synchronous converters for various classifications of service; (b) definition and discussion of automatic and semi-automatic substation; (c) automatic railway substation d.c. feeder control; (d) supervisory and remote control systems.

Synchronous converters are used on railway systems primarily to furnish power for the movement of trains. Where traffic conditions are such as to require sustained d.c. bus voltage, the compound-wound machine is desirable for the most satisfactory and economical operation. Where sustained voltage is not essential, the shunt-wound converter possesses certain operating advantages which may well be considered.

In general for railway service there are probably more compound-wound machines used than shunt-wound machines, and for the majority of the installations a compound-wound machine is more suitable.

For the average interurban service, a compound-wound machine is generally considered more desirable. It tends to maintain constant d.c. voltage with varying loads and hence requires the installation of less feeder copper.

For many years past manually operated railway substations have followed more or less conventional arrangements with respect to the nature and grouping of devices in the stations. Switches, instruments and relays are relatively simple with practically all operations of devices dependent upon the activity and ability of the station attendant.

The application of automatic equipment to railway substations has reversed the situation peculiar to manually operated stations, wherein the apparatus loses its former extreme simplicity and the station attendant is eliminated with the resultant advantages of reduced operating costs and more efficient operation, including a more accurate and timely functioning of the station than is possible in the manually operated equipment.

The application of shunt-wound converters to automatic substations simplifies the equipment somewhat, as compared to that required for controlling compound-wound machines, since less resistance is required for load limiting by virtue of the drooping voltage characteristic. Equalizer connections are eliminated with shunt-wound machines in either automatic or manual stations where machines are operated in parallel.

In many manual stations throughout the country, it is the function of the attendant to perform duties other than that incident to the operation of the electrical apparatus. For instance, the duties of ticket or baggage agent may preclude dispensing entirely with the attendant in the event of automatic operation, in which case it has been found desirable to incorporate in the manual station a portion of the standard automatic features with the view of protecting against any damage to the equipment during the absence of the attendant. It is the intention usually to have the attendant simply start the station in the morning and then continue his other duties while the station continues operating unless shut down because of unusual disturbances. Alarm bells are provided to call the operator in case of shut-down and after investigation he may again start the equipment.

The principal difference between an automatic and a semi-automatic station lies in the fact that the former starts and stops itself dependent on load demand and is at all times capable of starting without the aid of an operator if proper conditions exist, while the latter must be started manually. The semi-automatic station will protect itself from abnormal conditions during operation but if it becomes necessary to shut down for self protection, it must be restarted manually.

Because a semi-automatic station depends on manual attendance for the starting operations only, it is customary and desirable to provide all protective devices used in the fully automatic station except those directly identified with the starting operations. In other words, a semi-automatic station is similar to a fully automatic station in so far as operating features are concerned excepting for the elimination of those automatic devices having to do with starting the machine. The direct current side is complete in itself with the usual load limiting features so the station may be expected to function continuously as long as irregularities necessitating shutting down the machine do not occur.

Savings accruing from the elimination of light load losses are not realized in semi-automatic stations because of normally continuous operation.

Failure of an attendant to respond to an alarm indicating a station shutdown by a semi-automatic equipment may result in traffic delays of no small consequence. Also unusual power demands may arise which make it desirable to start up the stations. Should this occur when the operating schedule otherwise calls for the station to be idle and the attendant off duty, difficulty may be experienced in meeting the emergency. In some cases, additional compensation must be given to the part-time attendant because of longer working hours, which will more than offset the additional yearly charges for full automatic equipment.

FEEDER CIRCUIT CONTROL IN AUTOMATIC SUBSTATIONS

Where converters are subjected to infrequent but heavy swinging loads, such as may be due to the acceleration of heavy trains, resistors in series with the feeders, together with resistors in the machine circuit, will limit the current to be commutated, and thereby enable small converters to handle service which otherwise would require larger machines. The only argument for a resistor in the feeder is that it will, under some conditions, be sufficient to hold the load below the value at which the resistors would be cut in between the machine and the feeder bus and thereby prevent penalizing other feeders supplied from the same bus with the consequently lower voltage.

With but a few feeders, as are usually found in interurban substations, it is not difficult to arrange the resistance values and the thermal capacity of the feeder resistors so that satisfactory operation will result. The question becomes one of economics; how much capital shall be invested in a lot of highly inactive cast iron, together with the switching required for it. If, for example, a 500-kw. machine can, by the use of resistance, be made to handle the work of a much larger machine, considerable investment is, no doubt, justified. If not, it is of doubtful value.

In small stations, supplying light interurban passenger service, an automatic service restoring contactor is inexpensive and highly satisfactory. With such equipment no current limiting resistors are used in the feeder circuits. The contactor opens on overload and recloses automatically by the functioning of a relay in a testing bridge circuit set up to function when the resistance of the external circuit has increased to a value above a predetermined minimum. To permit the trolley to be sectionalized at the substation, similar equipment is supplied for each feeder circuit.

FEEDER EQUIPMENT FOR METROPOLITAN SUBSTATIONS

In large metropolitan stations, from which radiate a relatively large number of feeders, the aggregate load in actual service will often reach values such as to bring the current limiting resistors into the machine circuit when the load on any one feeder is not sufficiently heavy to cut in a feeder resistor. Should a given station be overloaded due to an outage on one or more adjacent stations, it may be shut down by overheated machine resistors without a single feeder resistor having been cut into the circuit. Such a condition can be prevented only by installing machine resistors with thermal capacity sufficient for continuous operation. The number of resistors to do this is, indeed, a large item of expense.

It is not desirable to delay the movement, as is done when voltage is reduced. Such, however, is done when current limiting resistors are inserted in the circuit. Congestion on one feeder is usually the result of blockade involving several different lines, so that simultaneously with the overloading of one feeder, other feeders from the station are at less than normal load. The station then is probably pulling the same total or even less than normal load. For the short time only that is usually required, the feeder circuit will safely carry the current necessary to clear the traffic.

The short circuit, selective, automatic-reclosing type of direct-current feeder differentiates between true overload and short-circuit. A legitimate overload, regardless of value, will not open the circuit unless the cable reaches an excessive temperature. A thermal relay then operates to open the feeder and locks it out of service. It must be understood that the current-limiting features in the machine circuit are retained even when this type of feeder is used. The energy developed in or shunted by an impedance circuit due to the sudden change of current which characterises a short circuit is used to operate the circuit interrupter of the feeder equipment. The impedance circuit may consist of a series transformer, a reactor, or a resistor and a reactor connected in parallel. Normal changes of load do not cause a sufficiently rapid change of current to produce energy sufficient to operate the tripping device. The reclosing of the circuit interrupter is dependent on the action of devices in a "feeding out" circuit set up to test the resistance of the external circuit. When the short circuit has cleared or the resistance has increased sufficiently to limit the load to a predetermined value, the feeder circuit is automatically reestablished. In the case of tie feeder circuits, for example, (feeders with more than one source of supply) the feeder contactors in each station will reclose immediately upon the energizing of the feeder, provided, of course, that the short circuit has cleared.

Among the outstanding developments in the art of electrical engineering of the present day are the large, widespread, power systems and apparatus for automatically operating power stations and substations. Both of these developments have reached a high state of reliability. Nevertheless, the need has arisen for some method of knowing what happens in these distant or unattended places. In addition, sometimes, it has become necessary to control some of the operations from a distant point. There are, therefore, these two main needs: (1) Indication of what is taking place at a distant point; (2) control of operations at a distant.

For the sake of simplicity, these will be referred to as "Indication" and "Control."

The requirements for a practical system are as follows: (1) Reliability; (2) simplicity; (3) few control wires; (4) moderate cost; (5) ease of maintenance.

Several different kinds of equipment have been developed to achieve the results outlined. With the idea of using apparatus already developed commercially and keeping the currents within such bounds that existing telephone circuits could be used, the general plan in all of the systems has been to use equipment that has been standardized for use in telephone and telegraph service. Standard auxiliary switches on oil-circuit breakers, and standard coils and relays for opening and closing oil circuit breakers are also necessarily a part of the equipment.

In view of the rapid advance being made in the application of automatic substations, together with remote control systems, the committee is of the opinion that these several subjects should be continued. It is, therefore, recommended that the subject in its various phases be reassigned for study during the coming year.

3—*Ventilation and Noiseless Operation of Automatic Substations* — For convenience, the report on this subject is in two parts, the first dealing with ventilation and the second with the reduction of noise. Obviously, the two subjects are quite closely related.

Ventilation systems may be divided into two main types:

1. Natural ventilation; in which system the heat is dissipated into the surrounding atmosphere purely by virtue of the temperature difference and the natural air currents which may be generated due to the heat transferred. In this case no specific supply of cooling air is directed toward the heated region by any mechanical means; and

2. Forced ventilation, in which system the proper quantities of cooling air are supplied to the heated regions by mechanical means, in which case there may be two further subdivisions: (a) Directive cooling, where the cooling air is directed to the spot where ventilation is required as well as being supplied by mechanical means, and (b) general forced ventilation, where the supply although effected by mechanical means, is general and not directive, such as in general room ventilation by means of exhaust blowers, etc.

A combination of these systems is ordinarily used in the design of practically all standard rotary apparatus, the rotating element being either provided with ventilating fans, or generating air currents by its own rotation.

Obviously, with directive cooling, smaller quantities of air can be used in the dissipation of the losses than in either the case of natural ventilation or forced ventilation without directive cooling, for in the latter cases the ventilating air frequently short circuits the spot to be cooled, allowing the creation of a hot pocket and correspondingly higher temperature rise.

The report contained a detailed discussion of the thermal properties of air, developing figures for the quantity of air required for various converter ratings as given in Table I.

TABLE I

APPROXIMATE QUANTITIES OF AIR REQUIRED FOR GENERAL STATION VENTILATION WHERE MACHINES ARE NOT INCLOSED AND DO NOT HAVE DIRECTIVE COOLING

(Figures correspond roughly to 150 cu.ft. per minute per kilowatt loss)

	Cubic Feet of Air per Minute			
	Rotary Converter Stations		Motor Generator Stations	
Kw. Rating of Unit	With Transformers	Exclusive of Transformers	With Transformers	Exclusive of Transformers
200	4,000	3,000	5,800	4,800
300	5,700	4,200	8,500	7,000
500	8,000	5,500	13,000	11,500
750	12,000	8,500	18,500	15,000
1,000	15,000	11,000	23,500	19,500
1,500	21,000	14,500	32,500	26,000
2,000	28,000	19,000	43,500	44,500
3,000	42,500	29,000	65.000	51,500

It should be distinctly understood that considerations as to load factor, location of air intake and outlet, etc., are of extreme importance, and may necessitate provision for greater quantities of cooling air than those shown, which are based upon nominal rating of the machines and favorable location of air intakes and outlets. With natural ventilation the intake louvers and outlets should be so placed as to take advantage of the prevailing winds in order to insure circulation. The same considerations apply in the use of low-head propeller-type exhausters, as the force of the wind in such cases may be sufficient to reduce the speed or even stop such a fan thereby limiting circulation of the ventilating air.

A number of types of ventilators commonly employed were described and illustrated in the report.

In many stations, natural ventilation can be employed to advantage and economy can thereby be effected in that, in such cases, there is no handling charge for the ventilating air. In such cases, louvers are usually placed in the side walls of the building, such as at St. Louis in the United Railways substations, or if a basement is used such as at Cleveland, they are then usually set below the floor line as gratings or grilles. Roof ventilators are likewise installed to provide for proper ventilation, the driving force for the circulating air being obtained by the tendency of the heated air in the station to rise. Natural station ventilation is always further influenced by the wind velocity.

In the case of automatic railway substations, and especially where noiseproof construction is employed, the results obtained from ordinary roof-type ventilators are somewhat problematical in that the velocities which can be accommodated by the devices are necessarily low due to being generated merely by the stack action of the building, and the wind. The fan action of the rotating open apparatus of standard design is in general indeterminate and cannot usually be credited with any definite value unless suitable duct work or housing are employed. Where attendants are present and windows and doors may be opened to increase the flow of air this indefiniteness has not worked serious hardship, exhaust fans being installed to increase the circulation in cases where the stations have run hot. With the unattended station, however, where windows are sealed (if present at all) and especially in such stations where noiseproof insulation (which is usually also effective heat insulation) is employed in the building construction, absolutely definite removal of the heat must be insured at all times, hence forced ventilation is usually required, either entirely or as a standby for natural ventilation.

With open-type machines in substations, the problem is apparently one of directing the hot air discharged from the rotors of the machines in such a way as to minimize recirculation and vitiation of the air entering the machines. In general, there is a discharge pressure belt or hot blast from synchronous converters and other rotating machines extending around the machine and even into any pit that may be constructed under the apparatus, with an intake cone or a region of suction along the shaft or at the ends of the machines. This hot blast may in cases have sufficient for to seriously impede if not altogether stop the admission of cool air to a machine by way of the pit, where natural ventilation is relied upon. In cases where the fresh air has access to the ends of the machines from other sources, this blast may have sufficient force to then discharge heated air from such a pit through grills which may have been provided for an inlet.

FORCED VENTILATION

As an alternative forced ventilation is frequently employed and must of necessity be used in connection with noiseproof stations where baffling of the cooling air to effectively absorb the noise is necessary, resulting in greater resistances than can be overcome with natural ventilation.

Where housed-in machines are employed the improvement in efficiency by virtue of the use of a separate fan designed for the particular conditions of service, and the reduction in quantity of ventilating air handled may in certain cases effect enough saving in power to compensate, at least partially, for the extra pressures required, and when taken in conjunction with noiseproofing and definiteness of air supply, may present many advantages. The use of enclosed alternating current machines has long been made but the development of enclosure systems for commutating machines has been deferred as the necessity, while in special cases urgent, has not been general. Complete and semi-inclosure has, however, been provided in special cases, though principally for Edison service the difficulties in converters and direct-current machinery being inaccessibility, and difficulty of inspection and maintenance of the current-collecting elements such as the brush rigging, etc.

With the motor generator sets, the tendencies have apparently been more toward inclosure of the alternating-current motor, with semi-inclosure of the generators. In such cases the heated air from the generators is discharged directly into the room, whereas that from the motor may either be piped directly out of the station or may be discharged into the station with the air from the generator. In either case the recirculation of air by the machines is considerably reduced and effective ventilation obtained.

Forced ventilation as applied to open-type machines usually consists of general station ventilation, the fresh air ordinarily being introduced into the pit under the rotating machines and being forced or drawn up against any blast action of the rotating element. In such cases additional exhaust fans may be installed to effect final removal. With ventilating systems of this type directive cooling is not employed in so far as the elimination of recirculation is concerned, hence the quantities of air handled, though somewhat less than with natural ventilation, cannot be reduced to the allowances tolerable with directive cooling. For such general ventilation, consideration must be given to the ambient as well as to the temperature of the fresh air, but in general the allowances should not be reduced appreciably below 125 to 150 cu.ft. of air per minute per kilowatt loss.

For such conditions it is also necessary to have the air introduced either below the machine or in some similar way equally effective in directing it to the apparatus, as merely a general inlet into the room and outlet from the other side has been found to be entirely inadequate, tests indicating that in some cases approximately 60 per cent of the air so introduced was ineffective in producing any appreciable cooling.

VELOCITIES IN VENTILATING DUCTS

In the distribution of air through ducts with forced ventilation, economy in space, equipment and operating costs are the principal criteria when noiseless operation is not essential and does not introduce other limitations. Velocities at the entrance and discharge louvers are generally not to exceed from 1,200 to 1,500 ft. per minute, whereas with interior work they may run up to 2,500 or more. The pressure drop in an ordinary metal duct is approximately equal to one velocity head for each 40 diameters of straight length of pipe, with a right angle causing likewise a loss of a complete velocity head. With concrete ducts the pressure loss per unit length is roughly twice that given for ordinary metal ducts. Various friction constants on air flow can be found in the N.E.L.A. report on ventilation of central station buildings and equipment published in 1923.

Where ducts are used to convey air, natural ventilation being employed, low velocities must be used, determined from the possible draft which may be generated due to the difference in temperature between the station interior and the outside atmosphere. As this capacity is limited velocities of 100 to 400 ft. per minute are usually all that can be generated, and hence the areas of such ducts must be proportionately increased. The computed velocities through louvers should also not exceed these figures when natural ventilation is employed.

TRANSFORMERS

In the small automatic substations where the concentration of power apparatus can be effectively accommodated by natural ventilation, the transformers may be housed in the same building compartment with the rotating equipment with some saving in building construction. With the tendencies toward outdoor switching stations, however, separate provision is frequently made for them. Likewise in larger capacity stations where bus structures and noise-proofing must be given consideration, the ventilation of the transformers can be taken care of to advantage in separate compartments, which further reduces the hazard from fire, and frequently enables natural ventilation to be employed for them, resulting in less volumes to be handled by the forced draft equipment. This arrangement likewise reduces the necessary insulation for sound elimination for such stations where it is desirable to reduce noise, in that the transformer hum can ordinarily be sufficiently silenced by standard building construction to eliminate any nuisance from this source, even in substations specifically designed for noiseless operation.

Sufficient data accurately determined are not available at the present time to make definite recommendations as to the particular limits of applicability of the various ventilating systems. For the smaller stations, and in outlying districts, natural ventilators can well be employed, whereas in the city substations where large powers are concentrated in small spaces, the tendencies are toward forced ventilation or natural ventilation supplemented by blowers which are brought into operation as required. With stations designed for noiseless operation forced ventilation at the present time appears to be essential.

NOISE AND ITS PREVENTION

The most favorable location of automatic railway substations is quite frequently handicapped by the objections advanced by property holders in the immediate neighborhood, especially as regards noise, but also at times at the lack of architectural harmony with the surroundings. It has accordingly been necessary in certain cases to insure practically noiseless operation and freedom from nuisance in order to be able to install the substation in the desired localities.

The nuisance from noise may usually be traced to the individual articles of equipment in a substation; namely, the rotating electrical apparatus, the transformers, the fans, duct work, etc., the chief elements usually being the rotating apparatus. The ultimate source is in practically all cases a vibration which usually, however, is quite complicated and which is transmitted either directly to the atmosphere and hence recognized as noise, or may be transmitted to various elements of the apparatus, foundations and structures, and from these to the atmosphere, thereby causing noise.

It should be understood that the energy of sound waves is usually very small, the amplitude of the vibrations being estimated by various authorities at from 0.00000005 in. for sounds barely audible to 0.005 in. for loud noises, hence the smallest vibrations may be productive of sound and nuisance. In the case of rotating machines these noises and vibrations are usually due to one or more of the following causes:

1. Vibrations and noise mechanically produced by (a) unbalance of rotating element; (b) friction and sliding or rubbing surfaces such as brushes on commutators, slip rings, etc.

2. Air vibrations—produced by windage and ventilation from (a) air roar due to high velocities over surfaces around corners, etc.; (b) siren action due to ventilating slots in rotors and stators.

3. Vibrations produced magnetically and electrically by (a) pulsations due to main flux or field cutting, alternately rotor teeth and slots; (b) unbalanced phases or single-phase operation causing variations in magnetic pull and hence vibration; (c) load current in irregular windings, usually of synchronous machines, causing magnetic pulsations and hence vibrations which vary depending upon the load.

Some of these causes are directly under the control of the designing engineer, whereas others, such as covered by group 1, are primarily a function of shop workmanship and the use of materials, such as brushes, determined from other operating characteristics and are hence practically always present to a degree. On the other hand, the economies of standardized punchings, fractional pitch windings, and interchangeable laminations lead frequently to various combinations of slot ratios and irregular windings, which produce smaller and cheaper machines, but introduce certain magnetic or air pulsations.

In the case of transformers, the vibrations and resulting hum are usually due to the vibratory movement of the laminations induced by the pulsating magnetic fluxes, and depend upon the densities employed and the tightness of the bolting. These noises, however, are usually not productive of great nuisance.

In general, the remedies applicable for these conditions may be divided into three classifications: (1) Removal or reduction of the fundamental vibrations, thereby eliminating the cause of noise at the source; (2) absorption of the energy of vibration or of the noise before it is transmitted to the structures, buildings, and general atmosphere, causing nuisance; (3) directing such noise as may be produced in such a direction as to minimize the nuisance.

In general, each of the foregoing methods is applicable to specific cases, it being the obligation of the manufacturer to reduce the fundamental causes of noise and vibration to the least possible values consistent with operating and commercial necessities and manufacturing facilities. However, in the present state of the art these elements are still present to such a degree that where noiseless operation is essential separate provision must be made in the form of inclosed systems with noise-reducing baffles or some other such means in order to insure freedom from nuisance. Accordingly various means of sound reduction as applied to building construction have been tried, some of which have been productive of very favorable results. Methods of noise reduction developed at the University of Illinois, were given in considerable detail.

In the case of vibrating or noisy machines, several schemes have been tried to prevent the transmission of vibrations and noise to the floor and building structure so that they will not act as sounding boards or otherwise augment any nuisance from those sources. Various methods have been tried to isolate machinery foundations, including cork, rubber and felt pads, etc., either between the machine and foundation or between the foundation block and the supporting mat and floors. Rubber may be adversely affected by oil and there is some doubt as to the utility of felt after extended service due to a permanent set with a tendency toward becoming hard.

In the Miller Street substation of the Public Service Electric Company at Newark, N. J., the foundation for each of the 1,500-kw. motor generator sets consists of a heavy concrete block under the machines, such block being effectively isolated by two layers 4 in. of "Anti-Vibro" and treated with a tar-pitch compound as an assurance against the penetration of moisture, which is further guarded against at the floor line by a plastic asphalt fill over a jute insertion. Although this station has been in operation only a short while and the effects of any permanent set have not been manifested, the installation at present so effectively isolates the machine that no vibration can be felt with the hand at any point of the floor surrounding the sets.

A number of methods used by the Los Angeles Railway were described. These have already been treated in ELECTRIC RAILWAY JOURNAL, issue of April 26, 1924, page 645.

The committee believes that additional information should be disseminated on noiseless operation of substations as the art develops.

It is recommended: (1) that the subject be reassigned to the ensuing commmittee for further study; (2) that if possible during the coming year some actual ventilation tests be made and the results presented by the committee; (3) that the co-operative arrangement established this year with the American Society of Heating and Ventilating Engineers be continued next year, so that the committee may have the benefit of the counsel and advice of expert ventilation engineers in its studies and tests.

REVIEW OF EXISTING STANDARDS

Manual Section G100-23 (formerly Gbla)—*Specifications for Boiler Tubes.* The committee proposes certain revisions in this specification in order that it may be in complete conformity with the A. S. T. M. specification for this class of material as revised at the 1924 convention of that Association.

It is recommended that the proposed revisions be adopted.

Manual Section G200-15 (formerly Gb2a)—*Specifications and contract for purchase of fuel.*

This specification has been reviewed.

It is recommended that it either be revised during the coming year to conform with present day conditions, or it be omitted from the Manual. It is thought, however, that the specification as it now appears should be retained for whatever value it may present until definite action is taken.

Manual Section G1-16 (formerly Gb3a)—*A. S. M. E. Boiler Code.*

In 1916 A. E. R. E. A. adopted as a standard specification the Boiler Code of the A. S. M. E. The Code was revised in 1918 by the A. S. M. E. The committee recommends that a footnote be placed on Manual Section G1-16 approving that revision.

Manual Section G200-21 (formerly Gm1a)—*Form of contract for purchase or sale of power.* The present form of contract was reviewed and no changes suggested at this time.

The report was signed by C. E. Bennet, F. C. Chambers, H. E. Davis, H. W. Codding, F. C. Hanker, G. H. Kelsay, H. A. Kidder, N. R. Love, F. W. Peters, G. W. Saathoff, T. H. Schoepf, A. E. Stierly, L. J. Turley, R. L. Weber, E. H. Schofield, sponsor, W. E. Bryan, vice-chairman and L. D. Bale, chairman.

In discussing the report Adrian Hughes, Jr., United Railways & Electric Company of Baltimore, called attention to the value of supervisory indication. C. H. Jones, Chicago Rapid Transit Company, also spoke on the value of supervisory indication and said that small wires were the first to give trouble in storms and that more reliable service would result if the number of control wires were reduced.

C. A. Butcher said that an automatic substation had been placed in service in Indiana which was using radio carrier current for its control, and so needed no control wires. Operation at this station is being watched with interest.

W. E. Bryan, United Railways of St. Louis, described the construction of his company's automatic stations and the precautions taken to reduce noise and to provide satisfactory ventilation. The forced ventilation which is used has proved very satisfactory and has warranted the additional cost involved.

L. J. Turley, Los Angeles Railway, described the construction of the ventilation system used in the substations of his company. The maximum difference in the temperature of the incoming and outgoing air is never more than 15 deg., even with extreme weather conditions. His company has gone to considerable expense to provide attractive exteriors, so as to make unobjectionable the location of substations in residence districts. Hollow tile with felt lining is used in the construction of the buildings. The doors also are felt lined and constructed on the same principle as doors used in ice boxes.

Adrian Hughes, Jr., said that his company had experimented with cork lining and had provided an air space under the floor. Air is exhausted through the roof. The maximum temperature difference between incoming and outgoing air has been 14 deg.

Pierre Bloomers, of H. H. Robertson Company spoke of the advantages of having incoming air enter through the cellar. He also called attention to the need of care in locating I-beams so as not to interfere with the proper circulation of air. He said that with proper consideration of this detail, I-beams could be located so as to assist materially in directing the air along advantageous paths.

Prof. W. Trinks of the Carnegie Institute of Technology said that the proper placing of ventilators upon the roofs of substations has an important effect upon the efficiency of ventilation. With ventilators placed in calm locations their efficiency is greatly reduced. Mr. Jones asked whether the manufacturers had considered the adaptation of a fan of rotary construction, thereby forcing circulation rather than have the rotor merely act as a churn. Replying Mr. Butcher said that a fan would prove uneconomical as it would have to overcome duct friction. Placing auxiliary fans to take care of ventilation was far more efficient and economical and he believed would prove more satisfactory.

As to elimination of noise in substation operation, Mr. Peters said that every company should be in a position to meet the condition when it arises. Quiet machines were considered by him desirable to eliminate noise. C. R. Harte stated that continuous low-pitched noise is apt to be serious as it is considerably more irritating than intermittent loud noises. He suggested that manufacturers look seriously the self-ventilated converter. That the converter determines largely the arrangement and type of ventilation employed was brought out by L. D. Bale. The use of forced or natural ventilation is determined by the location of the substation.

The report of the power transmission and distribution committee was read by C. H. Jones, electrical engineer Chicago Rapid Transit Company.

Power Transmission and Distribution

The work of the committee this year was divided up among 11 subjects, nearly all of which represent continuing investigations.

Subject No. 1—*Concrete Pole Design and Maintenance.*—Recognizing the increasing scarcity of timber suitable for poles and believing that suitable substitutes should be developed, the committee has revised the specification for the manufacture of concrete poles and it is recommended that it be substituted for the one now appearing in Manual Section D202-16.

The sub-committee has done considerable work in checking the formulas and tables pertaining to concrete poles in section D202-16, but has not been able to complete the work. It is recommended that the subject be continued next year so that the text portion as well can be put into final form to replace the present Manual section.

Subject No. 2—*Dimensions of Approach Ears or Flexible Tips* —The subcommittee finds, (1) that the bolted type of approach ear is being superseded by other special designs of fewer separate parts, capable of being more quickly attached and replaced, and (2) that it would be necessary to redesign the special castings to which it is attached in order to standardize the bolted type. It is recommended that further study of the subject be discontinued.

Subject No. 3—*Dimensions of Various Types of Trough Suspensions.*—The sub-committee has been able to arrive at standard ruling dimensions for three types of trough suspensions. This will make it possible to interchange suspensions of a given type, furnished by different manufacturers. It is recommended that the designs shown in the illustration be adopted as standard.

Subject No. 4—*Review Work of the 1923 Committee on Catenary Overhead Construction, for Other Than Steam Railroad Electrification,* and Subject No. 5—*Specifications for Catenary Suspension Materials.*—Sub-committee No. 4 has done considerable work reviewing the work of the 1923 committee and, in general, concurs in the work of that committee. Considerable study has been devoted to inclined catenary or displaced messenger construction, but there was not sufficient time to carry out certain experimental checks of results obtained by calculation for this type of construction. The committee, therefore, is not ready to report on the results of this study, but recommends that this subject be assigned to next year's committee for completion. It is also recommended that next year's committee be instructed to rearrange the report of the 1923 committee so as to put it in the form of a definite construction specification for catenary construction, using 150 ft. pole spacing. The general information on catenary construction calculation should be included as an appendix to the specification.

Sub-committee No. 5 has devoted considerable time to working up catenary material specifications, but has not been able to bring them up to the point where they are ready to be submitted to the association. It also seems desirable to prepare a definite construction specification and work up the material specifications to go along with it in order to be sure that there will be no conflict between them. The committee recommends that the cantenary material specification work be carried along and completed next year.

Subject No. 6—*Trolley Wire Wear and Composition.*—(a) Continue the study of the composition and the wear of trolley wires; (b) continue the study of trolley wire breaks from causes other than wear; (c) continue the study of various devices for trolley contacts and the effect upon trolley wire. This subject is to be studied in co-operation with the committee on equipment.

The present report represents the fourth successive year of study of the general subject of the study of trolley wire wear and composition. On some points there is very little to show in the way of definite conclusions. The reason for this is partly the difficulty of accumulating data from a sufficient number of representative sources with regularity, and in standard form for study by the committee. Furthermore, a study of this sort necessarily proceeds slowly. A definite method of procedure for the collection of this data has now been agreed upon and it is hoped that the co-operation of a large number of companies can be obtained so as to permit satisfactory and conclusive results.

It is not expected that this can be accomplished in a single year even now, for the subject is quite extensive. The point has been reached where definite recommendations can be made for this purpose and it is expected that several years will be required before sufficient data can be obtained. The requirement is for definite and positive data as to the actual wear of various kinds of wire in terms of car movements and then probably a classification of this data with regard to the operating conditions.

From data so far collected and studied definite conclusions can be drawn on certain methods known to give good results in the use of trolley wire.

A specification such as that contained in the Engineering Manual, D2-23, is absolutely necessary in the purchase of trolley wire. The specification should show the requirements for the finished product and if these requirements are met the actual composition of the wire and the methods of manufacture may be safely left to the manufacturer.

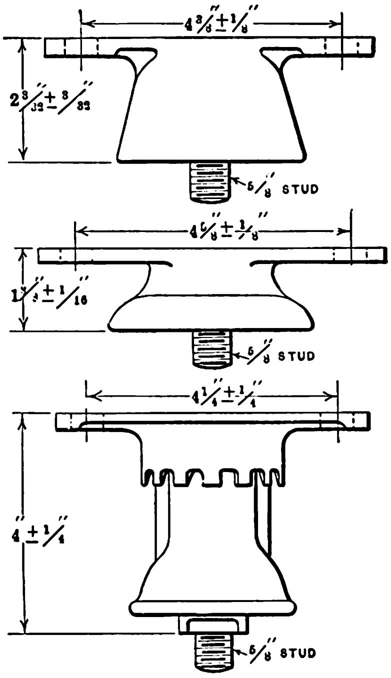
A factory inspection of each trolley wire order is advisable, or if this is impracticable, then the factory should be required to furnish certified copies of tests. It is, therefore, preferable to purchase trolley wire in as large quantities as possible, both for convenience and economy in inspecting, and also because frequently a better price can be obtained in this way.

The wire must be carefully handled during installation so as to avoid bruising, kinking or nicking. It should be pulled to a uniform, definite tension. The actual tension will depend upon the temperature at the time it is installed and the kind of wire; that is, whether it is hard drawn copper wire or alloy wire. This tension can be measured by means of a dynamometer or probably with sufficient accuracy by making pulls of definite lengths of wire with a certain number of men on a particular arrangement of rigging. It can be stated in general that the wire should be pulled tight, which means a pull of at least one-fourth the breaking strength of the wire. (See Manual, Section D101-16, par. 802.)

The supports should be as flexible as possible. Span wires should have a sag of at least 2½ ft. in 50 ft. for double-track construction. (See Manual, Section D101-16, par 702.) Where it is necessary to fasten the supports to rigid structures, as under bridges or elevated structures, some sort of a spring hanger will usually give better results than a rigid support.

The type and design of ear is important. An ear with thick lips, which entirely surrounds the wire, seems to be most desirable. It must also be carefully tapered at each end, not only on the bottom but on the sides, so as to give a smooth run on and run off.

Special mention must be made of the renewal of ears. No matter what size, shape or type of ear is used it is most important that the ear should be renewed as soon as the metal in the lips underneath the trolley wire has become worn away. Otherwise the trolley wire will rapidly wear out immediately under the boss of the ear. Frequently trolley wire has to be renewed because it is entirely gone under the ears whereas between spans it is good for several years more service. This condition can and should be prevented. It will be found cheaper to renew ears with greater frequency than is often the practice rather than to renew entire stretches of trolley wire. The renewal of ears should be put on the same basis as the renewal of trolley wire, that is, when the ears are worn out on any line, section or division, all ears should be renewed at one time. Any trolley wire should outlast four or five sets of ears. The length of life of ears on any particular line, or portion of a line where traffic conditions vary, can easily be determined from practice. In congested districts, the heavy lip type of ear which entirely surrounds the wire will last for 2 or 3 months. These ears will last for from 70,000 to 100 000 car movements.



Proposed Standard Trough Suspensions for Deep, Shallow and Insulated Bolt Hangers

Regular and careful inspection of the wire and fittings is also necessary. On several large properties, the emergency crews are made responsible for certain definite districts and they take care of both the inspection and the renewal of defective material. On another large property satisfactory results are obtained by the use of four special men as inspectors, to each of whom is assigned approximately one-fourth of the system, equivalent to a little over 100 miles of single track. The inspection is made on foot, and reports are turned in for the attention of the emergency crews who act as maintenance crews during the off-peak hours. In this way an inspection is made of every portion of the system once in 2 or 3 weeks, special attention being given to the congested districts and points of heavy wear.

The committee requests that member companies obtain and compile certain trolley wire data in a uniform manner and send copies of reports to association headquarters periodically. This data has been carefully confined to only that which can be readily obtained without great trouble or expense and which every company should have for its own information.

Many companies undoubtedly collect and record such data at present, possibly in more elaborate form than that which is here requested. It will be quite evident, however, that unless this data is reported in a uniform manner, it is difficult for the committee to make use of it. Member companies should not object to the slight changes that may be necessary to conform to the proposed methods. The suggested forms are printed in full in the committee's report.

These data include: (1) A record of trolley wire, including date of erection of wire, location, length, size and shape of wire, composition, maker's name and specifications, reel number and order number, type of ear. (2) A summary of the record of trolley breaks. (3) Periodic measurements of trolley wire in service. These measurements should be taken for any stretch of wire at a sufficient number of locations to insure obtaining an average condition. They can be taken with a micrometer, but a method which gives the actual area or weight of the wire is much better.

If a sufficient number of companies can be prevailed upon to furnish the above information it will unquestionably be possible for the committee to make some valuable recommendations regarding use of trolley wire. It will take time to accumulate sufficient data, at least 2 or 3 years, to permit drawing definite conclusions and will require the active co-operation of member companies.

It was suggested by the committee last year that a research engineer be employed to work under the direction of and report to the committee on power transmission and distribution for the purpose of making a more comprehensive and uninterrupted study of the performance and wear of trolley wire. The committee has, however, decided to postpone action on this matter for the time being, but there is no question that a very large saving could be brought about in this way.

CO-OPERATION ON CURRENT COLLECTORS

A considerable amount of thought and discussion was given to the necessity of effecting close co-operation between the committee on power transmission and distribution and the committee on equipment for the study of current collection and current collectors. There is a close relationship between trolley wire wear and the collection of current. In fact, the type and condition of the current collector is very much more important in connection with the trolley wire than it is in connection with the car itself. Ordinarily, trolley wire wear is caused primarily by the collection of current rather than by the friction between the wire and the current collector. This ratio is, from actual experience, known to be more than 10 to 1; that is, trolley wire wears away more than 10 times as fast due to the collection of current, than it does from the friction of the collector. When the collection of current wears away the trolley wire more than 10 times as fast as the mere passing of the collector over the wire, the effect of an arcing wheel can readily be appreciated.

A consideration of the relation between the annual costs for trolley wire renewals and maintenance and the annual costs for collectors will show the importance of considering the collector from the standpoint of the effect on the trolley wire. On one large property the annual cost of trolley wire maintenance and renewals is approximately $100,000 and the annual cost for trolley wheels $5,000. The fallacy of trying to increase mileage on trolley wheels at the expense of trolley wire is quite evident from these figures. A saving of 10 per cent on the trolley wire would pay the annual trolley wheel cost twice over.

At the first meeting of the committee in December, 1923, a request was made for a joint meeting between the sub-committee on trolley wire wear and the sub committee on current collectors of the committee on equipment. Two meetings were held during the year and arrangements were made to secure information. On the whole, excellent co-operation was obtained by these joint meetings. The relation between trolley wire wear and current collectors is so close and the subjects so important that it might be desirable to have a special committee consider this subject alone.

STANDARD SPECIFICATION FOR TROLLEY WIRE

In the preparation of a standard specification for trolley wire, the committee has endeavored to bring about an agreement with the A. S. T. M. so that there will be no obstacles to the acceptance of such a specification by the A. E. S. C. It is recommended that (1) The study of trolley wire wear be continued including the causes of wear and failure, using the program and methods suggested in this report; (2) a table be prepared giving the tension at which various sizes and kinds of trolley wire should be installed at certain temperatures; (3) a specification be prepared jointly with the A. S. T. M. for alloy trolley wires; (4) co-operation with the equipment committee in the study of current collectors be continued.

Subject No. 7—*Temporary Connections to Trolley Wire.*—The subject of temporary connections to trolley wire was continued from last year. Inquiries sent to a number of power distribution men indicate that last year's report has caused closer attention to be given to injury to trolley wire from inadequate connections. To determine the damage that such connections cause to trolley wire, V. S. Allen, a senior in electrical engineering at Purdue University, conducted a series of tests that will point out the damage that an inadequate connection will cause to trolley wire.

The results indicated that the hook type of contact should be satisfactory for apparatus requiring small currents up to 40 or 50 amp., provided they have a contact surface along the wire of at least 1½ in. and are made of brass, bronze or similar metal.

It will be noted that the above tests were made with a generator voltage of 115 volts and that the current values ran up to only 130 amp. In street railway practice, where 600 volts is used and where the current values run as high as 250 to 300 amp. for certain classes of equipment, we would expect that the damage to the trolley wire would be considerably greater than found in these tests.

The tests indicate that the contactor made of bronze fingers is the only one entirely satisfactory for the vlotage and current values used in this test, and corroborates the recommendation in the 1923 report of the committee on power distribution that some of the heavier types of contactors, which are shown in that report, should be used for apparatus requiring over, say, 40 or 50 amp.

It is felt that with the information as to types of contactors available, as was shown in last year's report, and the data heretofore shown on the damage than can be done to trolley wire by inadequate connections, this subject has presented sufficient data to power distribution men so that they can safeguard their lines from this source of trouble.

It is recommended that the subject be reassigned to next year's committee with instructions to prepare a section for the Manual on a recommended practice for making temporary connections to trolley wire.

Subject No. 8—*Overhead Construction for Trackless Trolleys.*—There have been no new developments during the past year on this class of overhead line. The sub-committee recommends that this subject be continued for the next year.

Subjects No. 9 and 10—*Review the Existing Sections of the Manual.*—All of the existing sections of the Manual were carefully reviewed during the year 1923 so that there was no revision necessary, except in co-operation with the manual committee during the year. It is recommended that next year's committee review existing sections of the Manual and keep it up to date.

The committee recommends that the subject of signal standards be assigned to next year's committee for study and report.

Subject No. 11—*Inductive Co-ordination.*—This committee was organized in order to keep the power transmission and distribution committee in touch with the work of the American committee on inductive co-ordination and to furnish to our representatives on that committee such data as they may require from time to time.

The American committee was organized during the year but did not begin to function actively; therefore, no work has been required of the subcommittee. It is recommended that the subject be assigned to next year's committee so that information may be furnished when called for.

The report was signed by J. Walter Allen, R. L. Allen, S. H. Anderson, S. M. Day, Leslie E. Delf. James H. Drew, Ralph W. Eaton. D. D. Ewing, Charles Gilman, H. W. Griffin, C. L. Hancock, H. D. Hawks, C. J. Hixson, Adrian Hughes, Jr., John Leisenring, H. S. Murphy, Carl P. Nachod, J. F. Neild, H. A. Pharo, W. J. Quinn, W. Schaake, A. Schlesinger, J. M. Waldron, F. J. White, G. I. Wright, M. B. Rosevear, sponsor; Frank McVittie, vice-chairman, and C. H. Jones, chairman.

DISCUSSION ON POWER DISTRIBUTION

H. H. George emphasized the appeal that the committee has made to member companies to co-operate by sending in data and information requested, so that it can furnish to the industry comprehensive recommendations of preferred practices. Mr. Rosevear called the convention's attention to the excellent work performed, which indicated that although few definite recommendations were included this year, they probably would be ready to present next year. The report was accepted as read.

W. E. Bryan, superintendent of power United Railways of St. Louis, read the report of the special committee on automatic substations. He called attention to the curves presented in the appendix, explaining their use and the difficulty in grouping and interpolation which the committee experienced in drawing them.

Economics of Automatic Substations

The committee last year submitted a report outlining two separate methods of dealing with the subject. The first method was of an analytical nature, while the second method was an elaboration of what might be termed the practical, or "cut and try," method used by previous committees.

The "cut and try" method has been adequately covered in the report of last year. The analytical method is especially applicable to the study of large areas, for the reason that once the tables and graphs have been worked out for any particular problem, a number of solutions covering districts of various load densities are immediately available. The method, which is chiefly the work of E. H. Scofield, represents quite an advance over that presented in last year's report, although the possibilities of this form of study have not, by any means, been exhausted.

The comparison and conclusions outlined may be applied to any specific problem by a simple reference to the load demand and density of distribution (or average distance of feed) provided that the foundation data, costs and operating restrictions are applicable to the particular locality.

The costs to be considered are subdivided into conversion costs, which are dependent upon the capacity and character of equipment in the station, and distribution costs, which are dependent upon and directly proportional to the average distance of feed.

Average Distance of Feed.—Since distribution feeders ordinarily follow existing streets, which in general cross at right angles, the average length of feeder to supply a rectangular area of uniform density, from a station located at the center of the area, is one-fourth the sum of the two sides of the rectangle. For a square, the average is one-half the length of a side.

In a study of a large area of non-uniform load density, it is necessary first to divide the area into smaller areas, each having a comparatively uniform load density. These areas can then be divided into smaller areas, the size of which will depend upon the capacity of the stations by which they are to be fed. The average feeding distance for areas of the same size, fed by stations located at the centers, varies to some extent with the shape of the area. It is evident, then, that the distribution cost (being dependent upon the average feeding distance) must be less for areas of certain shapes than for areas of other shapes.

Tables were included showing costs for various schemes of operation and grouping of units, as follows: (1) One-unit stations, all stations operating 24 hours per day; (2) one-unit stations, only half of the stations operating on light load; (3) two-unit stations; (4) three-unit stations. Under each plan of operation listed above costs are shown for units ranging in size from 500 kw. to 4,000 kw.

The tables list the various items necessary to the determination of annual station cost, and annual distribution cost for an average distance of feed of 1,000 ft.

To provide a ready means of making comparisons for areas of the same load density, a chart has been prepared from the data in the tables. This chart shows total conversion and distribution cost plotted against average feeding distance and also against area, since there is a definite relationship between the two latter factors. Six separate groups of curves illustrate costs for six different values of load density, and in each group are four curves corresponding to the four methods of station operation assumed.

The committee had expected to present, as part of the present report, the results of its studies on the question of loss factor. It had also expected to elaborate on what has been presented above, as to the effect of load areas of various shapes, station patterns, etc. The study of these subjects has not, however, been concluded. Furthermore, in view of the increasing use of automatic stations, new considerations of an economic nature will undoubtedly present themselves as new problems are encountered. For these reasons the committee recommends that this subject be continued for at least another year.

The report was signed by L. D. Bale, C. A. Butcher, Adrian Hughes, Jr., F. W. Peters, R. H. Rice, E. H. Scofield, sponsor; C. H. Jones, vice-chairman, and W. E. Bryan, chairman.

As a member of the committee and the one directly responsible for the continuance of the subject last year, Ralph H. Rice, board of supervising engineers Chicago traction, opened the discussion. He explained that the committee was endeavoring to obtain a general analytical solution or equation by which it would be possible to determine the economical size, number of units, and location of substations. He stated that the various fixed and operating charges had been incorporated into an equation in such a manner that would lend itself readily to different problems.

J. F. Neild, electrical superintendent Toronto Transportation Commission, expressed his interest in the yardstick idea formulated by the committee. By this means a cost figure could be obtained so that the exact amount of money needed for a project could be appropriated. The report was accepted.

The report of the committee on purchases and stores was presented by Jackson P. Dick, assistant to vice-president Georgia Railway & Power Company. As this report is included in the account of the purchases and stores meeting held on Tuesday, October 7, it will not be repeated here.

Action by the standards committee on certain recommendations is included in the abstracted report of that committee. Mr. Dick explained the advantages of the independent meetings and urged that the engineering association would continue to allow this.

Charles R. Harte construction engineer the Connecticut Company, read the report of the committee on resolutions, an abstract of which follows:

Resolutions

The committee on resolutions expressed the thanks of the association to President Johnson, Secretary Welsh, Special Engineer Hecker and to the standing and special committees for the service which has made possible the excellence of this year's meeting. The work of the manufacturers was commended for providing exhibits illustrative of engineering developments in the electric railway field and in the bus transportation field that far exceed in number and quality anything ever before attempted.

The thanks of the association were expressed to the committee on foreign operations and especially to President Johnson for the excellent work accomplished. While the findings of that committee's report indicate that in material progress the electric railway industry in America is, generally speaking, superior to that in European countries, this should not prevent us from appreciating the practices in which those countries excel.

The displays of the association illustrating the applications of its standards to current practice were commended, as were the efforts of the headquarters staff, and the member companies and manufacturers which furnished material for display.

The untiring efforts of Mr. Hecker and others at headquarters during the absence of Secretary Welsh as a member of the committee on foreign operation were commended.

The appreciation of the work of the committee on Engineering Manual in revising the Manual was expressed, and it was stated that much credit was due Mr. Hecker for his part in preparing the material.

While the work of the committee on welded rail joints has not proceeded as rapidly as had been anticipated, appreciation of the assistance of members in furthering the progress of this work was expressed.

A resolution of regret was expressed for the death of Past-President E. W. Olds, one of the organizers of the Engineering Association, who died during the year, and the secretary was instructed to send a copy of the resolution to his family.

The report was signed by Morris Buck, Daniel Durie and Charles Rufus Harte, chairman.

Nominations were read by H. H. George. The following officers were then elected unanimously:

President, C. H. Clark; first vice-president, R. C. Cram; second vice-president, C. R. Harte; third vice-president, Daniel Durie; secretary-treasurer, J. W. Welsh. Executive Committee: The above officers and R. H. Dalgleish, E. H. Scofield, M. B. Rosevear and F. H. Miller.

After all of the officers had been conducted to the platform, past-president H. H. Adams, spoke of the good work of president-elect C. H. Clark. Retiring President H. A. Johnson expressed his appreciation of the co-operation manifested by the association during the past year and urged the members to continue the good work under the leadership of Mr. Clark. Replying, Mr. Clark said:

"Our retiring president, Mr. Johnson, has certainly set a high mark for me to reach as his successor. Each and every year we think that we are nearing perfection in the engineering division and yet we still find that there are a great many improvements to be made, standards to make and modify as the study goes along. A good executive will divide his work among his cabinet, and each member of the cabinet according to his training will assign his allotment to others. Our Mr. Johnson planned accordingly and I see no reason to make any changes in his policy. We have some excellent men in our association, in fact the brains of the country in street railway engineering are here. It will be my duty to try to get them to co-operate and show the rest of the industry how to do it right, economically and quickly. I wish I could impress all managers with the wisdom of sending their engineers to these conventions. The expense is small compared with the value of the knowledge they may acquire by coming in contact with other engineers and exchanging ideas. Our retiring president has had the best of support from this body and I trust that the incoming adminstration will be treated likewise. 'In union there is strength.'"

Brief addresses were made by the other elected officers and executive committee members. Presentation of the past-president's badge to Mr. Johnson by President Clark preceded the motion to adjourn.

The committee on subjects of the Engineering Association prepared a report covering the proposed subjects for next year. This was printed in advance and sent to the membership of the Engineering Association. It will be acted upon at the first meeting of the newly elected executive committee. An abstract follows:

Subjects

The work of the committee on Engineering Manual has shown the definite need for a more thorough yearly review by the several committees of existing standards, recommendations and miscellaneous practices than has heretofore been obtained. If we are to maintain a high standing as a careful, thorough, progressive engineering body, we cannot afford to let our standardization work deteriorate through failure to keep even with current practices and the progress in the electric railway engineering field.

In order that the several committees may be impressed with its importance, your committee has placed the subject of "Review of Existing Standards" as the first subject assigned to each committee.

It is believed that a careful study should be made of the causes which have led to delayed or improperly prepared reports with the view toward changes, if necessary, in rules and regulations governing the preparation and submission of reports, which will tend to overcome these difficulties. In this connection, the suggestion has been made that the chairman of the several committees be requested to attend a meeting of the executive committee to be held either during the convention or within a very short period thereafter, at which meeting the methods of preparing reports and conducting effective committee work may be discussed. Such a meeting should result in a better understanding of these important factors in committee work.

The attention of the committee was called to the apparent need for the formation of a correlating committee somewhat on the order of a committee of like title in the American Engineering Standards Committee. The duty of such a committee would be to coordinate the work of our association with that of other bodies in order to minimize duplication of effort in the study of subjects wherein there is a joint interest.

The specific report on the proposed assignment of subjects for the 1925 committees follows as an appendix.

The report was signed by Morris Buck, R. H. Dalgleish, Daniel Durie, Charles R. Harte, R. C. Cram, chairman.

PROPOSED SUBJECT ASSIGNMENTS FOR 1925 COMMITTEES

Automatic Substations.—It was recommended that the committee be continued and directed to elaborate upon its 1924 report in connection with matters of loss factor, effect of varying shapes of load areas, station patterns and new features of an economic nature.

Buildings and Structures.—The following subjects were recommended: (1) Review of existing standards and recommendations; (2) continue study of design of buildings for proper maintenance and storage of buses; (3) design of terminals for bus operation; (4) carhouse and car shop standards. Co-operate with C. F. P. A. committee on carhouses and car shop standards.

Carhouse and Car Wiring Rules of the National Electrical Code.—It was recommended that this committee continue work in co-operation with the N. F. P. A.

Engineering-Accounting.—It was recommended that the subject of "Further Subdivision of A. C. C. Accounts to Include Equipment and Other Accounts Not Now Subdivided" be assigned to the joint committee on engineering-accounting.

Engineering Symbols.—It was recommended that the special committee on engineering symbols be continued.

Equipment.—The following subjects were recommended: (1) Review of existing standards and recommendations; (2) study design of hand-brake equipment with foundation brake rigging with view toward standardization; (3) study methods of car painting; (4) motor coach design problem. Consider motor coach standardization in co-operation with Society of Automotive Engineers; (5) devices for trolley contact. Co-operate with committee on power distribution and transmission.

Power Generation and Conversion.—The following subjects were recommended: (1) Revision of existing standards and recommendations; (2) continue study of uniform methods for recording failures of power apparatus and interruptions to service originating within the generator or substation; (3) continue study of existing practices in design and operation of automatic substations, including subjects of remote supervisory control; (4) ventilation of and reduction of noise in operation of automatic substation; (5) prepare specifications for high tensile strength bolts for use on superheated steam pipe lines.

Heavy Electric Traction.—It was recommended that the following subjects be reassigned: (1) Review of existing standards; (2) revise and publish the bibliography on heavy electric traction and electrification data; (3) collect data on (a) branch line electrification, (b) self-propelled cars, and storage-battery locomotives for yard work.

Power Transmission and Distribution.—The following subjects were recommended: (1) review existing standards and recommendations, including the sections on block signals and on concrete pole design; (2) prepare specifications, (a) for catenary overhead construction, (b) for materials used in catenary overhead construction; (3) trolley wire wear and composition—(a) study composition and wear, (b) study causes of breakage other than wear, (c) devices for trolley contact and their effect on trolley wire; (4) devices for temporary connections to trolley wire; (5) overhead construction for trackless trolleys; (6) inductive co-ordination; (7) the return circuit, including track bonding; (8) study of uniform methods for recording failures of power apparatus and interruptions to service originating in the transmission and distribution system.

Purchases and Stores.—The following subjects were recommended: (1) review of existing standards, recommendations and miscellaneous methods and practices; (2) present information and study as to economies to be gained through centralization of stores in central service building; (3) standardization of forms used and routine methods to be followed in the purchasing department and stores department. Also recommend method for handling of freight and express bills; (4) co-ordination of materials and supplies with the operating budget.

Proposed Committee on Rail Corrugation.—The committee on subjects recommended that a special committee of perhaps five members be raised to study and report on the subject of rail corrugation, to be known as the committee on rail corrugation.

Unification of Car Design.—It was recommended that this committee be continued.

Way Matters.—The following subjects were recommended: (1) Review of existing standards; (2) standardization of frogs, tongue switches and hard centers for special trackwork; (3) investigation of all forms of welded rail joints in co-operation with the committee on welded rail joints; (4) surface hardening of rails at the mill and in the street; (5) design and specifications for electric over steam railroad crossings; (6) report on arc welding processes for repairs to rails and manganese steel; (7) design of substitute ties.

Wood Preservation.—The following subjects were recommended: (1) Review of existing standards; (2) specifications for open tank treatment of wood poles; (3) specifications for brush treatment of wooden poles; (4) specification for pressure treatment of wooden poles; (5) report on methods of increasing life of timber by other means than application of preservatives; (6) report on other preservatives aside from creosote, carbolineum, zinc, chloride, etc., which may be used for preservation of timber; (7) prepare forms and recommend methods for keeping continuous records of performance of treated timber.

Special Committee on Air Reservoir Specifications to Co-operate with the A. S. M. E.—It was recommended that this committee be continued.

Unit Method of Voting on Standards.—The committee on subjects recommends that the present committee be discharged and that the subject be taken up within the executive committee by assignment to a sub-committee of that body.

Committee to Co-operate on Subject of Standardization with U. S. Department of Commerce.—It was recommended that the committee be continued.

The report of the committee on standards was printed in advance and distributed to the members of the Engineering Association. It was not read in full at the sessions of the convention, but Chairman Harte indicated the action of the standards committee immediately following the presentation of each recommendation of a committee requiring action of the standards committee. An abstract of those parts of the report of particular interest follows:

Standards

The report of the committee on standards, Charles R. Harte, chairman, was presented in sections after each committee report had been accepted as a whole. The recommendations of the various committees were in general approved. The action taken by the standards committee other than approval was as follows:

Buildings and Structures.—The recommendation that Figs. 6, 7 and 8 of this committee's report, together with the fundamental design data, be adopted as miscellaneous methods and practices was disapproved and the report was referred back for interpretation.

Purchases and Stores.—It was held that material submitted under the head of "Proper place for the purchasing and stores departments" for adoption as a recommended practice involved matters of policy outside the jurisdiction of the Engineering Association. The matter was referred back to the originating committee for revision of its recommendation.

Car and Carhouse Wiring. — The recommendation of this committee that the rules submitted covering car and carhouse wiring be adopted tentatively for the coming year and that the committee be continued and empowered to co-operate with the National Fire Protection Association in the preparation of final rules was approved with the understanding that the tentative rules would replace Manual section B200-23.

Equipment. — A number of miscellaneous methods and practices withdrawn in 1923 were revised by this committee. They were approved for use in the Manual with minor changes.

Approval of revised design of brake shoes, heads and keys recommended as standard for the new standard wheel contours, replacing present E1-21, was deferred pending correction of errors in the drawings.

Wood Preservation. — Discussion of proposed changes in Manual Section WP100-23 and WP101-23 disclosed that certain modifications might be desirable to clarify the situation. Action was, therefore, withheld pending action by the convention and the chairman was instructed to prepare amendments for submission on the convention floor.

Power Transmission and Distribution.—The recommendation of this committee that the designs submitted covering the ruling dimensions of three types of trough suspension be adopted as standard was modified to approval as a recommended standard, it being held that a new design should never be introduced as standard unless justified by extensive use.

The report of the standards committee was signed by H. L. Andrews, C. C. Beck, J. A. Brooks, C. H. Clark, L. C. Datz, W. G. Gove, C. G. Keen, C. S. Kimball, John Lindall, H. H. Norris, F. R. Phillips, Martin Schreiber, N. W. Storer, N. B. Trist and Charles R. Harte, chairman.

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Meeting on Bus Standards

A MEETING was held in Engineering Hall Monday morning of a joint committee of the equipment committee of the Engineering Association and a special committee on bus standardization of the Society of Automotive Engineers. The purpose was to see what could be done in the direction of standardizing bus design. Frank H. Miller, vice-president in charge of engineering Louisville Railway, acted as chairman. R. S. Burnett, standards manager of the Society of Automotive Engineers, was present to represent that organization, and P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, also occupied a seat on the platform. Mr. Burnett offered a compilation of dimensions representing present practice. A preliminary study of the work undertaken by this joint committee is contained in the report this year of the equipment committee of the Engineering Association.

One purpose of taking action at this time is the interest of the Board of Public Utility Commissioners of the State of New Jersey in the matter of formulating detailed specifications for bus design. In fact, under the direction of the board, certain tentative specifications have been drafted by the officials in each city in New Jersey charged with the supervision of bus operation. These specifications were discussed at the meeting Monday morning and are to be considered by the commission at a public hearing shortly after Dec. 1.

The point was brought out at the meeting that other states had established certain minor operating requirements for motor buses and that if the New Jersey specifications were adopted they might be copied by other states. Massachusetts has conducted tests on headlights and brakes and has already issued specifications for headlights.

A joint committee will review the situation and be prepared to be represented at the forthcoming hearing of the New Jersey commission. The incoming chairman of the equipment committee of the Engineering Association and the Society of Automotive Engineers will appoint the committee.

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T. C. Cherry

T. C. CHERRY, the new president of the American Electric Railway Transportation & Traffic Association, is a man of wide attainments. Although he entered railway work at the bottom, so to speak, he had four years of work at Syracuse University and the Syracuse Law School. Thus equipped he became a timekeeper on construction and track work. His next job was rodman with the Syracuse Rapid Transit Company. Two years later he was made superintendent of track of that company. Still later, in 1900, Mr. Cherry went to Lorain, Ohio, as superintendent of construction of lines and served as dispatcher on the Lorain Street Railway. From August, 1901, to December, 1903, he was general manager of the company.

Later Mr. Cherry served as superintendent of the Saginaw Valley Traction, Light & Gas Company, and still later as general manager of the Ohio Central Traction Company. Subsequently he became connected with the Buffalo & Lake Erie Traction Company as general superintendent. He served with that company for three years. In 1912 he was made superintendent of the Utica & Mohawk Valley Railway, but resigned three years later to become general manager of the Schenectady traction system.

In 1915 Mr. Cherry joined Allen & Peck as general manager of the Annapolis Short Line. In 1916 he joined the Auburn & Syracuse Railroad and in the following year was appointed general manager for the receiver of the Beebe, with the exception of the Auburn & Syracuse, which remained separate. Upon the discharge of the receiver Mr. Cherry was appointed vice-president and general manager of the Rochester & Syracuse Railroad. This position he still holds. He is also president of the Auburn & Syracuse Electric Railroad, president and general manager of the Syracuse & Northern Railroad and vice-president of Peck, Shannahan & Cherry, Inc., management engineers. In 1920 Mr. Cherry was president of the New York Electric Railway Association. Mr. Cherry was born in 1876.

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C. H. Clark

CHARLES H. CLARK, the new president of the American Electric Railway Engineering Association, has been engineer of the Cleveland Railway since 1910. His career, particularly his early career was in many ways spectacular. Although Mr. Clark was graduated from Cornell University in 1892 he really started in to work when only twelve years old as a water boy on the West Shore Railroad. This was in 1882. Nothing seems to have daunted him. He worked and studied and studied and worked until he was graduated from high school in 1887.

Charlie Clark, as he is now familiarly known, had no idea of remaining content with that achievement. Immediately after his graduation from high school he went to work as a timekeeper for T. W. Harris, the contractor who was then building the Woodlawn and Butternut Street railway in Syracuse. In this way he was able to finance his start at Cornell. While studying there he worked through vacations for Mr. Harris in Boston and White Plains. Following his graduation from Cornell University he began his railway career in the manufacturing end of the business with William Wharton, Jr., & Company as draftsman. He was superintendent of the Grays Ferry line in Philadelphia and made numerous surveys for railway lines in and outside of that city. In 1894 he was graduated into the managerial class in charge of the electric railway between Mauch Chunk and Tamaqua, Pa. He next returned to the employ of Mr. Harris and assisted in building the railways in Scranton, Swedeland, Troy, Norristown, New York and Washington. From this work he drifted into general engineering and was engaged in the work of helping to build the Trenton Falls dam. In 1901 he returned to street railway work as chief engineer of the Utica & Mohawk Valley Railroad and remained with that company for two years. Then he went to Cleveland, but during the franchise fight there in which Tom Johnson was one of the contending factors Mr. Clark went to the International Railway, Buffalo, for a short while. In 1908 he became chief engineer of the New York & North Shore Traction Company, Mineola, of which John J. Stanley, the president president of the Cleveland Railway, was then president. Mr. Clark next filled in for two months in work at Rochester, N. Y. In 1910 he returned to the Cleveland Railway as chief engineer.

T. & T. Association Proceedings

Attention Has Been Concentrated During the Past Year on Four Subjects—Progress in Accident Prevention Is Told—Publicity Men Describe Their Methods—Bus Data Is Submitted—Traffic Congestion Is Discussed

ACCIDENT prevention and the development of new business were the topics considered both in the formal papers and discussions by the Traffic and Transportation men at the opening session on Monday, Oct. 6.

President's Address

In opening the meeting of the Transportation & Traffic Association President J. K. Punderford urged full attendance at the meetings. A suggestion of this year's executive committee which he believes will materially assist in editing reports of the several committees is that each chairman prepare a sufficient number of copies of his report so that one can be sent to each member of the executive committee and the sponsor as early as possible after July 1. This will permit each member to make such corrections or suggestions as seem advisable for consideration by the executive committee. Continuing, Mr. Punderford said in part:

The committee on accident prevention has secured a large amount of data from member companies, and is able to make some very interesting tabulations of accident statistics covering the years 1922 and 1923, showing an increase in the different types of accidents disproportionate to the increase in number of car-miles operated and the great need for earnest endeavor to improve the situation.

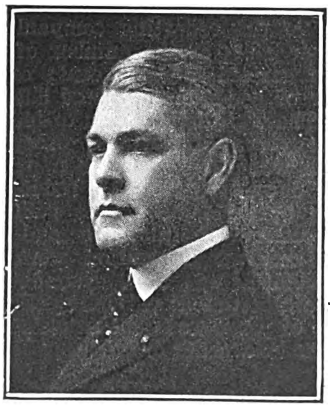
The report of the committee on development of new business indicates that the passenger traffic is still the mainstay of the electric lines.

The committee on relief of traffic congestion has dealt with what I believe to be one of the most, if not the most, important problems for municipal governments and street railways to solve. Ten years ago street congestion in the majority of our cities was not very serious, and as most street railways are not operating any more units than they did ten years ago it is obvious that the conditions have been produced by the large growth of the use of motor vehicles. When it is considered that during the rush hour, when congestion is the worst, from six to ten times the street area is taken to transport a passenger in a privately owned automobile to that taken for the conveyance of passengers in street cars, not to mention the limit to traffic flow due to the narrow streets caused by parked automobiles, it is obvious that any material relief at any practicable expense must be by regulation of the automobile. This subject affects nearly all branches of the street railway industry inasmuch as it has a direct bearing on the economics of schedules, with the incident effect on the amount of riding and the expense of operating an unnecessarily large number of cars to maintain a certain headway. The accident hazard also enters into the situation to a large degree.

J. K. Punderford
Retiring President

The committee on trackless vehicle operation has brought up to date statistical data concerning the use of trackless vehicles, with a large increase in companies furnishing data, which should be valuable to the industry.

One subject which I feel is worthy of considerable attention is that of one-man car operation. Many roads have been able to offset to a degree high wage costs, and in fact some to such an extent as to permit continued operation rather than abandonment of certain lines by one-man operation. The public as yet has not appreciated that such economies in operation are in the public interest and is rather inclined to agree with the opposition of the men to their extended use, not realizing that they must ultimately pay for any waste in operating costs which will be reflected in the rate of fare and service, and that one-man operation is one of the elements to assist in continued operation and at lower carfare than would be possible with two-man operation. Most companies are able to show that such operation has not been attended with increased personal injuries but in fact material decreases, another item of lessened wasteful expenditures in addition to the saving in platform cost.



T. C. Cherry
President-Elect

As most of us know, although the motormen and conductors have, through aldermanic committees and legislative bodies, attempted to restrict the use of one-man cars, when given an opportunity they have frequently bid in one-man car runs to obtain the four or five dollars increase in weekly wage. I believe we should use all proper methods to awaken the public and the men themselves to their personal interest in the extended use of one-man operation.

Time has been allotted to the Advertising and Publicity Section which we believe will be helpful in showing the industry what is being accomplished by this department.

I wish at this time to express my deep appreciation for the sincere and thoughtful work that has been done by members of the different committees and to express my great obligation to Secretary Welsh and his competent staff.

Secretary Welsh was called upon to read the reports of the executive committee and the secretary-treasurer. The former was read by title only as it will be published in the Proceedings, but the latter was read in full by Secretary Welsh. This disclosed many interesting facts and figures relative to the work of the association during the past year. Through the collection and study of data, the committees have developed some exceedingly valuable information which is presented in the various reports. The headquarters staff has co-operated with the committees in securing information and suggesting work for the coming year. The report also contained a suggestion that more individual memberships be taken out by the Traffic and Transportation men, for by so doing their names would be placed on the association mailing list.

The report of the committee on accident prevention was read by Charles W. Chase, president Gary Street Railway, Gary, Ind. An abstract follows:

Accident Prevention

The committee was able to better somewhat the result of the previous year in the obtaining of these statistics, 154 companies having responded to the questionnaire as against 113 in 1923; however, the comparative statistics

ACCIDENT STATISTICS OF COMPANIES REPLYING

	1920	1921	1922	1923
Cost of accidents per 10,000 car-miles operated	$148.00	$127.00	$137.24	$143.67
Cost of accidents per 100,000 passengers carried (including revenue, free and transfer passengers)	188.00	170.00	190.21	196.00
Cost of accidents, percentages of gross earnings	3.2	2.76	3.24	3.22
Average cost per accident reported	$42.20	$38.00	$37.90	$36.10
Number of accidents reported per 10,000 car-miles	3.39	3.32	3.63	3.98

shown in this report as the summary of the questionnaire include the statistics of only those companies reporting for both the years 1923 and 1922. The 154 companies reporting for 1923, or for both 1923 and 1922, represent 36.4 per cent of the electric railway mileage, 30.47 per cent of the gross receipts, and 33.5 per cent of the passengers carried in 1923 by electric railways of the United States, and can therefore be considered to represent a fair average of the experience of the industry in the matter of accidents. The questionnaire for 1923 establishes these important facts:

The percentage of gross earnings expended in cost of accidents in 1923 was 3.22 per cent, being higher than in any year since 1920.

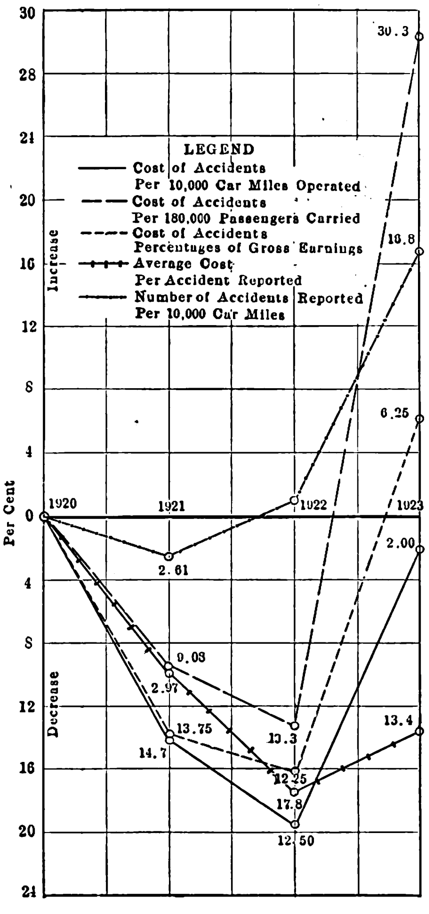
The total number of accidents of those companies reporting for 1923 and 1922 increased 13.31 per cent. Motor vehicular accidents increased 23.8 per cent. Number of car collisions increased 23.24 per cent. Number of fatalities increased 20.44 per cent.

The total cost of claims, injuries and damages, including safety work, increased 8 per cent. The number of persons injured increased 2.75 per cent. The number of passengers injured decreased 0.07 per cent. Against these outstanding increases in number of accidents and percentage of gross earnings we find an increase of gross income of the reporting companies of 8.386 per cent; of the number of passengers carried 4.6 per cent; of the number of car-miles operated 3.24 per cent. These statistics seem to indicate that in years of business prosperity such as was 1923, there is a general letting down of effort to reduce the number of accidents. This points to the necessity of intensive and persistent accident prevention work and of standardizing and systematizing such work so that it will carry through periods of prosperous operation as well as in the lean years of business depression.

The accompanying table is based on the report of the accident prevention committee for 1922 and on the reports of 147 companies in 1923. The accompanying chart shows percentages increase and decrease from the 1920 base. From the analysis it is quite apparent there is a wide field for further intensive effort in the work of accident prevention. A summary of the methods reported as being used by different companies in accident reduction work is also given.

SUMMARY OF REPLIES TO QUESTION ON METHODS

	No. of companies using method
Making employee feel responsibility for own carelessness	3
Inspiring employee with will to be careful	1
Seeing that equipment is in first class operating condition	2
Division of platform men into teams and giving a banquet at company's expense to team having lowest number of accidents in	
1 month	7
2 months	2
3 months	2
4 months	1
1,000 car-miles	1
General educational work, including periodical company safety meetings and group instruction	53
Personal work to platform men individually	13
Bonus	12
One-man safety cars	1
Accident-elimination board in trainmen's room	1
Gold stars given men who operate for 12 months without accident for which responsible	3
Stop signs on cars doors	1
Advertising	1
Merit system	2
Accident prevention placards on cars	2
Accident prevention placards on streets	1
Co-operation with local safety councils	5
Operator of car pays 10 per cent of cost of repairs to vehicles where company settles and where witnesses' statements show that company is at fault	1
Monthly safety periodical distributed to trainmen	1
Display of drawing of horse race with movable jockeys representing various departments, each jockey being moved forward or backward as the number of accidents for that department decreases or increases compared with preceding year	1
Display of National Safety Council and other safety bulletins	6
Posting of monthly accident records	1
Pin maps at all carhouses showing where accidents have occurred	1
Honor roll without bonus for trainmen without accident for which responsible for 1 month	1
Co-operation between employer and employees	1
Removal of grab handles has almost eliminated alighting, and has decreased boarding accidents	1



Yearly Fluctuations in Accidents and Their Cost

The committee believes that the greatest danger point, or at least one of the greatest which may be most easily reached, is that of motor vehicle accidents. The psychology of the situation is now right for the securing of the utmost co-operation from municipal and state authorities, the owners and drivers of motor vehicles, and the public at large. The committee therefore makes the following recommendations:

1. That a continuous and intensive campaign of accident prevention work be carried on by each member company.

2. That such accident prevention work should provide: (a) A systematic campaign to induce local and state authorities to adopt standardized rules and regulations for the control of motor vehicle traffic. (b) Keeping local authorities posted on up-to-date methods of regulation of vehicular traffic in other cities.

3. That subsequent committees on accident prevention should endeavor to promulgate a standard classification of what elements constitute the cost of accidents, so that a uniform report of such expense may be obtained from each of the reporting companies.

4. That every operating company should consider joining and co-operating with the National Safety Council in its work of safeguarding human life and property.

5. That reasonable expenditure be made by the member companies of the industry to insure the greatest possible efficiency in safety equipment.

6. It is recommended that the executive committee of the American Association appoint a committee composed of members of the affiliated associations to be known as the accident prevention committee to carry on the study of accident prevention.

The report is signed by M. W. Bridges, C. H. Evenson, James Harmon. A. W. Koehler, D. E. Parsons. R. M. Reade, S. B. Irelan, W. Phipps, A. Gaboury, C. W. Chase, chairman, and E. M. Walker, sponsor.

John J. Reynolds, claims attorney Boston Elevated Railway, presented an extended written discussion of the report, which he said was moderate yet convincing. More constructive work was needed, as industrial requirements never stand still. The influence of the automobile on accidents was shown by the speaker by means of statistics. In Massachusetts, $15,800,000 is spent annually as the result of automobile accidents. The Metropolitan Life Insurance Company has published a table of the different causes of mortality in America showing that except as to cancer every case of mortality is going down, but that all of the gains resulting from new methods of controlling diseases are offset by the ever-rising number of deaths on public highways.

At the last session of the Massachusetts Legislature a bill was introduced to establish a state fund to indemnify persons injured in automobile accidents where damages could not be obtained from the owner of the vehicle causing the injury. Stricter regulation of drivers is most important.

While electric railway men may realize the need for these reforms, they should at least take the initiative in reporting to the proper authorities the more serious automobile accidents in connection with electric railways which are due to the plain carelessness of the persons operating the machine. They can also co-operate with all means for impressing the need of safety on the public. As regards the electric railway itself, the methods mentioned by the committee are all good, especially 1, 3, 5, and 6, the others being really amplifications of the latter two. With all is the great need of a proper system of discipline, rigorously maintained at all times. In conclusion, Mr. Reynolds said, the railways must not forget that many companies are adding motor buses to their equipment and a close check should be kept on all bus accidents, and every effort should be made to eliminate them as far as possible.

An informal talk was given by Lewis E. MacBrayne, general manager Massachusetts Safety Council, upon the results of the council's meeting recently held in Louisville, Ky. He urged the delegates to stress the fact that in causing the large number of accidents automobiles are taking away the equivalent to a dividend which might have been paid to the stockholders.

A report of the committee on the development of new business was presented by F. W. Shappert, chairman. An abstract follows:

Development of New Business

Replies to a questionnaire sent out by the committee on development of new business were received from a fairly representative number of interurban lines and indicate that the industry realizes the necessity and need of a traffic or sales department. Advertising is necessary, but the real business getter is the personal touch of the traffic department with the traveling and shipping public.

The answers received to a question seem to indicate that practically all lines were now in the freight business and that much importance was being placed in its possibilities for building up revenues. The report would indicate that a majority of the lines in the Middle West are badly hit by motorbus competition on passenger traffic. A few lines have established their own bus lines in competition with their own cars; the effect, however, on the rail revenues is practically the same.

The passenger traffic is still the mainstay of the electric lines, the general average being close to 25 per cent freight, 75 per cent passenger, with a tendency toward greater increases in freight earnings. There are some exceptions. Lines between large commercial centers, or serving a district subject to tourist travel, have not felt the same slump in passenger travel, especially where advantage has been taken of the use of better equipment, faster and more accommodating schedules with a liberal support given to the soliciting department.

The committee felt that due importance was not being given to the traffic department. It is only through the traffic department that real contracts and real business are secured. The operating department must be prepared to handle this traffic with the least possible delay and it must be handled carefully to avoid damage or loss. The traffic man must be familiar with tariffs, routes and schedules and be able by his personality to secure traffic even against odds.

The following points are made covering service in the freight traffic: (a) Adequate, accessible and convenient terminals; (b) a schedule regularly maintained and adapted to the needs of the community served; (c) cars, adequate both as to number and character to suit the merchandise carried in the particular community; (d) encourage new industries to locate on right of way of electric lines; (e) arrange competitive through rates and divisions with all possible connecting lines; (f) eliminate transfer at junction points by arranging interchange of equipment, operating through cars wherever possible; (g) encourage and assist in the establishment of public relations. With this foundation, the traffic department must then, (h) become thoroughly acquainted with the customers; (i) invite all possible suggestions from the public for improvement in the service; (j) cultivate the acquaintance and the friendship of all the teamsters and truckers where possible, and eliminate to the greatest possible extent their complaints; (k) thorough co-operation between the operating and traffic departments and between the operating and other supporting departments is necessary to establish and maintain the kind of service, "To put it over."

The following suggestions are believed of value in the handling of passenger traffic: (a) Clean, comfortable, well painted passenger cars; (b) study the requirements of the property and put into effect such schedules as will supply its needs; (c) inaugurate where possible long distance travel, by operating through cars on fast limited schedules, as this is the only means of inducing long haul travel over the rails; (d) cars should be well lighted and made as inviting and cheerful as possible; (e) great care should be taken to insure reliable service and the maintenance of schedules. By these means the regular travel may be maintained without loss.

There is much extra business which may be secured if proper efforts are made along the following lines: (f) Keep in touch through the agents, newspapers, and convention guides concerning the movement of conventions, lodge meetings, church affairs, picnics and other organized movements of this kind. There is no better way to secure this traffic than a personal visit by a solicitor, even to the extent of assisting in the disposition and sale of the tickets. (g) A representative should, in movements of this kind, accompany the party, to assist in every way possible to their comfort and convenience; (h) efforts should be made to secure the movement of theatrical and vaudeville companies, in their various moves throughout the territory; (i) close working arrangements and quick communication with connecting lines in their respective territories so that advance information regarding movements of interest to both lines can be given; (j) in some cases, in order to stimulate travel, it might be well to put in low Sunday excursion rates to strictly excursion points.

The report was signed by F. L. Butler, J. A. Dewhurst, S. W. Greenland, J. P. Griffin, W. H. Harton, H. G. Monger, F. D. Norviel, C. D. Smith, O. A. Smith, Bert Weedon, M. A. Welsh, R. P. Woods, Samuel Riddle, sponsor, and F. W. Shappert, chairman.

In a prepared discussion Frank L. Butler, vice-president and general operating manager Georgia Railway & Power Company, Atlanta, Ga., observed that the committee members are unanimously of the opinion that the development of new business—of new traffic—could best be brought about by the creation of a traffic department. We are bound to admit frankly, he said, that something has got to be done to offset the losses we are sustaining by competition. The public is not generally interested in our troubles and it appears that a complete breakdown of the service is the only fact that will bring a community to the realization that it has a vital and personal interest in the success or failure of our business.

Take the Public Into Your Confidence

The company which fails to take the public into its confidence by advertising is making a mistake, according to Mr. Butler. It is not recorded, however, that even the best publicity campaign has induced the public to take an aggressive, partisan attitude in favor of any company, and all we can hope for, and all we have a right to expect, is good will, and a receptive attitude. In the past many of us have been content to tell our patrons that we were furnishing good service, and we have left them to their own conclusion as to what we meant. We have not shown them the frequency of our schedules, the speed and regularity of our cars, and the reliability of our service. Neither have we stressed the fact that practically every interest in the community is dependent upon the successful operation of our system. Personal solicitation from the traffic department is the surest method of correcting these conditions.

We no longer have a monopoly, he continued. The competition must be thoroughly understood to be met in a practical manner. We must go to the public and tell them of the low cost and other advantages of our service, and personal solicitation is far better than printer's ink.

That there are splendid possibilities in building up a freight business to offset passenger losses there is no doubt. But we must go after this business, nurse it along and take care of it when we get it. We cannot go after it today and neglect it tomorrow. In going out after this business by personal solicitation, the traffic representatives have the opportunity for creating good will, not only for that individual department, but also for other phases of the company activities.

MORE ATTRACTIVE ROLLING STOCK IS NEEDED

Discussion by various members added even more to the fund of information and constructive suggestions on the subject. W. S. Rodger, traffic manager Detroit United Lines, said that the electric railways must render a service which is superior to that of the private automobile, bus and truck, if the present traffic is to be retained and new business attracted to the lines. He said that parlor car service put on by the Detroit United has been the means of diverting traffic from rubber to rails, and described some of the steps his property is taking to co-ordinate bus and rail service. Among other things buses will be used to transport passengers from interurban terminals at the outskirts of Detroit to the center of the city.

Personal solicitation was held to be of utmost importance in getting new freight business. Experiments in the operation of motor trucks into surrounding territory as feeders to the rail lines have proved so successful that this class of service is now being extended at several points on the system.

C. D. Smith, general manager Beaver Valley Traction Company, showed that the private automobile is more serious to the lines in smaller communities than in the congested cities, due to the fact that more parking space in the smaller towns makes the use of automobiles more convenient. He urged that everything possible be done to beautify and make electric railway cars more attractive, even at the risk of overdoing it for a time. Mr. Smith also outlined the psychological effect of eliminating identification slips in connection with zone-fare collections, and stated that experience on his property had led them to believe that passengers resent the implication of dishonesty when slips are used.

In giving the Pacific Coast viewpoint of the traffic situation, O. A. Smith, passenger traffic manager Pacific Electric Railway, said that salesmanship is needed and that a traffic department is essential for taking care of both freight and passenger business. Mr. Smith illustrated this point by citing examples of results accomplished on his property in soliciting picnic and excursion traffic. He said that members of the traffic department on his property were assigned to ride on each of the divisions from day to day in order to keep in touch with the sentiment of passengers regarding the character of the service rendered, and to report any needed improvements or changes in schedules.

Knowing what the public wants, and filling that want, was cited as the only successful method of increasing traffic on electric railway lines. Mr. Smith said that his company's 65 agents formed an important part of its traffic building organization and that the representatives at various points on the lines were urged by the company to belong to business, luncheon and social organizations and to take an active part in all civic affairs in their community.

Development of new business on city lines requires application of the same principles that have been used on interurban properties, according to W. E. Wood, manager Houston Electric Company. He said that the work of traffic building should not be limited to any one department, but should be an important part of the activities of the management. The first requirement is to have the service right. Unless this is the case, publicity and solicitation will do little good and may actually be harmful.

Following the same idea, F. R. Cogswell, traffic agent Pittsburgh Railways, illustrated how merchandising methods are used to build traffic on his property. He told about the care which is taken in running down complaints, and said that in some cases this practice had made valuable friends for the company. Whenever possible, complaints are followed up by a personal call on the person sending in the letter.

An interesting honor roll plan for agents used by the Texas Electric Railway to stimulate interest in traffic building was described by J. P. Griffin, vice-president and general passenger agent of that property. He said that agents are an important factor in building new business as well as taking care of that already obtained, and suggested that such men should all be active members of the traffic department and responsible to the traffic manager.

The session was closed with a further discussion on the paper by C. E. Morgan, vice-president and general manager Brooklyn City Railroad. Mr. Morgan emphasized the importance of keeping schedules fitted to traffic requirements by frequent checks and by contact with conditions in the community served, so as to make changes when they are required.

Tuesday's Session, T. & T. Association

THE meeting of the T. & T. Association on Tuesday afternoon was called to order at 2:45 by President Punderford. He expressed his pleasure at having the publicity men present their views. The publicity man, he said, is an adjunct to the transportation department, as the business of that department is to sell rides. In the T. & T. Association publicity men will find an opportunity to sell their services to the executives and thus to boost their business.

After paying a fine compliment to Labert St. Clair for the work he has done in publicity for the association, the meeting was turned over to him by President Punderford.

Dwight Burroughs, publicity agent United Railways & Electric Company, Baltimore, Md., was the first speaker. He said that his topic, "Safety and How to Make It Interesting for Mothers and Children," was a rather difficult one. The song writers say everything nice about mother and children and then put it up to father. He said he would do his best.

Baltimore has a good safety department, he said. A number of means have been employed to reach the children. One way that has proved very successful is the use of a "safety alphabet." Each letter has a jingle made up in the form of a nursery rhyme designed to catch the attention of the child. For example:

A is for accident,
Which you may meet
If you are careless
In crossing the street.

A second means of approaching the children is by work in the schools. In Baltimore the school boards have co-operated by setting aside one day a year to be known as "Safety Day." The company also gives to the teachers a textbook which contains suggestions for interesting various classes of pupils. As an illustration, Mr. Burroughs mentioned safety "Don'ts." These have been used very effectively in the lower grades. Topics for essays are used for interesting children who are taking more advanced work. He said that as the result of these topics he had received nearly 100,000 contributions from the public and private schools in Baltimore.

A third method for interesting children used in Baltimore is the display of safety pictures at expositions and exhibits. These safety pictures were designed to show the relation between street cars and the home, one feature being safety. One topic that had been used to good advantage in these pictures was "Safety Bob" and "Safety Betty."

Another plan that he had used was the distribution of safety buttons. These have been distributed widely in the schools. The safety alphabet has also been reproduced in a folder and distributed to children. The old magic lantern in its improved form of automatic stereopticon has been used to good effect for displaying safety pictures. He believes that the use of these methods had prevented many accidents.

President Budd of the American Association addressed the meeting briefly. He regards the work of transportation and traffic men as most fundamental. This department does more than anything else for the success or failure of an electric railway since it is responsible for the service that is given—and the service is responsible for all other things. Many of the details of the service are the foundation for public relations. Following this out, it makes for or against the ability of the transportation department and of the railway to get funds. And funds are necessary to get the wherewithal to give service. In any case, many minor things can be done to give service, which determines the ability to get money.

We have to be sincere in our efforts,

said Mr. Budd, and must be imbued with the spirit of service. To be worth while, it must come from the heart and must indicate to the people you serve that you are of the right sort. Illustrating his point, he mentioned that complaints from patrons are frequently turned over to subordinates. This he felt was unfortunate as the old methods do not apply to the high pressure days of 1924. The best letter writer in the world cannot write a letter that will not be misinterpreted. Eliminating letter writing in answer to complaints and making personal calls by responsible executives is the answer. Such men can properly explain the reasons for the difficulties or why the company cannot comply with the request. In this way human contact can be established. Incidentally, said Mr. Budd, this will react on the officials who have to make many calls outside of office hours, and they will get the reaction to reduce causes for complaints. Above everything, he said, it is necessary to keep the good opinion of the public.

A paper on the subject of "Selling Transportation by Boosting Your Home Town" was read by L. K. Starr. Following this W. H. Sawyer spoke on the subject "It Can Be Done," and James P. Griffin described the methods by which his interurban railway in Texas increased passenger traffic by energetic publicity work. Abstracts of these papers appear elsewhere.

A short talk on the subject of state public service information committees was made by J. S. S. Richardson, director Pennsylvania Public Service Information Committee. Major Richardson said that when Bessemer first explained to a group of steel makers in England the method by which he proposed to make steel, he was laughed at and his remarks were expunged from the record of the meeting. A few years ago the man who advocated public utility companies undertaking publicity work received a similar reception.

People sometimes ask why a public utility should advertise when it is so largely a monopolistic enterprise. The point of view of those who ask this question is not unlike that of the owner of a general store in a small Western town. When asked by the advance agent of a circus if he did not want to advertise his merchandise by a sign to be carried on the back of one of the elephants in the circus parade, he replied that he had been in business for 25 years and every one in that town knew him. To that the agent responded:

"How long has that church been standing there on the other side of the street?"

"About 100 years," he answered.

"Don't they ring the bell every Sunday morning?" the circus man asked.

Bureaus of public utility information came into being because of the misrepresentations of demagogues and certain newspapers. It was thought that the best way to combat these elements was by the formation of an organization which would disseminate the facts. Such bureaus have now been formed in 37 states. Numerous public speaking bureaus also have been organized, and courses in public utility subjects have been arranged in various colleges. This movement is receiving ample financial support from the utility companies, but more than that is necessary. In order for it to prosper and progress, it will be necessary for it to receive more constructive criticism from the executives.

"Cold Soup" was the subject of a paper presented by John S. Bleecker. An abstract appears elsewhere.

W. P. Strandborg spoke extemporaneously, telling of the success which his company has had by using car cards in Portland, Ore. The number of people riding in the cars who see these cards every day is greater than the combined circulation of all the newspapers. Newspaper publicity, however, is very valuable for a railway, he said. It is much better for the railway publicity man to drop in and talk to the newspaper editor than to simply send over a written story and expect to get it published. But, best of all, is the method of buying space in the paper and telling the railway story exactly as the company wants it to appear. An interesting point brought out by Mr. Strandborg was that during the past 13 years, while various "truth in advertising" campaigns have been in progress, not one important violation has been charged against any electric railway.

The report of the committee on trackless vehicle operation was presented by V. E. Keenan, in the absence of W. J. Flickinger, chairman.

Trackless Vehicle Operation

The committee interpreted its function to be the collection of statistical matter concerning the use of trackless vehicles for transportation by street railways and the assembling of such data for the information of member companies. The report contains figures obtained from 34 companies operating 488 buses. It is subdivided into five groups, general information, operating methods, suggested operating rules, maintenance methods and financial statistics. The operating companies are not mentioned by name and the information is not summarized in a way that indicates definitely present tendencies in bus operation. The data compiled by the committee are presented in table below.

There seems no longer to be any doubt, according to the committee, that those who formulate the policy of street railways realize that in the bus they have a very useful ally to the rail car. No progressive railway managements will stand by and see part of their territory served by independent bus operators without making a determined effort to convince the traveling public that it is of mutual interest that all mass transportation be performed by the established agency. Having succeeded in this, as they ultimately will if they are persistent, they have available a combination of facilities with which they can give the traveling public exactly what it wants and maintain the good will of the community.

Under the head of operating methods the committee states that all but three companies from which information was obtained have found it expedient to operate the buses with the same supervisory organization as that which has jurisdiction over the railway operation. In the case of the few companies which reported separate supervisory organizations it was apparent that the general management was handled by the same general officers as the railway, but that the subordinate officers were separate and distinct. Another point brought out was that there seems to be no radical difference between the physical examination required of bus

STATISTICS OF BUS OPERATION

Company	Number of buses Owned	Seating Capacity	Number Buses Operated		Number of Routes	Total Length of Routes (Miles)	Average Speed Without Layover			Average Speed With Layover		
			Base Schedule	Maximum Schedule			City M. P. H.	Suburban M. P. H.	Interurban M. P. H.	City M. P. H.	Suburban M. P. H.	Interurban M. P. H.
A	33	25	13	20	10	24 0	7.5	10.41	....	3.75	7.3	....
B	3	19	1	1	1	3.7	....	11.0	....	....	7 4	....
C	8	21–25	5	6	4	17.7	....	....	....	8.66	14.6	....
D	5	25	4	5	2	10.2	11.0	....	....	8.1	....	....
E	5	12, 16, 22, 26	2	4	2	7.12	9.3	....	16.08	6.2	....	8.04
F	28	25, 29	9	13	5	85.6	12.0	....	20.0	10.4	....	13.8
G	51	14, 18, 21, 25, 29	20	37	12	48.0	8.5	14.0	15.5	7.6	13.0	12.0
H		16, 21	*	*	2	65.0	20.0	25.0	25.0	....	....	....
I	36	14, 15, 21, 23, 25, 27, 29	11	24	13	58.0	8.8	11.23	....	7.93	9.15	....
J	11	7	10	10	1	88.0	....	....	25.5	....	....	....
K	11	12, 20	10	13	4	*	8.72	8 72	8.72	8.72	8.72	8.72
L	6	18, 30	3	4	3	5.0	8.25 to 13.2	....	....	....	....	....
M	25	16, 25, 29	15	16	4	10 5	12 to 15	....	....	6.54 to 10.96	....	....
N	13	14, 22	6	10	1	32 0	....	....	26.0	....	....	....
O	12	18, 22	4	12	1	44.0	....	....	25.2	....	....	17.6
P	17	25, 29	10	12	3	8.77	10.6	....	....	10.0	....	....
Q	2	20	1	2	1	1.5	12 to 15	....	....	7.5	....	....
R	16	25	5	5	3	6.0	10 0	....	....	....	....	....
S	5	12, 18, 25	3	3	3	*	9.0	....	....	7 0	....	....
T	12	29	2	3	2	5.36	9.0	22.5	....	5.7	....	....
U	9	21, 29	5	6	4	11.0	....	....	....	9 37	....	....
W	2	25	1	1	1	2.4	12.0	....	....	9.6	....	....
X	12	16, 24	7	9	4	4.07	6.1 to 7 5	7.5	....	....	....	....
Y	18	14, 20, 24	10	13	8	19 5	12.0	14.0	....	10.0	12 0	....
Z	4	17, 18, 25	3	3	3	41 5	15.0		....	....		....
AA	3	25	2	2	1	5 4	....	10.8	....	....	7 6	....
BB	6	25	1	3	2	3.5	8 0		....	....		....
CC	4	25, 29	3	4	2	16 46	11.93	14.05	....	11 36	8.9	....
DD	41	25	18	34	7	16.9	....	....	....	9.14 to 9.50	....	....
EE	31	15, 22, 24	....	26	4	8 16	9.07	9.9	....	8 28	....	....
FF	12	25	8	11	2	10.85	11.9	....	....	10.5	....	....
GG	4	12	2	3	2	1 47	8.5	....	....	8.0	....	....
HH	7	14	4	4	4	54 0	....	....	20.0	....	....	12.0
LL	31	25	14	28	6	29.5	8.7	10.4	19.6	7.73	9.73	15 0

*Not given

drivers and that required for street railway employees. The standard form of examination blank is used by the majority of companies and covers the usual questions. In some instances employing companies require that a prospective bus operator shall have a state chauffeur's license before he will be employed.

It was felt by the committee that a suggestion for a set of rules for the guidance of bus operators would be helpful at this time. Accordingly a book containing 82 regulations designed to govern the operation of buses is presented in the report.

The report states that the general practice is to have bus maintenance supervised by the same organization which has charge of maintenance of railway cars. The committee finds, however, that because employees engaged in bus chassis maintenance require a different training from those engaged in electric car maintenance more satisfactory results will be obtained through the separation of these departments as soon as the number of bus units becomes large enough to keep a separate organization busy during a full working day. There appears to be no uniformity among the companies in their inspection practice.

The financial section of the report is confined entirely to cost figures because the local conditions govern the matter of income to such an extent that revenue figures would be of little value. The total operating expenses and taxes vary from approximately 17 cents per bus-mile up to nearly 33½ cents per bus-mile. Inasmuch as no statement of operating conditions accompanies these figures, it is practically impossible to draw any definite conclusion therefrom.

The committee finds that trackless trolleys are being operated by five railways. This type of vehicle is used to such a small extent that this phase of trackless vehicle operation is left to the consideration of future committees which will have the benefit of greater experience in its use. The fact that the number of companies operating trackless trolleys has increased by two and the number of vehicles by 15 during the past year makes it evident that places are being found where, in the judgment of the management, the trackless trolley can be operated to better advantage than the gasoline-propelled vehicle.

The report is signed by B. W. Arnold, H. F. Fritch, V. E. Keenan, D. A. Scanlon, J. B. Stewart, Jr., O. A. Smith, sponsor, and W. J. Flickinger, chairman.

In discussing this report, C. D. Cass gave details of bus operation on the Waterloo, Cedar Falls & Northern Railway. He suggested that the automotive engineers should make studies of bus design in order to prevent mistakes during the coming formative years of the industry. The scope of this committee should be enlarged, in the opinion of R. N. Graham. The fact that the committee has found the actual cost of bus operation to be nearer 24 cents a mile than 14 cents a mile is important, he said. In fact, the cost, everything considered, is likely to be somewhat higher even than that. Obsolescence must be remembered and included in the cost. Mr. Graham said that city bus operation can be successful only when the load factor is high, the haul is short, and the fare is adequate.

The short length of time which has been necessary to bring the railway and motor bus interests into a spirit of co-operation was mentioned by G. R. Dahl. In no other instance have competitive modes of transportation so quickly harmonized their points of view, he said. Attention was called by this speaker also to the fact that accidents are fewer with bus operation than with railway operation.

Standardization has no place in bus operation, according to J. S. Bleecker, except in the matter of accounting. He said that it would be a mistake to try to standardize in other directions. Especially it would be a mistake to try to tie down the bus drivers by a code of rules similar to the street railway rules of the vintage of 1906. He spoke briefly on the subject of maintenance. In closing, Mr. Bleecker said that he considered a separate corporate organization for the operation of buses to be undesirable in most cases if it is legally possible for the railway company to operate buses under its own name. The discussion of the report was closed by W. J. Locke, who said that although bus operation had heretofore in many cases been unprofitable, there was promise of better financial return in the future. He mentioned also the possibility that steam or electricity might be utilized as a means of propelling buses.

Thursday's Session, T. & T. Association

THE Thursday afternoon session was called to order by President Punderford, following an interesting exhibition of moving pictures showing the activities of the Public Service Railway of New Jersey. In introducing the subject of relief of traffic congestion Mr. Punderford called attention to the difficulty of securing action along these lines by civic bodies. Although the number of automobiles in Connecticut has increased from approximately 10,000 in 1910 to about 170,000 at present, while the number of street cars operated has remained practically the same, the general feeling of automobile clubs is that relief should be given almost 100 per cent by the railways. The report of the committee on relief of traffic congestion was read by D. L. Fennell in the absence of Chairman Paul E. Wilson.

Relief of Traffic Congestion

The committee believes that certain causes of traffic congestion are to be found everywhere throughout the country, and that these common causes of congestion will require a common method of prevention or elimination.

The streets of any city are created for the express purpose of moving the traffic growing out of the business and social intercourse incident to city life. The fact that the cities were laid out and street width determined under totally different conditions from those now existing results in streets entirely inadequate for present use. The seriousness of the problem can only be realized when we remember that there must be moving into and out of the congested district of such a city as Denver within an hour or an hour and a half in the morning and evening rush periods 30,000 to 40,000 persons on streets that will not average more than 66 ft. from building line to building line, further reduced by sidewalks to 42 ft. from curb to curb.

Some form of mass transportation on rails is inevitable if this volume of traffic is to be moved, and this necessity of rail transportation calls for a strip not less than 22 ft. wide for two car tracks with clearance in the middle of this limited street width, leaving under general conditions not more than sufficient space for a single line of moving vehicles on each side of the rail area. Long-time or limited-time parking privilege results in cutting down the width available for traffic flow, so that as a result of extensive studies we find that out of the full area of street space, cities which permit parking utilize 20 or 25 per cent of the street space for stored vehicles, approximately 75 per cent for moving automobiles, considering only the necessary clearance between vehicles, and less than 5 per cent under the same conditions for moving street cars.

The service rendered in the movement of traffic by these three divisions of street area are entirely out of proportion to the area utilized. The standing vehicles, of course, do not provide for any passenger movement. Moving automobiles carry on the average slightly less than two passengers each, while moving street cars, especially during peak hours and in the direction of peak movement, carry from 50 to 100 passengers. In other words, the 20 per cent used by standing vehicles carries no traffic, the 75 per cent occupied by moving automobiles carries from 20 to 30 per cent of the total traffic flow, and the minute 1 to 5 per cent occupied by moving street cars carries the utterly disproportionate 70 to 80 per cent of the total traffic.

In Chicago, it has been found that passenger automobiles form 51.3 per cent of the traffic volume entering the loop on a normal week day, but carry only 18.9 per cent of the passengers. Street cars form only 10 per cent of the traffic and carry 74 per cent of the passengers.

MAJOR CAUSES OF CONGESTION

While the narrow streets, resulting from the failure of city planners to foresee modern conditions, make traffic congestion, there may be recognized three primary causes of present-day congestion. The first of these is the concentration of modern business in every large population center into a relatively small area.

The second cause of the street congestion grows out of the tremendous increase in use of private vehicles. Where a few years ago such a city as

Syracuse had in its streets only 8,000 automobiles, this same city in 1923 had 40,000 automobiles. Detroit, for example, between 1922 and 1923 showed an increase of 28 per cent in the number of automobiles. Chicago last year licensed 261,254, an increase of 133 per cent since 1920. When it is remembered that in the earlier period practically the entire passenger traffic was handled in street cars carrying 50 or more passengers in the rush period and that it takes on an average more than 25 private vehicles to carry the same load, it is no wonder that the streets have reached the saturation point and have, in many cities, passed beyond this toward a condition of traffic stagnation.

The third cause is the demand of the private vehicle owner for the right to stop his vehicle in the business district while he transacts business therein for a period ranging from a few minutes to the entire day. Approximately 20 per cent of the total street area in a business district, worth as bare land not less than $25 per square foot, and graded, paved and policed by the municipality at an expense of not less than an additional $1 per square foot, is actually being utilized by less than 3 per cent of the public as a private garage.

SUGGESTED REMEDIES FOR CONGESTION

Various remedies which have been suggested for the solution of this problem of congestion fall naturally into two groups, the first of which consists of various methods of increasing the traffic area and the second of which looks to increasing the capacity of the existing traffic area. In the first group comes: (a) the opening of new streets; (b) the widening of existing streets either by moving back the building line or the widening of the street bed by the narrowing of the footways; (c) the duplication of the street width by the construction of elevated roadways or subways; (d) the elevation or the arcading of the footways, thus adding the present footway area to the vehicular street width.

There is one distinct objection to all of the remedies of this class. If the business district has already reached the limit of its business population and traffic flow, relief might be obtained by the increase of the street area, but under existing conditions, increased areas will be immediately absorbed by still further concentration of business within the congested district, so that the relief furnished by an increase of the existing facilities would be of short duration.

The second group of remedies consists of those which tend to increase the capacity of the existing street area. The ability of a main street to carry away from the congested district the business population depends solely upon two factors, the number of moving units which it can contain and the speed at which they can travel.

Speed of traffic flow demands first of all that the main arteries which ought to discharge the traffic shall have as nearly as possible an unimpeded right of way. It demands, in the second place, that, as between various types of vehicles moving in the main traffic stream, the preference shall be given to those which are furnishing the maximum of service. It means, also, that the slow moving vehicle unable to maintain the standard speed of traffic flow must ultimately be excluded from the main arteries during the relatively short period of their maximum use, and that the left-hand turn, however convenient it may be to the occasional motorist, must be eliminated where possible.

In some few cases it is possible by the development of by-pass streets which pass around the relatively small congested area to divert from this area the through traffic which would otherwise swell the traffic stream.

It is also possible in some cases, particularly on streets occupied in part by street cars, to facilitate the traffic flow by the use of one-way streets. But the one-way street is apt to concentrate upon one of two streets the outbound traffic which should be handled by both, while the other is practically empty.

It is probable that the most important means of increasing the street flow is the elimination of the standing vehicle during at least the peak-hour period. The capacity of any channel is measured by its narrowest point. To all intents and purposes a single vehicle standing in a 50-ft. street is equivalent to the destruction of from 7 to 10 ft. of street width from that point to the end of the congested area flow.

All of us who drive our own machines appreciate the inconvenience of not being allowed to stop in the congested area or anywhere else for the transaction of business. The seriousness of this situation and the importance of removing this particular form of interference with the traffic flow is emphasized by the fact that out of the 30 cities selected as typical not a single one fails to emphasize the elimination of parking during the peak hour as the most important possibility of relief. Nor is there one that has not advocated some means of protecting the flow of traffic after the taking effect of a non-storage rule.

Ideal conditions of the movement of the general public involve first a free flow of the vehicles used for mass transportation. These vehicles must stop at not less than 50 per cent of the street intersections and they must be operated at frequent intervals. The minimum headway between cars must be from 30 to 45 seconds, and any interference with the movement between stops must inevitably throw cars off schedule and result in delay which inconveniences the entire body of car users. Where driving upon the car tracks between stops and safety zones is unrestricted, the usual condition during the rush hours is that the stopping of a street car at an intersection necessitates the stopping of practically every following car for several blocks in the rear, not for the purpose of taking on or discharging passengers, but simply for a dead wait in the middle of the block. In other words, if 70 to 80 per cent of the population which is moving by the mass vehicle is to be carried in comfort and with reasonable speed, non-street car traffic must be excluded from the rail space, not only at intersections but in mid-block as well.

The private vehicle must also have a free traffic lane. In the few cases where street width is sufficient to provide for double tracks and two lines of traffic flow on each side of the tracks, it is possible to provide for this and still permit a limited amount of stopping at the curb, but even here the result is a destruction of the street width if the stop is any longer than is necessary to take on and discharge passengers, and a slowing down of the speed of the traffic line nearest the curb, where the stopping is limited to the taking on and discharging of passengers. In the large number of cases, however, the street width permits only one line of traffic flow on each side of the car tracks. Delayed street car operation means increased operating expense to the street car companies, and the congestion resulting undoubtedly increases the percentage of accidents and accident cost. But under the modern theory of regulation these extra expenses are passed on to the general public, the result of which is that the majority of the public, riding on the public utility vehicles, not only secure a less comfortable and less speedy service, but themselves pay the extra expense of their own discomfort and delay.

The committee feels that the matter of congestion of traffic on city streets is a public matter in which all citizens are vitally interested; that the only authorities capable of properly passing upon it are the public authorities; that the problem is naturally one within the jurisdiction of "planning bureaus" equipped to study the question and to present it to the citizens in a purely scientific and impartial manner. We also know that too much propaganda on the part of a street car company in any community is likely to create the impression that it is entirely a street car matter, whereas if the question is handled by impartial experts and treated on the basis of sound public policy, the street car company, from the strength of its position, is bound to be benefited by a proper solution.

To summarize, the committee finds: (1) Traffic congestion exists everywhere and is the foremost urban problem; (2) traffic congestion can be greatly relieved if not almost eliminated by regulations that will secure to the public the maximum use of existing streets; (3) these regulations must be of two kinds: first, the restriction of needed street space to moving traffic; the other, the control of moving traffic in and along main thoroughfares or arteries; (4) the problem is one for the general public, rather than any one industry affected; (5) all industries affected should co-operate with public authorities.

The appointment of a standing committee on traffic regulation by the American Association is recommended, this committee to co-operate with both industries and public for their mutual interest in the continuous study of the problem, the securing and applying of remedial measures and the education of the public in both.

The report was signed by G. B. Anderson, H. O. Butler, D. L. Fennell, M. McCants, W. H. Maltbie, James Smith, W. E. Thompson, J. V. Sullivan, sponsor; Paul E. Wilson, chairman.

J. H. Norris, chairman Board of Street Commissioners, Boston, called attention to the reduction in automobile registrations in several states, and the reduced proportional increase in others, as an indication that the saturation point in number of vehicles in use is fast being approached. He said that the first duty of all public officials having to do with traffic regulation, should be to protect the movement of vehicles used by the masses. Mr. Norris also expressed himself as being in favor of the elimination of traffic officers except in extremely congested districts, and also advocated elimination of time limit parking.

Upon invitation of the chairman, H. F. Lansdowne, traffic superintendent London General Omnibus Company, addressed the meeting briefly and discussed some phases of American conditions which have impressed him. He felt that mechanical devices for the regulation of traffic, such as the Fifth Avenue signal system in New York, needlessly interfere with the movement of traffic, and that better results would be accomplished by proper education of drivers. He expressed surprise at the parking conditions in this country. This situation, he said, called for attention on the part of those interested in the relief of congestion. A great measure of relief in London is obtained by prohibiting the delivery and collection of goods during certain hours of the day, according to Mr. Lansdowne. He also said that Lord Ashfield had decided to send a group of his operating officials to this country each year to study American methods, and at such a time that they could attend the annual convention. He suggested that a paper prepared for the occasion would serve to inform American operators of developments in England.

J. A. Stoll, superintendent of transportation United Railways & Electric Company, Baltimore, described some of the traffic conditions in that city. Elimination of left-hand turns on Market Street in San Francisco has speeded up the cars materially, according to M. McCants, general manager Market Street Railway. As for the parking situation, he said that he believed the public ultimately would come to a point where they would insist on relief and that the situation would be worked out because of such a demand from the public itself.

G. B. Anderson, manager of transportation Los Angeles Railway, objected to a policy of allowing the situation to work itself out. He said that the street railway managements and the association have the responsibility of defending the unorganized large group of people who depend on street car transportation daily to and from their work.

Discussion at the recent safety conference held in Louisville by the National Safety Council and carried on by traffic men not connected with electric railways showed a trend toward methods of traffic congestion relief which have been accepted for some time by railway men, according to J. P. Barnes, president Louisville Railway. L. H. Palmer, general manager United Railways & Electric Company, Baltimore, objected to a suggestion by the committee that this subject of congestion be considered by a standing committee of the American Association, and the association voted to refer the matter to the incoming executive committee of the Transportation & Traffic Association.

THE NEW OFFICERS

The following officers and executive committee members were elected for the ensuing year: President, T. C. Cherry, vice-president Rochester and Syracuse Railroad, Syracuse, N. Y.; first vice-president, G. H. Clifford, vice-president and manager Northern Texas Traction Company, Fort Worth, Tex.; second vice-president, J. V. Sullivan, assistant to the vice-president Chicago Surface Lines, Chicago, Ill.; third vice-president, Edward Dana, general manager Boston Elevated Railway, Boston, Mass. Executive committee members: W. H. Boyce, commercial manager Pittsburgh Railways; E. M. Walker, president Schenectady Railway; Samuel Riddle, vice-president Louisville Railway, and Paul E. Wilson, secretary Cleveland Railway.

The new elected president was escorted to the chair by Messrs. Palmer and Clifford. He expressed his appreciation of the honor conferred upon him and then presented a past-president's badge to Mr. Punderford, who responded and pointed out the live topics that are before the association for consideration next year. He asked that the new president be given the same hearty co-operation which he had received.

*It Can Be Done**

By W. H. Sawyer

President East St. Louis & Suburban Railway

Publicity Not Backed Up by Performance Is Worse than Useless—Local Newspaper Advertising Is Best Method of Reaching Public

W. H. Sawyer

IT CAN be done because it has been done. A few years ago it had not been done and there were many people who said, "It can't be done." There were others, and they too were many, who said, "It should not be done." There were even some who said, "It must not be done," but the facts are, *it has been done.* I refer, of course, to effective publicity by electric railway companies.

I pride myself that I was one of the first to insist that it should be done—that it must be done. I also pride myself that I was one of the first to say, "Now that we have proved that it can be done, let us confine our efforts to analyzing how it can be done better." There are some few electric railway executives who do not now believe in, or at least do not now practice, effective publicity.

There are also probably some electric railway executives who do not appreciate that the car riders are their customers, and that one of the chief duties of an executive is to see to it that in so far as it is practicable to do so, his customers are satisfied customers, believing in him and in his company.

There are possibly some few electric railway executives who do not appreciate that cleanliness and courteousness are most essential. There are, in short, some few electric railway executives who should have been thrown out of their executive positions about five years before they secured them. It is a waste of time to appeal to them when there are so many others who are asking for constructive suggestions and help.

It can be done! Let us review the situation as to what has been done by effective publicity, not with the idea of converting those few, who will not see or will not hear, but with the idea of instilling enthusiasm toward greater effort with rightful expectation of greater reward. Effective publicity has caused electric railway companies to be born anew, as it were, to radically and effectively change public sentiment by giving the public—our customers—the facts about their electric railway so that they might appreciate that every time they co-operate with us, every time they help us they put us in a better position to help them in return. We cannot expect co-operation except as we give our customers full and complete knowledge of the facts, take them into our confidence, and do our part toward instilling into them a just pride in their electric railway.

Publicity not backed up by performance is useless, is worse than useless. No man, no company can afford to go on record with publicity unless he gives the facts. He has no right even to promise something which he is not practically sure he can fulfill. It is far better not to use publicity than to come out with publicity which cannot be fulfilled to the very letter and to the limit of the spirit.

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*Abstract of a paper presented before the annual convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 6-10, 1924.

Our business is capable of reasonably exact analysis, and there is little excuse for any mistakes in our publicity. Our business is above all not a business where we can afford to give false testimony, even though it may temporarily relieve a perplexing situation. Effective publicity has won strikes, has peaceably settled labor disputes, and has been the direct means of obtaining increased fares.

Local Newspapers Are the Best Advertising Medium

Personally I believe that local newspaper advertising is the best method to obtain effective publicity. No electric railway company can afford not to advertise in the local newspapers, and in fact, no business that I know of catering to a local general public can afford not to advertise in the local newspapers. We ask to be treated like other business and we therefore must conduct ourselves like other business and advertise in the local newspapers.

Advertising is a business. Our advertising department should be just as much a part of our business as is our transportation department, as is our mechanical department, as is our engineering department. Effective advertising requires training, study, thought, aptitude and initiative. Some few years ago when I first realized that advertising was essential to the electric railway business I also realized that I personally knew little about advertising, although there was no other branch of the electric railway business with which I was not familiar from actual experience.

So instead of hiring a trained advertising man I set about to train myself in at least the rudiments and essentials. The first year or two I personally wrote practically every advertisement, not because I could do the job better than anyone else, but because I believed that advertising was part of my business. Moreover, I wanted the experience so that I could form definite conclusions based on my own experience as to how effective publicity could best be secured.

How Can It Be Done Best?

How can effective publicity best be secured? As the result of our experience over the past five years, I have my own thoughts, but I am frank to admit that we just scratched the surface, as it were, of advertising knowledge and I am not qualified to tell you how effective publicity can best be accomplished. Even if I thought I were capable of doing this I should hesitate before an audience composed of so many publicity experts. When I consider how many real publicity experts there are here today it brings home forcibly the truth of my subject. It can be done. That's settled. What I want is for the publicity experts to tell us how effective publicity can *best* be accomplished.

Organizing the Public Relations Department[*]

By L. K. Starr

Manager Public Relations Department
Georgia Railway & Power Company
Atlanta, Ga.

L. K. Starr

The Director of Public Relations Should Know Human Emotions and Reactions, Must Know How to Disseminate Information and Must Be Able to Make Friends for Himself and His Company

JUST because a company is well and happy, so to speak, doesn't mean that it never is going to be seized with some serious malady. Therefore, it is probably more important that public relations activities be considered as preventive medicine rather than curative.

Good service of course is the fundamental of good public relations. If we fail to do our best to give good service we will not deserve public good will. In our business, however, good service alone, no matter how cheerfully given, will never hold good public opinion. Grudgingly given, it can never gain friendship. It thus becomes essential that, in addition to rendering good service, we must gain public understanding through the furnishing of correct information about this business. There is often as much harm done by misinformation as by failure to give service. Also it is our duty to give the facts about a business which is so affected in a public interest.

Ten to one the public relations manager knows very little about the detail and technique of operation of the street railway system any more than he knows how to audit the books, direct the building of roadways, the maintenance of equipment or the building of dams and transmission lines. You would not consider employing an auditor to build a transmission line any more than you would employ a carpenter to take out your appendix. By the same token you should never employ a man who doesn't know the business to direct your public relations activities.

There are many ways of building and maintaining good public relations and of disseminating information. There is the necessity of good service. Essential to good public relations are good employee relations, a company spirit created and maintained through inspiring leadership, plus correct information. Essential also is the use of every medium of distribution of information, such as newspaper advertising, motion pictures, employee publications, public speaking, and the like.

The director of public relations ought to be a man who knows something of human emotions and reactions; who has had experience in dealing with the variable moods of the human mind; who can win and hold the confidence of employees; who knows how to disseminate information; who has the confidence of the public and of company officials and who has sufficient personality and knowledge of the business to make friends, not merely for himself, but for the company as well.

Most companies, in the organization of public relations departments, have drawn men from the editorial or news departments of newspapers for their directors. There is a sound reason for this. The daily work of the newspaper man is to study and know the human mind and human emotions. But none of them are successful unless they know what people want and what people think and how people will react under various conditions.

Further, newspaper men are supposed to have a gift of expression in understandable language and the ability to write readable advertising copy. The ability to tell your story in understandable forms is absolutely essential to getting your story to the public. There are many brainy and gifted executives who know their business but can't tell it to the public. It's no reflection on them if they can't "talk the public's language." Let them tell it to the publicity man and leave it to him to tell the world.

So, employ some good newspaper man to direct the work. Let him be the spokesman of the company. Take him into the complete confidence of the inner councils and give him sufficient prestige in the company to command public regard as the company spokesman.

With the creation of the public relations department comes the details of organization, which of course should be left to the department manager. But it should be clearly understood that only through the public relations department is there to be any dissemination of information. This department should give out all information; should direct employee activities and contacts with the public; should advise with all departments on matters of policy and should direct and handle all advertising.

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[*] Abstract of a paper before the Annual Convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 6-10, 1924.

With the public relations department established under the direction of a trained manager with competent assistants, every branch of public relations activities should be co-ordinated under the direction of the new department. Co-ordination of all public relations activities is just as necessary as co-operation of all departments is necessary.

If you would make your public relations department a success organize it under the direction of some one who knows at least the fundamentals of the public relations business. Recognize the department as one as important as any other in the company. Give it a free hand and opportunity to do its work as its manager thinks it should be done, just as you give your other departments a free hand to do their particular work as it should be done. Tell your public relations department everything about the business; give it authority; put it under the direction of one executive and one only; centralize in it all of your public relations activities of every character.

Support your publicity with performance. You will find that your public is fair when the facts are known and that, when convinced of your honest endeavor, will accord you generous treatment.

Cold Soup*

Standardized Publicity Must Be Given Local Treatment—Railways Should Advertise in the Same Way as Any Other Business—The "Lag Factor" Is Gaining Recognition

By *John S. Bleecker*
Day & Zimmermann, Inc., Philadelphia

THERE is no more sense in undertaking to send out from a centrally located headquarters in New York or Philadelphia prepared publicity copy for a street railway operating in a distant city than in attempting to send a bowl of soup from the Traymore Hotel to the Marlborough-Blenheim expecting it to be hot on delivery. At the same time, there is every reason in the world why soup should be canned, and very delicious hot and cold soup is prepared from tins. It is, however, in every instance given such local treatment as will make it fit the circumstances surrounding its consumption. Publicity matter can also be handled the same way.

I have heard it said that a street railway which was not making money, could not afford to spend money on advertising, and that one which was making money did not need to. As a corollary of the above, I would say that a company which did not spend money on advertising and the establishment of satisfactory public relations could not be successful and that a company making some money without publicity would make a great deal more with it.

Practically all of the publicity matter indulged in by seven traction and nine bus lines passes across my desk. There is no attempt made to standardize publicity for these various properties. Methods applicable at one point are either unnecessary or disadvantageous at another point. Peculiar or unusual local conditions call for special treatment. There is only one general rule applicable to all and that is, "Keep everlastingly at it." We have no set percentage of the gross earnings allocated to publicity and advertising activity, but we do not look askance at the tendency to increase the appropriations from the almost absurd minimum of one-tenth of 1 per cent to as high as 3 per cent. Ordinarily, however, it has been running less than 1 per cent. When the budgets are prepared at the beginning of the year we discuss fully the question of an appropriation for publicity and include the figure decided upon, whether small or large, in the actual estimates. The decision regarding appropriations is made in each case independently of the others.

We urge all operators to give to the question of publicity and advertising the same enthusiastic interest and constructive thought as they do to operating and engineering questions. We do not suggest that they accept so-called "boiler plate" or standardized copy without special local treatment any more than we would recommend that everybody order the same kind of soup for lunch, but we do tell them that soup is nourishing and has a definite place on the menu. We do not send them advertising material and tell them they must use it, but we do send them large quantities of advertising suggestions which have proved beneficial elsewhere. There is no more reason for not undertaking to apply approved advertising matter to a local situation than for not using an accounting form or a motor or wheel which has proved its value elsewhere.

Have something in the newspapers every day, keep in close contact with the newspaper reporters, welcome them into the office, give them all the information that they want about accidents or anything else in connection with the property, remembering that when newspaper items are published that they should be truthful and full rather than sketchy and inaccurate. Moreover, we urge managers to keep in contact with the editorial staff through associations like rotary clubs, country clubs and civic bodies. We encourage the purchase of advertising space in the newspapers, believing that a concern which does not advertise is not alive to its possibilities. We stress the fact that the news, editorial and advertising departments of a newspaper are absolutely separate and distinct.

The character of publicity on the various properties which is favored by the local management and by those into whose hands the details of advertising are placed is as varied as the individual peculiarities of the men themselves. Men who are imbued with the spirit of service and who have experienced the reaction resulting from contact with the public, however, are quite alive to the particular kind of publicity needed in their own localities.

Pamphlets, booklets, general advertising matter and, in some instances, newspaper write-ups are submitted to us for comment, either before they are published or soon afterward, so that we may be of assistance to the local manager, but in no case is the responsibility for the publicity taken off the shoulders of the local men.

There is one phase of publicity which seems to be getting a more thorough recognition than ever, and that is what might be termed the "lag factor." Once the street car magnate went around, his chest out, lording it over the electric light and power man. Today the situation is reversed and the electric light and power man is sorry for the railway man. While certain natural causes have brought about the reversal of position, at the same time it is a fact that to overcome some of the electric light difficulties, intensive publicity was indulged in for many years. Street railways, on the other hand, neglected this publicity until trouble came. It took the electric light and power companies years of continuous publicity to attain their present enviable position, and it will take more than a few months for the electric railways to catch up to them.

The result of publicity is oftentimes not reflected in the condition of a property for months, and perhaps years, after the campaign has been undertaken. Spasmodic publicity will produce spasmodic results, and these spasms will be separated by an interval of time.

It may be that where publicity effort is spasmodic, its consequences could be plotted as a curve, alternately rising and falling, from zero to a maximum, and then back to zero or perhaps below the line. There would be a periodicity and a phase relationship between the publicity and its results which if heard over a radio would be anything but harmonious.

Continuous, constant, intelligent and thorough publicity will eliminate the "lag factor." It is along these lines that we are constantly urging action on the part of those in charge of the properties that we manage.

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*Abstract of a paper presented before the annual convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 6-10, 1924.

The Purposes of the Public Utilities Advertising Association*

By W. H. Hodge

Manager Advertising and Publicity Department
Byllesby Engineering & Management Corporation, Chicago

W. H. Hodge

This Organization, Which Is Affiliated with the Associated Advertising Clubs of the World, Is Setting New Standards for Ethics and Co-operation

THE Public Utilities Advertising Association, which was organized at the American Electric Railway Association convention at Chicago in 1922, now has about 230 members, all actively interested in the advertising of one or more of the utility industries—electric railway, electric light and power, gas and telephones. Individuals or companies may take out memberships. Our primary purpose is to increase the efficiency of public utilities advertising toward the advancement of the best interests of operating companies. We want to make every dollar spent for advertising return the greatest possible value. We want to develop further the power of advertising for utility companies so that it will increase earnings paid by a pleased and satisfied public; so that it will further harmonize the relations between the public and the utilities and achieve the sustained good will, which cannot be secured in any other manner.

Advertising in the United States is a large, successful and well organized industry. The public utilities do not yet realize its power and possibilities. Many other kinds of business understood the value of advertising long before we did. We are catching up rapidly, but we still have a long way to go.

Advertising is internationally organized in the Associated Advertising Clubs of the World, which is the clearing house for all that is best in advertising thought and practice, and sets the rules and standards, just as the American Electric Railway Association influences the progress of your industry. It is composed of some 25 organizations representing every branch of advertising, all the way from the advertiser to the many mediums through which it is expressed.

It was only through organization of the Public Utilities Advertising Association that the public utilities could join this important and forceful body and put public utilities advertising on the national advertising map. In this channel we are in touch, in a collective sense, with other advertisers, with the writers and manufacturers of advertising and with the publishers and others who provide the vehicles for reaching the public eye and thought.

As a department of the Associated Advertising Clubs of the World, we are in a position to see that public utilities advertising is accorded the recognition it deserves and to profit to the full extent from contact with those who spend their lives and a great deal of money in making advertising pay. We, also, have something to contribute in the way of experience and methods and from the results of showing utility companies not utilizing advertising fully how they can avail themselves of the opportunities before them.

In the structures of the national utility associations—with one exception—little has been provided to serve as a meeting place for the people in these industries who carry on the advertising functions. Many convention speakers have urged more and better advertising; little has been done to give the men and women actually working with advertising a forum to discuss their problems, ideals, ambitions and plans—to exchange ideas—to help them accomplish the truly difficult things it is so easy to build platitudes about. The national association programs have talked a lot about advertising but they really have neglected it.

We have in mind, also, the fact that utilities advertising will not progress unless we attract individuals of the proper ability and character to these particular fields. It is hoped that our association will be made an agency for employment on the one hand and the development of talent on the other.

We propose to collect and distribute among our members all possible information about and examples of utilities advertising; to assemble data relating to proved results; to study budget making and costs. By the exchange and comparison of products we propose to stimulate originality and develop new and advantageous conceptions of what, when, where and how to advertise.

We are pledged to high standards, accepted ethics and to earnest co-operation with our national, geographical and state utility associations.

The Public Utilities Advertising Association is young, modest and inexpensive. It has hardly started to prove its usefulness. But what it lacks in some respects we hope it will more than overcome in energy and practical accomplishments. We invite the interest and the membership of every utility company and every individual actually interested in better and more efficient advertising practice.

I wish also to say a word regarding certain exceedingly useful work accomplished by the National Vigilance Committee of the Associated Advertising Clubs. This committee, and the Better Business Bureaus which it fosters in many cities, are the police force of advertising. Their business is to keep out and prosecute the untruthful advertisers, the frauds and the fakers. One of their big achievements is the suppression of "wildcat" financial advertising. Every dollar saved to the public means that much money conserved for investment in sound securities such as the public utilities offer.

The National Vigilance Committee and the Better Business Bureaus deserve our moral and financial support. Their work is kept going by sustaining memberships, the cost of which is insignificant compared with the substantial good accomplished for honest people and honest business. They already have been formally indorsed by the customer ownership committee of the National Electric Light Association.

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*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 6-10, 1924.

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Advertising the Interurban*

By James P. Griffin

Vice-President and General Manager
Texas Electric Company, Dallas, Tex.

THE Texas Electric Railway has valuable interurban connections at Dallas and at five other points has valuable steam railway connections—Denison and Sherman in the north, Dallas in the center, Waco in the south and Corsicana in the southeast. We naturally point much of our advertising effort to care for the opportunities to secure traffic off the interurban and steam railways at these connecting points, also to deliver traffic to them at these points. In our advertising plan the daily and weekly newspapers naturally take a prominent place. We believe, and I feel that this is commonly accepted everywhere, that the newspaper offers the best field for general advertising for the interurban, doubtless reaching more readers than any other medium. It is our policy to carry regularly each day or each week certain space in the various newspapers published daily or weekly in the cities and towns served by us. In the two large cities of Dallas and Waco, where we do not use space each day, we contract for certain space for the year, using this space largely for advertising special events.

Under the Texas statutes we are permitted to exchange transportation for advertising space with the newspaper people, dollar for dollar on regular rate basis, and we have taken advantage of this opportunity to increase our newspaper advertising. We have had printed a special form of ticket for use under these exchange advertising agreements, containing $10 worth of transportation in 5-cent coupons, which the holder presents direct to the conductor on the car. We keep a ledger account with each one with whom we have a contract under this agreement, charging him with transportation as issued, and crediting him with his bills for advertising as rendered.

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*Abstract of a paper before the annual convention of the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 6-10, 1924.

We believe in using time cards freely, and put out each year through our agents and traveling representatives and by mailing to selected lists of steam railway agents and hotel men some 50,000 of our time card folders. The time cards for the three divisions are printed on a large sheet of cardboard, and are carried in frames under glass in all our stations. Printed cards for each division are framed and displayed in hotels, banks, post offices, drug stores, restaurants, etc.

We also get out special cards showing schedules out of certain principal points, with arriving time as Dallas. For Dallas a card is printed showing the leaving schedules of all the interurban lines serving the city.

We also get out printed blotters for general distribution. These are usually distributed by our traveling representatives when making their trips over our lines into surrounding territory. Car dash signs are used for advertising special events, such as our fairs, etc. The boards are also used quite regularly for advertising theatrical attractions in Dallas, also for the circuses, and other purposes where there seems to be opportunity to attract traffic. We have used some postal cards showing scenes along our lines and our equipment. These have been sold or given to newsstands, drug stores, and other places where postal cards are sold. Some are mailed out and distributed by our traveling representatives when making their trips. We believe that postal cards are entitled to a limited space in the interurban advertising plan.

In our interurban cars car cards are carried, devoted to various thoughts of merchandising transportation, safety of interurban service and use of the interurban instead of the automobile. These cards are placed in frames under glass in the front of the car and on the middle partition. It is our policy to mail samples to a number of advertising men in the industry, and we receive from them samples of cards they are using in similar advertising plans.

This year we joined with the other interurbans in Dallas in installing a booth at the State Fair at Dallas. This exhibit includes a miniature interurban car, which is operated with certain safety devices, and a large map of the various interurbans entering Dallas, with a flasher arrangement so that the several lines and stations are flashed in rotation. A stereopticon will be operated, showing scenes along the interurban lines and epigrammatic interurban advertising thoughts.

One of our chief dependencies of advertising is through the medium of personal solicitation. Our traveling representatives are constantly going over the territory served and frequently into surrounding territory. They personally present the interurban appeal to possible patrons. As one of their means of approach they carry pencils, penholders and notebooks. The pencils are distributed more or less generally at points off our lines; the penholders are usually placed in hotels and at the check counters in banks; and the notebooks are given to hotel clerks, railway agents and others at strategic points. We make it a policy to have our traveling men accompany trade trips of chambers of commerce, business men's leagues, etc., on which occasions they distribute our "hand out" advertising matter.

Advising the public that our agents' are prepared to make theatrical, railroad or hotel reservations for our patrons has been productive of considerable revenue to us. The agent telephones our general passenger office, and receives in return advice as to the making of the reservation. Patrons have found this service dependable, and use it frequently.

Engineering Executive Committee Meets

A MEETING of the Engineering Executive Committee was held at Atlantic City, Oct. 5. Members present were: President H. A. Johnson, C. H. Clark, C. R. Harte, R. C. Cram, Daniel Durie, M. B. Rosevear and G. C. Hecker, representing Secretary Welsh.

The report of the committee on Engineering Manual was approved. Witn regard to revisions to be made in the manual sections between publications of the bound volumes, which now will be every three years, it was agreed that every effort should be made to keep the technical committees active in putting through revisions as soon as desirable. Between publications such revisions will be included in an annual supplement.

A report of the activities of a committee of this association in connection with the division of simplified practice of the Department of Commerce was presented by R. H. Dalgleish. A number of meetings have been held which have been attended by Mr. Dalgleish and C. S. Kimball. The standardization of material used in all branches of industry is included in the program of this department. It was voted that this committee be continued to work with the department of simplified practice.

Mr. Hecker described the exhibit of association standards at the convention. A motion by Mr. Harte was adopted that the railway companies and manufacturers who have supplied material for this exhibit be given a vote of thanks by the association.

Jackson P. Dick, chairman of the committee on purchases and stores, appeared before the executive committee and requested authorization for a joint committee to co-operate with similar committees of the National Electric Light Association and the American Gas Association on purchases and stores. Authorization was granted.

Mr. Harte reported on the A.E.S.C. activities and on the relations of this body with the Engineering Association. A number of specifications now being handled through the A.E.S.C. were discussed. It was brought out that the A.E.S.C. will not take up standards for one or two industries only, but that a general use of the material in question over a wide range of industries is necessary before its standardization will be considered.

At present the reports of the various sectional committees of the American Engineering Standards Committee are incorporated in the report of the secretary of the Engineering Association. It was moved by Mr. Cram and adopted by the committee that hereafter reports of these representatives on the sectional committees of the A.E.S.C. be published separately.

With regard to the standardization of lumber sizes, Mr. Harte moved that a special committee be appointed with representatives from the way, equipment, and buildings and structures committees to investigate and report on the recommendations of the central lumber committee. It was requested that action be taken prior to the Midyear Meeting of the association.

T. & T. Executive Committees

THE executive committee of the Transportation & Traffic Association held a meeting on the veranda of the Marlborough-Blenheim Hotel Monday morning. There was considerable comment concerning the committees which should be continued next year and it was agreed that the subjects of traffic congestion, ride salesmanship, and trackless vehicle operation should be continued. A letter was read from Edward Dana suggesting an investigation to find out what benefits result to railways from conventions held in their localities.

The new executive committee of the Transportation & Traffic Association held a meeting at Atlantic City following the general session on Thursday. A report from the subjects committee was made by C. H. Clifford, vice-president and manager Northern Texas Traction Company. Four general subjects were decided upon, and will include the following: Merchandising, traffic congestion, accident prevention and use of the bus by electric railway companies. A fifth subject will be selected later.

It was decided that the committee on relief of traffic congestion should consider methods of carrying out the recommendations already agreed upon rather than simply an elaboration of these measures which are now well understood by railway men and accepted by them. Attention was called to the importance of specifically defining the nature of the work assigned to each committee. Still another decision made to facilitate and improve the work of committees was that the committee chairman will meet with the executive committee for consideration of next year's reports before final printing.

The News of the Industry

Change in Spartanburg

New Company Offers to Operate Buses on Regular Schedule—Controversy at an End

The South Carolina Gas & Electric Company, formerly the South Carolina Light, Power & Railways Company, was recently purchased by W. S. Barstow and associates of New York. R. L. Peterman, representing the new owners, appeared before the City Council of Spartanburg on Sept. 24, and stated his readiness to put on sixteen buses to augment some proposed restored railway lines. This action is expected to solve the problem of Spartanburg, a city of 25,000 population, where the street cars have been idle more than two years following a long legal fight between the city and the operating company, in which the city contended the company had not lived up to its franchise. Since the case has been in litigation the company has been attempting to handle the city traffic with four buses.

LITIGATION OF LONG STANDING

The controversy in Spartanburg dates back to December, 1922, when the company abandoned railway operation on the ground that it was unprofitable. Later the South Carolina Railroad Commission authorized abandonment in the city, but this action was followed by a mandamus petition by the city demanding the restoration of service. The Supreme Court at Columbia ruled that the company must renew railway operations. The opinion upheld the contention of the city that the franchise of the company to operate cars was a contract, which the South Carolina Railroad Commission had no authority to abrogate. Prior to the decision of the Supreme Court the company with the help of its President George B. Tripp, worked out a plan for the operation of a bus system putting four buses in operation in the city proper with two car lines on the suburban lines. Meanwhile the company decided to appeal to the Federal Court.

But now under a new management, the City Council is willing to meet the Barstow people half-way. At a Council meeting on Sept. 24, an agreement was reached whereby the Barstow management promised a fifteen-minute schedule to outlying mill towns, thus linking up a large mill population with the city and bringing many more thousands of dollars to the merchants in Spartanburg.

The building of the Southern Railway shops in the northern suburbs of the city has already brought several hundred new citizens to Spartanburg, and when completed in January, 1925, it will bring 5,000 more people to add to the city's population. The shop site is one and one-half miles from the heart of the city, and to get the several hundred workmen there now to and from their work is quite a problem. When the five thousand come the problem will be multiplied, unless the Barstow interests solve it by adding still more buses after they have doubled the original sixteen.

Many Provisions of Cincinnati Franchise Still Unsettled

Revision of the provisions of the proposed traction franchise tentatively agreed upon has been completed by the conferees representing the city of Cincinnati, Ohio, the Cincinnati Street Railway Company and the Cincinnati Traction Company. Nine provisions of the tentative franchise ordinance still are in dispute and the conference will be resumed in a final effort to effect an agreement by compromise.

The most important of these is the provision relating to street paving. The city's representatives insist that the operating company shall pay one-half of the cost of restoring existing streets which the cars traverse, while representatives of the Cincinnati Traction Company assert that only the cost of future repairs should be shared by the company, and that it should not be called upon to aid in the rejuvenation of existing worn-out streets. The Cincinnati Traction Company refuses also to defray any portion of the cost of maintaining the office of the Director of Street Railroads, while the city insists the company share in the expense up to $15,000 a year.

A further disputed point is whether or not the operating company should be compelled to rehabilitate the traction system by Dec. 31, 1927, or whether the time is to be extended to Dec. 31, 1928. The remaining controverted provisions pertain to the guarantee fund, whether the 5 per cent dividend should be cumulative during the rehabilitation period, the increased rates of fare and the payment of a 10 per cent premium on stock, if the city determines to purchase the system.

On the question of increased fare for owl service, the company would charge double the day rate of fare between the hours of 1 and 5 o'clock in the morning. The city strenuously objects to that increase, but would permit a provision that a different rate of fare be charged for owl service, if agreed upon by the Director of Street Railroads and the operating company.

The city refuses absolutely to pay any premium on the outstanding stock of the traction company if it determines to take over the system, but will pay par value for such stock. The proposed new ordinance will likely provide that a charge be made for transfers, if by so doing the rate of fare may be kept down.

Eight Cents Authorized

Oklahoma Railway Puts Higher Fare Into Effect—Parking and Jitney Ordinances Adopted

The Corporation Commission on Sept. 28, 1924, issued a temporary order, granting an increase to the Oklahoma Railway to 8 cents with 2 tickets for 15 cents. The company on Sept. 24 filed application for an increase to 10 cents single fare, three tickets for 25 cents. The fares then in force were 7 cents, four tickets for 25 cents. The rate for school children will remain at 2½ cents. The railway company alleged in its petition that operating costs in Oklahoma City were excessively high and burdensome because of automobile traffic congestion, especially in the business district, where automobiles are parked. This congestion, it claimed, resulted in slowing down schedules, reducing patronage and increasing loss from damage suits resulting from collisions. It was also pointed out that numerous railroad grade crossings in the city necessitated frequent stops for flagging cars or to await passing of trains. It was also alleged that automobiles carry many people in and out the business districts who would otherwise patronize the street railway.

COMMITTEE APPROVED OF HIGHER FARE

The company presented the report of a committee appointed by the Mayor of Oklahoma City and made in February of this year. This committee, after thorough investigation, recommended an increase in fares to single fare of 8 cents, with two fares, 15 cents. The company also referred to the receivership application in the federal court brought by the Mississippi Valley Trust Company, representing bondholders of junior mortgages, as a reason why relief is necessary.

The commission, in its order, states that it "is driven to the conclusion that a temporary increase in the fares for the transportation of passengers in Oklahoma City is necessary, such increase to be in effect until a more complete investigation of the affairs of the company may be had, either at the hands of Oklahoma City or by this commission."

The order was put into effect by the railway Oct. 1.

After relief had been granted by the commission, the Mississippi Valley Trust Company, through its attorneys, asked for a continuance of the receivership application. The federal court, therefore, continued the case until Jan. 15, 1925. The City Commissioners have already adopted the 20-deg. parking ordinance and also an ordinance prohibiting operation of jitneys within two blocks of a street car line.

Rensselaer Institute Commemorates Centenary—F. R. Low Awarded Degree

The Rensselaer Polytechnic Institute, Troy, N. Y., celebrated the 100th anniversary of its founding on Oct. 2 and 3 with ceremonies which were participated in by eminent educators, delegates from practically every engineering society in this country, a number of the leading societies abroad and by a large number of the engineering alumni of the institute. In addition to the unveiling of several commemorative tablets and an excellent pageant in the evening outlining the history of the school, the exercises consisted mainly in addresses by prominent educators and engineers.

The principal addresses were made by Secretary of Commerce Hoover, Sir Charles L. Morgan, president of the Institution of Civil Engineers of Great Britain; Henry Abraham, past-president of the Society of Electrical Engineers of France; Fred R. Low, president American Society of Mechanical Engineers, and many others prominent in the engineering world.

Frederick Rollins Low, editor of *Power*, a McGraw-Hill publication, was awarded the degree of doctor of engineering by the institute. Mr. Low is the author of "The Power Catechism," "The Compound Engine," "Condensers" and "The Steam Engine Indicator." He has been editor of *Power* since 1888.

Purchase Proposal Advanced for Greater Kansas City

A new factor has appeared in the electric railway situation in Greater Kansas City. This is the proposal of Mayor Gordon of Kansas City, Kan., to Mayor Beach of Kansas City, Mo., suggesting that the two cities buy out the Kansas City Railways and operate their own systems as a solution to the present transportation problem. He suggests also that both cities apply to their state Legislatures for authority to issue bonds to purchase the transportation system. It is Mayor Gordon's idea that Mayor Beach should appoint a committee of five substantial business men to meet a like committee from Kansas City, Kan., to discuss the proposition fairly.

In his letter he referred to the Kansas City Railways being in receeivers' hands and the difficult problems confronting the receivers, which they have handled well. He said that these problems might be more firmly grappled with if the municipalities owned the systems. He wrote at some length on municipally owned and operated transportation systems, declaring that if economically operated and properly administered they would solve the transportation problems.

He said that the idea that the street car as a mode of transportation is passing into ancient history might be true in the congested districts of New York, or some of the larger cities, but that it was not true in either of the two Kansas Citys, and in his judgment would not be true for some time to come. He said he believed the bus was not a reliable mode of transportation in these two cities because in bad weather it couldn't be operated as successfully.

Bus Petition Causes Stir in Albany

Attorneys for the United Traction Company, Albany, N. Y., and the K. L. W. M., Inc., were given until Oct. 20 to file briefs on the application of the K. L. W. M. for a certificate for the operation of a bus line between Bloomingrove and Troy, following the adjourned hearing before the Public Service Commission on Oct 2.

Opposition of the United Traction Company was based on the fact that the certificate, if granted, would make possible the operation of buses by the K. L. W. M. between Albany and Troy, by operating between Albany and Bloomingrove over a route for which the company has a certificate. The K. L. W. M. contended that even though buses did run to Troy, the travel would be light compared with the traction company, the distance being greater, the service slower and the fare higher.

John E. McLean, who appeared for the traction company, offered in evidence the financial reports of the company for the year 1923 and for the two quarters of 1924 to show that the company could not afford to lose any of its traffic.

Mr. McLean also appeared for the Troy & New England Railroad, protesting against the granting of the certificate because it would permit the K. L. W. M. to operate between Averill Park and Troy in competition with a branch of the railroad. Objection was also made by he New York Central Railroad.

Mayor Makes Suggestion for Rockford Franchise

For many months now the Rockford Traction Company, Rockford, Ill., has been negotiating for a new franchise, but without success. The company has been insisting upon a 20-year franchise on the ground that it will be unable to borrow the money for needed extensions on a franchise of shorter length. Mayor Hallstrom of Rockford and his supporters want the railway to submit an application for a 10-year franchise. The company is also reluctant to pay for any track paving, while the city is demanding that the company pay for all track paving costs. Recently Mayor Hallstrom made counter proposals to the company's plans. He said he would withdraw his objection to a 20-year grant providing the company deposit $750,000 in a Rockford bank as a guarantee so that provisions of the franchise would be carried out. The Mayor's proposal of a $750,000 guarantee fund would be used within twelve months to make certain improvements in the company's rolling stock, line extensions and paving repairs. The tentative draft which was submitted by the company, in the opinion of Mayor Hallstrom, forces the city to pledge public credit with the equity in the property unprotected. He said he didn't care whether the service was supplied by buses or street cars.

International Railway's Buses Given Ten-Year Franchise

The International Bus Corporation, a subsidiary of the International Railway, Buffalo, has been granted a franchise by the City Council to operate buses on Delaware Avenue from McKinley Square to the Buffalo-Kenmore city line and on East and West Delavan Avenues from the city line to Niagara Street. The franchise is for a term of 10 years. The fare will be 10 cents with free transfers to connecting car lines. Under the terms of the franchise the municipal authorities will have the right after April 1, 1927, to take over the bus service.

Application will be made at once by the International Bus Corporation to the Public Service Commission for the necessary consent to operate the two bus lines in Buffalo. As soon as the Public Service Commission gives its consent, the company will place orders for a fleet of double-deck buses to operate on Delaware Avenue and single-deck buses will be placed in service on the East-West Delavan Avenue lines.

The City Council divided three and two on the franchise, Mayor Frank X. Schwab and Commissioner of Public Affairs Frank C. Perkins, the Socialist member of the Council, being opposed. Mr. Perkins renewed his plea for municipal-owned buses on these two routes, but was voted down. The action of the Council turns down the permit sought by the VanDyke Motor Bus Corporation, which proposed a series of city-wide bus routes with an initial investment of upward of $1,250,000. The petition of this company was rejected by the city because there could be no transfer arrangement from buses to connecting car lines.

When the car riders ask for transfers to bus lines an additional charge of 3 cents will be made for a transfer. The carfare is 7 cents so that the 3 cents extra charge for a transfer to buses will make the 10-cent fare when passengers use buses and cars. The previous application of the International Bus Corporation asked for a 10-cent fare and a 3-cent transfer charge. The company amended its application by striking out the transfer charge and by enlarging the Delaware Avenue route.

Safety Bulletin Issued

The safety bureau of the Buffalo Chamber of Commerce has issued a bulletin urging automobile drivers and others to use extreme caution to avoid car accidents. The bulletin says:

> A street car is a heavy vehicle; it cannot always be stopped suddenly and it certainly cannot turn out to pass you.
>
> If an automobile and a street car meet, a street car won't get the worst of the argument.
>
> The motorman is on the alert and nine times out of ten he will avoid an accident if he has half a chance, but the tenth time may send you to the hospital and your car to the junk pile.
>
> Remember: At all streets the street car has the right of way, no matter in which direction the vehicle is approaching from—except where the traffic is being directed by an officer.
>
> Never pass a street car on the left, you may bump into one coming from the opposite direction.
>
> The street car is set in its ways; don't argue with it.

News Notes

Parlor Car Service Begun. — The Eastern Massachusetts Street Railway has started its parlor car service between Boston and Lowell, which is a non-stop service for $1 per trip. Twenty trips will be made on week days and eighteen on Sundays.

Bus Lines Allowed.—Three new bus lines within the city of Syracuse, N. Y., were authorized Oct. 3 by the Public Service Commission. Two of the routes will be operated by the Syracuse Railway Co-ordinated Bus Line, Inc., a subsidiary of the New York State Railways, and the third certificate was granted to Harvey D. Gros, general manager of the Syracuse & Eastern Railroad. Hearings on all three of the applications were held before Commissioner George R. Van Namee. All three certificates provide that transfers shall be made from the bus lines to the Syracuse lines of the New York State Railways.

Fare Increased to Ten Cents.—The Cincinnati Traction Company, Cincinnati, Ohio, increased its rate of fare from 9½ cents to 10 cents on Oct 1. The half cent increase is a result of the service-at-cost franchise which provides that whenever there is a deficit in operating expenses the fare will increase one-half cent every three months until the deficit is wiped out and a surplus of $600,000 is established. Although this deficit gradually is being cut down, it still amounts to more than $1,500,000 W. Kesley Schoepf, president of the traction company, said that the rate of fare probably would have to be increased to 15 cents in order to wipe out the deficit entirely.

Considers Bus Appropriation. — An appropriation of $17,000 for two municipal buses for operation on Empire Way in connection with the Seattle Municipal Railway cars has been considered by the City Council and referred to the city Utilities Department. Vigorous protest was voiced by the Seattle & Rainier Valley Railway, which declared that the proposed buses would be operated in competition with Rainier Valley cars. The company asked that consideration of the appropriation be withheld until the Council took up a pending resolution for the purchase by the city of the Rainier Valley system.

Lower Theater Rates Promised.—Announcement has been made by the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., that it will restore the low fare night theater rates to Indianapolis. The innovation of an unusually low rate of fare for night travel created a good deal of comment last year and several other railway companies adopted this practice following this company's example.

One-Man Cars in Superior.—After a study of five months on the petition of the Duluth Street Railway to establish one-man car service on its South Superior and Billings Park lines in Superior, Wis., formal approval has been given by the Railroad Commission. Double-truck cars remodeled into one-man types will be placed in service. Insufficient operating income to meet the rising operating expenses was cited by the company as the reason for this measure of economy. Testimony presented to the commission showed that the operating income of the company from Oct. 1, 1923, to April 1, 1924, amounted to only $7,134, whereas the company is allowed by the Commission to earn $8,167 per month alone on its investment of $1,225,000 or $48,999 instead of $7,134 for the six-month period.

Answer Sent to Governor.—Following Governor Pinchot's letter to the Pennsylvania Public Service Commission rebuking it for its "unseemly haste" in authorizing a temporary 8-cent fare on the lines of the Philadelphia Rapid Transit Company. Chairman Ainey has sent an answer to the Governor stating that the commissioners welcome an investigation into the existing fare situation in Philadelphia and into all the commission's actions in this connection.

New Wage Scale in British Columbia.—The British Columbia Electric Railway, Vancouver, B. C., has completed negotiations for a new wage scale for its trainmen. Motormen will receive an extension of their present maximum rate of 62 cents an hour for three years. Janitors, carhouse men and a few others, numbering about two hundred in all, will be reduced 3 cents an hour. One-man operators in Vancouver will not be affected, continuing at 68 cents. In Victoria, where all the men are one-man car operators, the rate will be reduced from 68 to 64 cents an hour.

Hoarding Tokens in Buffalo.—Gambling in car tokens sold by the International Railway, Buffalo, N. Y., is under way with announcement in the newspapers that there is danger that the Public Service Commission will soon hand down its decision on the application filed by the railway company to charge 8 cents cash on local lines in Buffalo or two tokens for 15 cents. The present fare is 7 cents or 4 tokens for 25 cents. Passengers are buying four tokens for 25 cents every time they pay a cash fare and hoarding the three other tokens so they can be used if the fare is raised. This would save car riders 5 cents on every four rides. The only way the International Railway can offset the use of tokens bought now when the fares are increased is to change the tokens, but this would necessitate a large expenditure. Company officials doubt if the increased cost of the new tokens would warrant changing them to prevent such hoarding.

Effort Made to Attract More Riders.—The Fitchburg & Leominster Street Railway is experimenting with a new system to give longer rides for 10 cents. A return check system is used whereby passengers are given twice as much mileage for the same price. Patrons of the south side loop who ride only as far as either terminal without transfer are given a check when they pay a 10-cent fare that will carry them back to their starting point. It is expected that the new system will cause more liberal patronage of trolleys.

Trolley to Carry Mail. — Arrangements are under way at Southington, Conn., to have the U. S. mail en route to the town brought from Meriden by trolley. This was made necessary by the discontinuance of the railroad service by the New York, New Haven & Hartford Railroad.

Transfer of Passengers Brings Agreement.—Following the refusal of the City Council of Olean, N. Y., to sanction the petition of the Iroquois Motor Trails Company of Buffalo, for permission to use the streets of that city in connection with the operation of a bus line from Olean, Salamanca and Buffalo, an announcement has been made by that company that the line will continue on its present schedule. Through an arrangement made with the Olean, Bradford & Salamanca Railway, passengers will be transferred to the railway's Boardman. East Olean line, which will convey them into the city. The bus company, with this plan in effect, will convey the passengers into Olean via the trolley system, free of charge, charging fare only to the Olean city limits.

Bus Service to Start.—The Boston & Maine Railroad has installed an automobile bus service between Ashburnham and South Ashburnham on the Fitchburg division. It gave up the train service some time ago because it did not pay; then it tried a gasoline engine, but had to abandon that also on account of the cost of operation. As a final resort it will try an automobile bus that costs about $7,000 and has a 60-hp. engine. The fare between the two stations will be 10 cents.

Seeks Fare Advance.—The Atlantic City & Suburban Railway and Shore Fast Line, Atlantic City, N. J., have petitioned the Board of Public Utility Commissioners of New Jersey for permission to increase passenger rates. The Suburban line asks for an increase from 6 to 7 cents in Atlantic City, while the Shore Fast Line wants to increase fares from 5 to 7 cents in Ocean City. Other slight increases, including those in school tickets, are also asked from the surrounding towns. The Suburban line would increase the fare from 14 to 16 cents between Atlantic City and Pleasantville.

Bus License Granted. — The City Council in Attleboro, Mass., has appropriated $1,200 to cover the estimated deficit from operation of the Interstate Consolidated Street Railway during the next four months. It has also voted to grant license to the same company to operate buses between Attleboro and Providence.

Wants Two-Men Cars.—A resolution was introduced in the City Council of Erie, Pa., on Oct. 2, by William D. Kinney, Director of Parks, calling for an investigation by city officials into the operation of one-man cars on the streets of Erie by the Erie Railway, the company recently formed to assume the operation and assets of the Buffalo & Lake Erie Traction Company's lines within the city. He called attention to the fact that an 8-cent fare was charged for short hauls on cars which, because they were not manned by two men, he claimed gave inadequate service.

Financial and Corporate

Foreclosure Proceedings Filed

Trustee for the St. Louis Transit Bonds Wants Sale of Property—Suburban Holders Want Interest Protected

The first formal step toward a complete reorganization of the United Railways, St. Louis, Mo., was taken in the United States District Court, Oct. 3, when counsel for the Mercantile Trust Company, trustee for the St. Louis Transit 5 per cent bonds, filed foreclosure proceedings against the car system. The petition asks for a consolidation of the United Railways litigation pending in the federal court and for the sale of the properties of the company for the benefit of the creditors. Federal Judge Faris has expressed himself as favoring an early termination of the present receivership.

SUIT IS DIRECTED AGAINST THE RECEIVER

The suit was directed against Receiver Rolla Wells, the St. Louis Transit Company and the St. Louis Union Trust Company, trustee for the $30,000,000 issue of general 4 per cent bonds. The latter has a foreclosure suit pending alleging the United Railways has defaulted on the $9,790,000 mortgage securing the Transit 5s, which are past due since Oct. 1. Pleading for a consolidation of the litigation, the Mercantile Trust Company contends that foreclosure under the general 4 per cent bonds would seriously impair the Transit 5s, now past due, while the general 4s do not mature until 1934.

Reorganization of the system will proceed without the participation of the holder of the $6,500 000 of Suburban system bonds if their protective committee remains firm in its announced stand of rejecting the reorganization plans as they relate to the Suburban securities.

COUNSEL STATES THE CASE

Stanley Clarke, counsel for the reorganization committee, made this clear, saying:

"We deem more than fair the offer which we have made to pay off $2,000,000 of the Suburban bonds immediately and retire $100,000 additional each year for ten years. The Suburban bondholders will be given an opportunity to deposit their securities whether or not the committee representing them approves of it, and their acceptance is a matter for them to determine."

At a meeting on Oct. 1 held at the United States Bank in St. Louis, the Suburban bondholders tentatively accepted a new proposition from the reorganization committee providing for the guaranteeing and retirement of a new issue of $4,500,000 Suburban bonds to replace the present general issue. Prior to the meeting the Suburban security holders had assumed a belligerent attitude and a long legal battle threatened.

The Suburban bondholders' committee had another meeting scheduled for Oct. 8, to determine what steps to take to protect their interest in view of the foreclosure suit under the Transit bonds. Members of the committee said they were ready to take over and run the Suburban lines as a separate system if necessary to protect their holdings. It was stated that such step would be taken with hesitancy because of consideration for the public, but would become necessary if the reorganization committee did not guarantee the new issue of $4,500,000 Suburban bonds.

Receiver Named for Springfield Property

John S. Bleecker has been appointed receiver of the Columbus, Newark & Zanesville Traction Company, Springfield, Ohio. Attorneys James M. Butler and Paul C. Martin were appointed as counsel for the receiver. A reorganization of the property is the next step. An organization of holders of approximately $3 500,000 of bonds in the company will be attempted. It is expected that the property will be put up for foreclosure sale within a few months. An application for a receivership was made to the federal court in Columbus some months ago by the Irving Bank-Columbia Trust Company of New York. It charged at that time default of payments of interest on a $1,200,000 bond issue.

The company operates between Columbus and Zanesville by way of Newark, the local street car system in the city of Newark and furnishes electric current in Zanesville. Service will be continued as usual under the receivership, according to Mr. Butler.

Receiver Named for Maumee Valley Line

B. A. Webster, general manager of the Maumee Valley Railway, Perrysburg, Ohio, has been made receiver of the property. The appointment of a receiver had been asked by the Commercial Savings Bank & Trust Company, trustee. Suit for foreclosure of a mortgage of $345,000 on the property had been filed in Common Pleas Court at Toledo. The suit comes as a climax to a number of troubles the road has experienced. It now has an application before the State Public Utilities Commission to abandon service, but no action has been taken on the application. A change in grade of the river road between Toledo and Maumee brought about abandonment of part of the territory served by the company. The Maumee Valley Transportation Company was granted a permit on Oct. 8 to operate buses on the east side of the river between Toledo and Perrysburg.

Bluffton Property Bought by Insull Interests

Another purchase of Indiana utility and traction property, amounting to more than $750,000, was made Sept. 29 by the Samuel L. Insull interests of Chicago in the acquisition of the property of the Marion & Bluffton Traction Company, according to an announcement made at Bluffton, Ind., the head offices of the traction company.

Charles W. Chase of Gary, Ind., was elected president of the new controlling concern. Thomas G. Hamilton of Gary was elected vice-president, George F. Mitchell, Chicago, treasurer; W. D. Bohne, Chicago, secretary, and R. M. Scheidt, Gary, assistant secretary and treasurer. James S. Clark of Bluffton, former manager of the Marion & Bluffton Traction Company, will be general manager. William A. Kunkel, Jr., of Bluffton was president of the old company.

The original investment of the old company, it was announced, was $785,000. Stockholders are said to have received par for their holdings. The transfer of the property also included the Linn Grove Light & Power Company lines, which supplied light and power to two small towns near Bluffton. The branch office of the new company will be retained in Bluffton. The main office will be in Chicago.

The traction line extends a distance of 31.8 miles between Bluffton and Marion. It will give the Insull interests a direct line now from Frankfort to Bluffton, the line between Marion and Frankfort having been taken over some time ago. The newly acquired property, which has been operated under the management of Mr. Clark since the death of James W. Sale, is expected to be improved.

Seeks Discontinuance of North Hornell Line

The Hornell Traction Company, Hornell, N. Y., through Frank M. Prentice, president, and Raymond E. Page, receiver, has made application to the Public Service Commission for approval of a declaration of abandonment of a part of its line known as the North Hornell line. The line was constructed in 1913 as an extension from the then northerly terminus near the city line of Hornell to the village of North Hornell. Receipts on the North Hornell line, averaging from $2 to $4 daily, amount to only about one-third of the cost of operating the line, which is about $12 a day, exclusive of repairs and expenses of maintenance.

Since the appointment of Mr. Page as receiver, on July 29 last, receipts for the whole railroad to Sept. 1 amounted to $18,404, whereas expenses for the same period were $19 304, the petition says. The railroad is in immediate and urgent need of new rails, new ties and new equipment, but funds are not available.

Abandorment of the line was consented to by the mortgage bondholders of the railroad, provided the property was used as far as available for repairing the other portions of the railroad and the proceeds of anything sold to be used for the same purpose.

Customers May Purchase on Installment Plan.—The New Orleans Public Service, Inc., New Orleans, La., has announced, following a successful selling campaign of two weeks in which 3,400 employees bought more than 96 per cent of the corporation's cumulative preferred stock offered to them, that stock of the same issue may now be bought by the customers of the company or other local people in large or small amounts, for cash, or on the installment plan, at $10 a month. The shares, it is declared, pay dividends every three months and yield more than 7½ per cent a year on the money invested.

Wants To Issue $2,400,000. — The Lima-Toledo Railroad, Lima, Ohio, has asked the Public Utilities Commission for authority to issue $2,400,000 in securities to pay for property formerly part of the old Ohio Electric Railway. The proposed issue is divided into $650,000 common stock, $750,000 7 per cent preferred and $1,000,000 in 6 per cent 25-year bonds. It is proposed that the issue be dated as of Dec. 1, 1922. A request to issue $2,700,000 in securities in 1922 was refused on the ground that the earnings were not sufficient to carry such capitalization.

Bonds Offered. — Halsey, Stuart & Company are offering at 89 and interest, yielding more than 5¾ per cent, $9,000,000 of first mortgage and refunding 5 per cent gold bonds of the Ohio Public Service Company, Mansfield, Ohio. The bonds, known as series D, are due Sept. 1, 1954.

$7,000,000 Municipal Railway Loan Expected at Toronto.—The City of Toronto, Ont., is awaiting a court decision on a contested valuation of the Toronto Railway, when it plans to sell a bond issue to pay for taking over the utility. The case is now before the London Privy Council, whence it was carried on appeal. A loan of about $7,000,000, to be offered on a competitive basis, is expected.

Approves Issue.—The Arkansas Railroad Commission has approved the petition of the Hot Springs Street Railway, Hot Springs, Ark., to issue $68,000, par value, first mortgage, 8 per cent bonds. The bonds will mature in 30 years. The Hot Springs firm operates both the street railway and the electric light plant and has an authorized capital of $500 000.

Wants to Discontinue Line. — The Menominee & Marinette Light & Traction Company wants to discontinue its Quimby Avenue car line across the river in Menominee, Mich. In making this request, the company maintained that the operating costs of the Quimby line were $11,000 annually, while the revenues only reached $4,000, leaving scarcely nothing to pay for fixed charges or depreciation.

Discontinuance Date Set.—The Alabama Traction Company will discontinue its railway service in Decatur, Ala., and Albany, Ala., on October 11, according to an official notice signed by W. R. Speer, superintendent of the company. This suspension follows permission given several weeks ago by the Alabama Public Service Commission. It is announced that this company had been operating at a loss for some time. Several times schedules were changed, with the hope that operation could be continued. Officials announced that automobiles were carrying so many passengers that it was impossible for the railway to operate at a profit. The company has 7 miles of track and nine cars.

Old Management Retires.—Negotiations during the past two months have resulted in the Pennsylvania & Maryland Street Railway, Elk Lick, Pa., being turned over to the Wilmoth interests of Meyersdale. The Pennsylvania & Maryland was organized by the late C. H. Jennings of Towanda, Pa., and began operating in 1906 between Salisbury and Meyersdale, 9 miles above Grantsville. Later it was extended to Garrett. About a year ago the Garrett end was abandoned and trips were made between Salisbury and Meyersdale. Owing to the improved road through this section passenger traffic has decreased so greatly that the former management decided to quit.

Payments Not Made. — Preferred stockholders of the Worcester Consolidated Street Railway, Worcester, Mass., have not received, for the first time in two years, the usual payment on the back stock dividends due Oct. 1. Officials of the road say the heavy expenses of operation under the new agreement with the employees do not favor the payment.

Bonds Offered.—A syndicate including J. G. White & Company is offering at 99 and interest to yield more than 6.55 per cent $11,700,000 in secured 6½ per cent gold bonds of the Continental Gas & Electric Corporation, which through a recent merger is a subsidiary of the United Light & Power Company. The bonds, known as series "A", are dated Oct. 1, 1924, and are due Oct. 1, 1964. The principal companies controlled by the Continental Gas & Electric Corporation include the Columbus Railway, Power & Light Company, the Kansas City Power & Light Company and the Lincoln Gas & Electric Light Company. The preferred and common stocks of the Continental Gas & Electric Corporation have been sold at this time to provide over $5,000,000 cash, which, together with the proceeds of this issue of $11,700,000 of bonds, will be used to acquire practically the entire remaining outstanding shares and 25,000 additional treasury shares of the Kansas City Power Securities Corporation (owning 100 per cent of the outstanding common shares of the Kansas City Power & Light Company, and not less than 75 per cent of the common shares and a substantial interest in the preferred shares of the Columbus Railway, Power & Light Company, and to provide funds for the acquisition of additional securities of controlled companies.

Personal Items

James G. Nellis Succeeds Charles F. Teagle at Schenectady

Charles F. Teagle, who has held the position of superintendent of transportation of the Schenectady Railway, Schenectady, N. Y., for the past four years, tendered his resignation to the president on Oct. 1. Mr. Teagle will not sever his connection with the company until about Oct. 15.

James G. Nellis will succeed Mr. Teagle, with the title of superintendent, on Oct. 20. Mr. Nellis comes from Auburn, N. Y., where he has been superintendent of the Auburn & Syracuse Electric Railroad for some years past. He is no stranger to Schenectady as he was formerly a division superintendent with the Fonda, Johnstown & Gloversville Railroad at Amsterdam, N. Y. He was at one time manager of the Quincy division of the Eastern Massachusetts Street Railway. He joints the official ranks of the Schenectady Railway with a record of accomplishment in the electric railroad field, which he entered in 1893 with the Cayadutta Electric Railway.

L. V. Sutton, for the past twelve years connected with the Carolina Power & Light Company, Raleigh, N. C., has been appointed assistant general manager of the Arkansas Central Power Company, Little Rock, Ark., to succeed H. U. Wallace, who resigned several months ago. Mr. Sutton has assumed his duties as assistant manager. He is a native of Virginia and is a graduate of Virginia Polytechnic Institute. He has made a study of electrical and chemical engineering and after his graduation from the Virginia Polytechnic Institute was employed by the General Electric Company at Lynn, Mass., for two years.

J. Henry Scattergood has been appointed by Governor Pinchot of Pennsylvania a member of the Public Service Commission, succeeding Samuel M. Clement, Jr., who recently resigned. The new commissioner has had experience along banking, insurance and manufacturing lines. He is treasurer of Haverford College and a director of a bank and of several industrial firms. He was one of the founders of the original committee of seventy. For six years he served as registration commissioner of Philadelphia on the original board named in 1906. During the war he was with the Red Cross in France and twice went abroad for the American Friends' Service Commission in post-war relief work. Mr. Scattergood was born in Philadelphia in 1877 and was graduated from Haverford College in 1896.

Raymond S. Tompkins, engaged in the newspaper business for a number of years, has become assistant to the president of the United Railways & Electric Company, Baltimore. Mr. Tompkins has been a member of the staff of the Baltimore *Sun* since 1916 and represented that paper in France during the World War.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Car Orders Double in Two Years

Number of Electric Railway Vehicles Built in 1923 Was 103 per Cent Greater than in 1921

According to data collected by the Department of Commerce at the biennial census of manufacturers there was a large increase in the production of electric railway cars in 1923, as compared with 1921, the last preceding census year. The total number of such cars, including both passenger cars and freight cars, was 2,882, as against 1,420. An even greater proportionate increase occurred in value, from $10,128,472 in 1921 to $26,184,713 in 1923.

It will be observed that the total number of cars built is considerably smaller than the total number of cars ordered in 1923, which was 4,029, as told in ELECTRIC RAILWAY JOURNAL for Jan. 5, 1924. This difference is accounted for principally by the fact that the government figures are based on the returns sent in by eight manufacturers engaged primarily in the business of building electric railway cars. The figures published in the JOURNAL, on the other hand, include cars built by other manufacturers who were not engaged primarily in this industry and included also cars built by the railways themselves.

Of the eight companies engaged in the manufacture of electric railway cars two each are located in Missouri and Ohio and one each in Illinois, Massachusetts, North Carolina and Pennsylvania. In 1921 this industry was represented by ten establishments, the decrease to eight in 1923 being accounted for by the fact that one establishment went out of business before the beginning of 1923 and that another during that year was engaged primarily in the manufacture of steam railroad equipment. Statistics of the industry are given in the accompanying tables.

GENERAL STATISTICS FOR THE INDUSTRY: 1923 AND 1921

	1923	1921	Per Cent of Increase
Number of establishments	8	10	.....
Wage earners (average number)	3,978	2,912	36.6
Maximum month	Nov. 4,838	Jan. 3,598	.....
Minimum month	Jan. 3,271	Dec. 2,304	.....
Per cent of maximum	67.6	64.0	.....
Wages	$5,880,773	$3,199,145	83.8
Cost of materials (including fuel)	$17,312,194	$7,880,405	119.7
Products, total value	$29,074,062	$14,856,068	95.7
Value added by manufacture	$11,761,868	$6,975,663	68.6
Horsepower	10,028	Not reported	.....
Coal consumed (tons of 2,000 lb.)	44,630	Not reported	.....

NUMBER AND VALUE OF CARS BUILT: 1923 AND 1921

	1923	1921	Per Cent of Increase
Electric railroad cars			
Number	2,882	1,420	103.0
Value	$26,184,713	$10,128,472	158.5
Passenger			
Number	2,767	1,358	103.8
Value	$25,695,757	$9,525,402	169.8
Freight and other varieties			
Number	115	62	85.5
Value	$488,956	$603,070	—18.9
All other products (includes value of rebuilt cars)	$207,485,685	$153,633,097	35.1

Comparative Labor Statistics for Ten-Year Period

Startling figures are given in a study of labor wages from July, 1914, to July, 1924, by the National Industrial Conference Board, New York. The board reports that in twenty-three leading manufacturing industries covering, on the average, 700,000 employees, wages show an advance of 127.3 per cent, and taking the relation of the changes in earnings to the change in the cost of living from the common base of July, 1914, the figures show that the wage earner in these industries is 27 per cent better off today than he was in July, 1914. The drop in the cost of living from the high peak of 1920 has been considerably greater in proportion than the drop in wages from the same high peak. Consequently, the purchasing power of the dollar is greater than it was.

Less striking but still of considerable significance are the changes in employment and hours of work. Employment in identical manufacturing plants throughout the period advanced 12 per cent between July, 1914, and June, 1924. This is a remarkable indication of expansion when it is remembered that employment in June of this year was at a low ebb, being 25 per cent lower than in June, 1920.

The average work week has dropped more than five hours during this ten-year period. The average nominal or full-time work week in July, 1914, was fifty-five hours, but with June of this year it had dropped to 49.9 hours. In the same way the average work week per wage earner declined from 51.4 hours in July, 1914, to 45.4 hours in June, 1924. In connection with the latter figure, it should be remembered that manufacturing activity was considerably below normal in June of this year and consequently the average week per wage earner is lower than the normal work-week of this general period.

Register Business at Peak

An interesting light is thrown upon the present status of the electric railway industry by a recent statement of John F. Ohmer, president Ohmer Fare Register Company. More Ohmer registers are being sold to railways at the present time, according to Mr. Ohmer, than ever before in the history of his company. This is in addition to large purchases of registers for buses and other recording devices made by this manufacturer.

Power Show Coming

The Third National Exposition of Power and Mechanical Engineering will be held in the Grand Central Palace, New York, from Dec. 1 to 6, 1924. The large increase in the use of the individual motor drive on machine tools has led the managers of the show to make a special effort to bring a group of manufacturers of modern economical motor-driven machine tools into the show as an object lesson of what can be accomplished in securing savings by the greater use of the electric motor in general manufacturing. Exhibits of bearings, couplings, belting and belt drives and gearing will be extended and elaborated at the coming exposition in New York.

Rolling Stock

Interstate Public Service Company, Indianapolis, Ind., to perfect its coal transportation plans, will purchase 100 new gondola coal cars. The company also has included in its 1925 program for development the purchase of additional rolling stock equipment, part of which will be 40 new freight cars, 20 box cars and the same number of flat cars. This equipment was deemed necessary to care for the expected increase in general freight traffic.

Metal, Coal and Material Prices

Metals—New York	Oct. 7, 1924
Copper, electrolytic, cents per lb.	12.875
Copper wire base, cents per lb.	15.125
Lead, cents per lb.	7.80
Zinc, cents per lb.	6.56
Tin, Straits, cents per lb.	49.375
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.275
Somerset mine run, Boston, net tons	2.075
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.375
Central, Ill., screenings, Chicago, net tons	1.175
Kansas screenings, Kansas City, net tons.	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.25
Weatherproof wire base, N. Y., cents per lb.	17.75
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	1.03
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.12
Turpentine (bbl. lots), N. Y., per gal.	0.88

New York, Saturday, October 18, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
Henry W. Blake and Harry L. Brown, *Editors*

Volume 64
Number 16

Modernization Taking Place in Accounting Practice

ONE of the most important subjects given consideration by the Accountants' Association at its recent convention, that of cost accounting, was covered in a comprehensive paper by Henry S. Day of the Westinghouse organization. In his paper, Mr. Day brought out the advantages to the operating man of a cost accounting system which will reflect, to as accurate a degree as possible, the expense of operating and maintaining various property units. It was the thought of some members of the association, as was evidenced by the discussion, that the installation of such systems might require certain revisions in the accounting methods at present in use in determining operating expenses, but it is generally agreed that the subject should be given some thought. The advantages to the operating department of even a simple cost accounting system, particularly when operating data pertaining to bus operation is being compared with similar railway statistics, are quite apparent. In connection with this subject, the suggestions made for consideration of similar studies on fixed capital and plant inventory records are also worthy of favorable comment.

It was the general opinion among the members of the Accountants' Association that the report of the stores accounting committee was the best ever presented to the association on the subject. The suggestions on harmonizing the stores records with the general ledger are of particular value. Inventories are too often compared with records which are not in agreement with the general accounts, and it goes without saying that proper control of the company's investment in materials cannot be obtained until the physical inventory and the financial records are known to contain the same elements.

During the coming year the Accountants' Association is planning to give particular attention to a number of new subjects, particularly bus accounting and cost records. Its work will continue to be of value to the industry and the association should receive all the assistance and encouragement possible.

Classification of Bus Accounts to Be Studied

THE adoption of a uniform classification of bus accounts is a subject of interest to any electric railway operator, regardless of his present policies in connection with bus operations. As was pointed out in an editorial in *Bus Transportation* for September, at present it is extremely difficult to secure satisfactory comparative operating data, since there are so many different accounting classifications in use. As a result, the various items of direct and indirect expense are subjected to all kinds of interpretations. As an illustration, the costs per mile sometimes quoted by various manufacturers and operators show differences of 100 per cent or more. Under such conditions, electric railways already operating buses cannot obtain figures from other operators which correspond with their own, while companies contemplating bus operation are at a disadvantage when attempting to secure the advance information which is so vital to them. It might also be said that the operating costs of electric railway properties where buses are neither operated nor contemplated should not be compared with bus operating costs unless they contain the same elements, and even then care should be used to prevent drawing erroneous conclusions.

The action of the American Electric Railway Accountants' Association in assigning this work to a special committee, of which M. W. Glover of the West Penn Railways is chairman, is of particular interest at this time, when a number of companies are considering the operation of buses. The executives of these companies should receive the benefit of the best and most comprehensive operating data obtainable. This study should cover not only the revenues and details of operating expenses, but also property costs, taxes, obsolescence, changes in standards and other similar subjects considered during recent years by the electric railway industry.

There is a large field for constructive work ahead, and it will be to the advantage of the electric railway industry, the bus manufacturers and the bus operators if the committee to which this subject has been assigned is given full co-operation by member companies.

Physicians and Surgeons Hold Session at Claims Convention

THE wide range of subjects closely related to electric railway operation was again instanced in the session by physicians and surgeons at the Atlantic City convention. Occasionally in the past a member of the medical profession has been asked to present a paper before the Claims Association, usually on some topic connected with damage claims, so that the claims representatives present could have an aspect of the medical side of the injuries for which suit is often brought.

Some of the papers presented at the session on Oct. 7 were of this nature, but others showed the growing closer interest which railway companies must take in medical matters in connection with their personnel work. This includes not only the medical and surgical care of the men, so that they can be kept in good condition, but similar care extended also to their families by the company.

A natural step in this medical work is periodical examinations, a topic discussed by two papers at the convention.

While the theoretical justice of such examinations will be admitted by the employees, those who have cause to fear rejection will be apprehensive and will oppose the idea. This is undoubtedly one reason why re-examination is not more general. But, after all, as was brought out at the meeting, the medical examination is for the benefit of the men quite as much as for the company. If a man has a defect, it can often be cured if taken in time. If not curable the men should understand that everything will be done which is possible to keep them in the service in less responsible positions. There should also always be a chance of a medical appeal from the verdict of the examining physician.

Periodical re-examinations of trainmen are bound to come, particularly on those railways where operating conditions are severe, and there is consequently much danger from the physical failure of the trainman. The Claims Association is to be congratulated upon developing facts upon this subject.

Electric Locomotive Manufacturers Now on Common Ground

TWO significant announcements in the heavy traction field were released for publication this week, and appear elsewhere in this issue. The first is that the New York, New Haven & Hartford Railroad has contracted with the General Electric Company for seven locomotives of a new design to operate on the New Haven's 11,000-volt, single-phase system; the other is the first comprehensive description of the electrical features of the Ford-Westinghouse locomotives being built for the Detroit & Ironton Railroad, which will be used on a 22,000-volt, single-phase system.

While both of the new locomotives described are somewhat radical departures from anything yet built they both will utilize the same type of electrical equipment. Each will take current from a single-phase contact line and step it down through transformers, after which it will be converted to direct current by means of synchronous motor-generator sets. In both cases propulsion motors of the familiar d.c. series type will be employed.

These announcements are of great import in the progress of railroad electrification. The division of opinion regarding the relative merits of the different systems, which has given rise to serious controversy at times, has held back electrification. Steam railroad executives have felt that if electrical engineers and manufacturers could not agree, it was undesirable to proceed with the expenditure of such large sums of money. This was pointed out in an editorial in this paper for Jan. 6, 1923, in which the further statement was made that signs pointed toward a realization by the manufacturers of the deterrent effect of the controversy, and that developments might be expected along the lines which have now taken shape in these latest locomotives. While these developments have taken longer than was anticipated at that time, the progress made is noteworthy, and it is hoped will be but the forerunner of greatly increased activity in railroad electrification.

It has come to be more or less generally accepted in both schools of electrification opinion that the single-phase a.c. system is most advantageous for distribution, and that the rugged series d.c. motor is the most satisfactory propulsion unit. Thus, the latest locomotives of both the General Electric and the Westinghouse companies embody what may be said to be the best features of both the principal systems of electrification heretofore employed. If they work out satisfactorily in practice, and there seems to be no reason why they should not, they offer one basis on which both manufacturers may be ready to compete for the business of electrifying any railway where an a.c. distribution is considered essential by the purchaser or his experts.

Control Features of New Locomotives Are Not New

THERE is nothing fundamentally new in the form of control used in these new a.c.-d.c. locomotives for the New Haven and the D. & I. roads. The direct current from the motor-generator is fed directly to the propulsion motors without the interposition of resistance, as is customary in d.c. traction. Instead, there is a voltage control obtained by varying the field of the generator, making it unnecessary to waste energy while starting or when operating at reduced speeds. Such a system was first proposed by H. Ward Leonard before the American Institute of Electrical Engineers in 1892, and described in the *Street Railway Journal* for July of that year—over 32 years ago. The need for a control of this type did not arise, however, and it never came into commercial use. In fact, not a locomotive using the principle was built in this country prior to the present orders.

The original Ward Leonard control was planned for use with a direct-current supply system, so that the only advantage was in the perfection of speed control obtainable. This was offset by the excess weight of equipment, so that some form of series-parallel control always has been considered superior for straight d.c. work. In the present adaptation to the single-phase contact line, practically the only refinement introduced is the provision for separate excitation of the propulsion motor fields to permit control of the rate of regeneration, and the substitution of a single-phase synchronous motor for a d.c. shunt motor to drive the motor-generator set.

Some have said that this new type of locomotive is universal in that it can be interchanged among railroads electrified with either the direct-current or single-phase system. This is true provided the locomotive is equipped with the standard series-parallel control apparatus for operation with a 600-volt d.c. overhead, in addition to the motor-generator control equipment. But the present-day commutator type single-phase motors may also be operated on d.c. lines, provided the locomotives are supplied with d.c. control equipment. Thus, the universality of use is not a feature exclusive to the motor-generator type locomotive. For example, all of the New Haven passenger locomotives are arranged for operation on either form of current. However, the complication of providing a complete changeover of connections to the motors when transferring from one system to the other has been one of the serious handicaps with which the New Haven has had to contend. This difficulty would also apply to the motor-generator type locomotive if it were undertaken to make it universal.

The Brief that Won the 1924 Charles A. Coffin Prize

The story is told by the railway of the work it has done in all phases of its operation to merit the distinction which it has won — The advertising done to create traffic and the various measures employed to build good will stand out as the chief contributions to the industry — Many modernization steps have also been taken which have successively improved the cost side of the operation and brought the operating ratio down to the low figure of 61 per cent — A story worthy of study by every railway management.

By the Northern Texas Traction Company

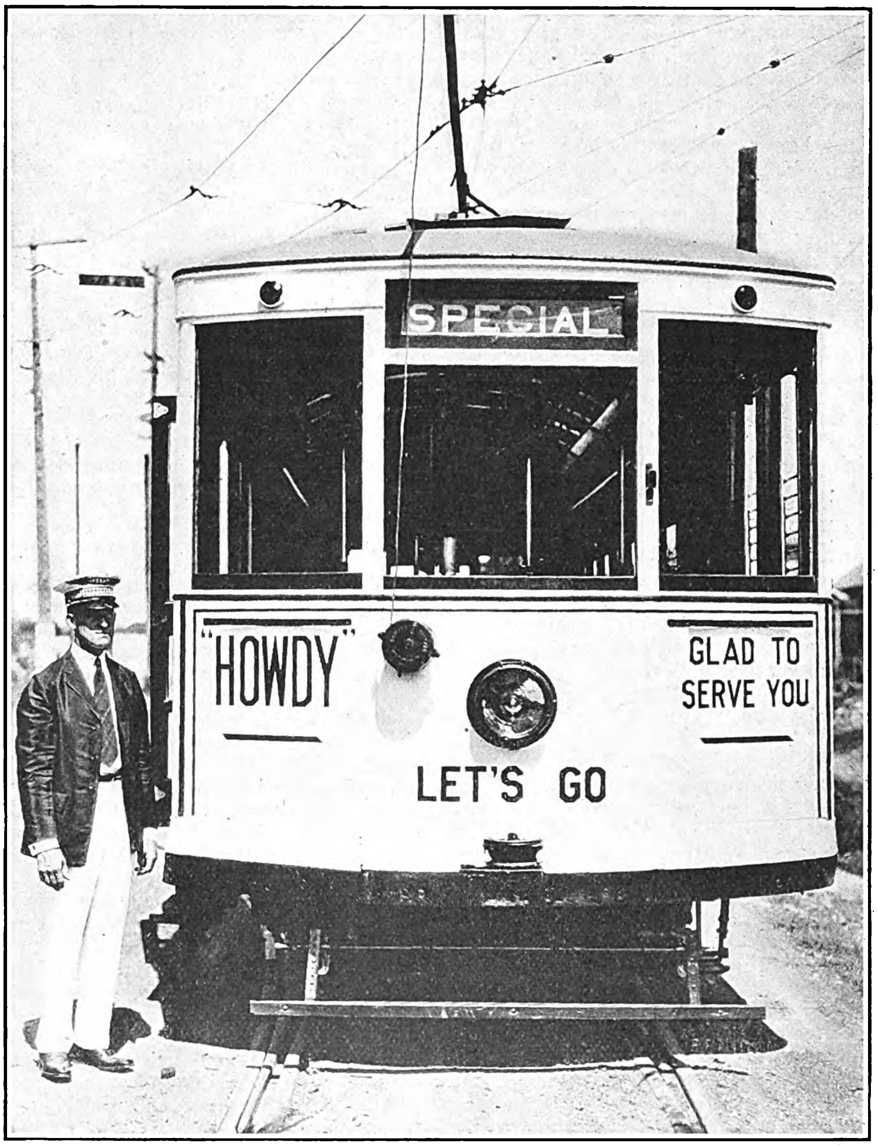
Fort Worth, Tex.

THE Northern Texas Traction Company operates all the street railway service in the city of Fort Worth, Tex. It also operates an interurban railway between Fort Worth and Dallas, a distance of 34 miles, providing a high-speed, frequent service between these two cities of 150,000 and 200,000 inhabitants respectively. The Fort Worth-Dallas interurban line also furnishes transportation service to people located in the towns between the terminal points, including Handley, Arlington, Dalworth and Grand Prairie.

Under the name of the Tarrant County Traction Company, but with the same personnel, we operate a high-speed interurban line between Fort Worth and Cleburne, Tex., a distance of 32 miles. We also do the lighting and power business in the smaller communities served by our interurban lines, but we do not do any of the lighting and power business in the terminal cities.

The company owns 177 miles of equivalent single track, 192 city and 58 interurban cars. Our power house has a capacity of 11,000 kw. and we operate seven substations. Our organization personnel totals 750 men and women.

The public relations and standing of the Northern Texas Traction Company in the community it serves are the best. In spite of increasing cost and private automobile competition, this company, by paying rigid attention to all details of operation, has kept its ratio of operating expense to gross revenue down to the low figure of 61 per cent for the year. During the year ended Dec. 31, 1923, this company built and put into operation 6.65 miles of city track, which gives it the distinction of having made the largest extension of new lines of any company operating in a city of this size, and also of making the third largest track extension of any street railway company in the United States, being surpassed only by the extensions made by the Twin City Rapid Transit Company, Minneapolis, and by the city of Detroit.



Front of One of the White "Talking" Cars Used Effectively for Advertising Purposes by the Fort Worth Company. Note the "Natty" Uniform Worn by the Operators of These Two Cars

Popularizing Railway Service

The ways in which this company uses initiative, skill and enterprise to popularize electric railway service are many and varied. A great deal of the popularity of our service, both city and interurban, is due to the loyalty of employees, who are constantly striving to give that touch of personal service in their contact with the public which is so essential in present-day practice.

This company keeps a close check on the transportation needs of the community served by it, and the service rendered is based upon the fundamental policy of providing short headways and anticipating the public's requirements.

There is little doubt that the popularity of our electric railway service has been the means of maintaining a high per capita riding in the face of the ever-increasing use of the private automobile. Business is created by this company, and, in doing this, we do not hesitate to use every legitimate means at our command. This company has a product to sell—transportation. We use up-to-date and novel sales methods in order to sell it. We believe we have shown much initiative, skill and enterprise in popularizing electric railway service. Illustrative of this are the different methods used to bring our merchandise to the attention of the buyers. Such methods include the poster campaign, newspaper advertising, white "talking" cars, etc., all supported by a high-class service.

It is conceded by those who have anything to do with the advertising for this company that the outstanding piece of advertising done, aside from the general newspaper and car card advertising, was the placing in regular service of two white "talking" cars. One of these cars was a double-truck, one-man car, and the other a single-truck, standard Birney car, the two types being selected to impress upon the public mind the kinds of cars now representing the latest standards. The bodies of these cars were painted a dazzling white. The trucks were painted black and the window sash finished in mahogany. Appropriate statements were painted in black on the side sheeting and letterboards, as well as on the dashes. The wording on the dash, common to both ends of each car, was as seen in the accompanying picture.

"Ride the Street Cars and Save the Difference" occupies the full length of the letterboard on each side. On one side of each car appeared "Our Service Is a Shopping Convenience" and "You Don't Have to Park Your Street Car." Between these two signs were the words "Think It Over." On the opposite side of each car the signs read:

"The Convenience of Our Service Is Increasing Daily."

"We Appreciate Your Patronage."

The words "Think It Over" were repeated between these two messages.

Regular trainmen instructors were selected to operate these cars, and they were furnished with special uniforms to emphasize the distinctiveness of the white cars. White caps, similar to those worn by police officers, with the word "Operator" in gold braid across the front; white shirt and collar, black silk coat, white flannel trousers and black shoes made up the uniform. It is needless to state that these men looked mighty fine in these outfits and that they were highly complimented upon their appearance by hundreds of their patrons.

Both cars were operated in regular schedule over the different lines in the city, carrying their share of the riding public. They were kept in service exactly one month. They were withdrawn from service for only one reason, namely, to change the outside wording.

When the cars made their initial appearance, newspapers were enlisted to explain to the public their purpose. Advertisements were run from time to time to advise the readers as to the routing of the cars. One of these advertisements is reproduced on another page of this issue.

As an additional aid in making the white car advertising scheme an absolute success, dash signs calling attention to the white cars were carried on all other cars operating in the city. The wording on these signs was as follows:

"Do You Believe What the White Cars Say?"

"A Memory Test—Can You Repeat What the White Cars Say?"

On the first day the cars appeared, and for several days thereafter, people would congregate on the street corners in order to read the messages of the cars as they pulled up to load or unload passengers. And during the entire time they were in operation the public never stopped commenting upon them. It was practically impossible, for example, to go into any public gathering, such as a noon-day luncheon, without hearing some favorable mention made of the white cars.

When we put out the dash sign asking the public if it could repeat what the white cars say, it was not long before the question was a popular greeting. A man, for example, would meet a friend on the street and greet him somewhat like this: "Hello, Bill, can you repeat what the white cars say?" Usually there followed a friendly contest between the two to ascertain which one had the better memory.

Local newspapers carried feature stories and photographs of the cars, dealing with them in the most friendly manner. The cars have now been out of service about one month, but there is still popular discussion about them. It is impossible to determine the direct benefit derived, but we do know that as the result of the operation of these cars, many people were attracted to our service.

DASH POSTERS EFFECTIVELY USED

While the above mentioned campaign of advertising to popularize our service was going on, we also realized that a poster on the dash of our city cars would be a very desirable way to advertise for new business. A dash sign is practically a traveling billboard and it can be used very effectively to put over an idea. We have done this by appealing to the automobile owners to "Ride the Street Cars and Save the Difference." These dash posters are changed every ten days, so that a new message is frequently placed before the public. The dash advertising is based on two fundamental ideas: First, that our service is convenient, and, second, that it is economical. Every one of these dash posters carries a definite message calculated to make the automobilist see the advantage he will gain in convenience and economy by using the street cars.

That the "Save the Difference" campaign is a success is best testified to by the number of people who, to our personal knowledge, now ride the street cars to and from home and their places of business. The slogan is often heard on the streets of Fort Worth. People when asked what they are going to do when they intend to board a street car will say, "I'm going to save the difference."

Whenever something out of the ordinary is going on in the city, we also use dash posters to invite the public to use the street cars. For example, two days before Easter Sunday we ran a special poster with the following message: "Let Us Take You to Church Easter Sunday." Incidentally, the ministers of the city were pleased with this.

While dash sign advertising has been practiced by many companies for years, the effectiveness of the campaign as conducted by this company is directly attributable to the thought and originality of the copy used. It has resulted in attracting many riders to the street cars. Following are some of the slogans used on the dash posters:

"Ride the Street Cars and Save the Difference."

"You Don't Have to Park Your Street Cars—Save the Difference."

"Are You Saving the Difference the Street-Car Way?"

"Don't You Agree that the Difference Is Worth Saving?"

"Get Acquainted With Your Neighbor; Ride the Street Cars."

"Your Neighbor Rides the Street Cars and Saves the Difference, Why Don't You?"

"You Won't Have to Park Your Street Cars During the Stock Show."

"Ride the Street Cars; Build a Home With the Difference."

"Going to Dallas? Ride the Interurban and Save the Difference."

"There Is a Difference! Save It on the Street Cars."

"Own a Home First."

"Our Service Is an Economic Convenience."

"Our Service Is a Shopping Convenience."

"Howdy, Folks—Can You Repeat What the White Cars Say?"

INTERIOR CAR CARDS CARRY ON THE THOUGHT OF THE DASH POSTERS

The fact that people are on the street cars is no reason why we should not appeal to them through advertising copy placed inside the cars. We do this by means of car cards located at each end of the body, so that one of the cards faces the passengers at all times. The wording on these cards is linked up with the dash posters. These interior car cards, as well as the dash posters, are changed about every ten days.

The interior car cards on the city cars carry a direct appeal to the people of Fort Worth, whereas those on the interurban carry a different story directed to travelers, many of whom do not live in our territory. Examples of the copy used on the interior car cards follow:

"Howdy—We Are Glad to See that You Are Saving the Difference Today. Do It Again Tomorrow."

"Good Morning, Neighbor! Let's Get Acquainted Today So We Will Know Each Other When We Take the Street Car Tomorrow."

"Your Neighbors Have No Parking Troubles—They Ride the Street Cars and Save the Difference Not Only Today, But Every Day. Why Don't You?"

"Own Your Own Home. There Is Room for 20,000 More Homes Along Our Car Lines. Systematic Saving Makes Home Ownership Possible. Ride the Street Cars and Save the Difference."

"Build a Home First—On One of the 20,000 Available Residence Lots Now

Served by Our Car Lines—With the Difference."

"The Value of Our Service to You, As a Shopping Convenience, Is Increasing Daily—We Appreciate Your Patronage."

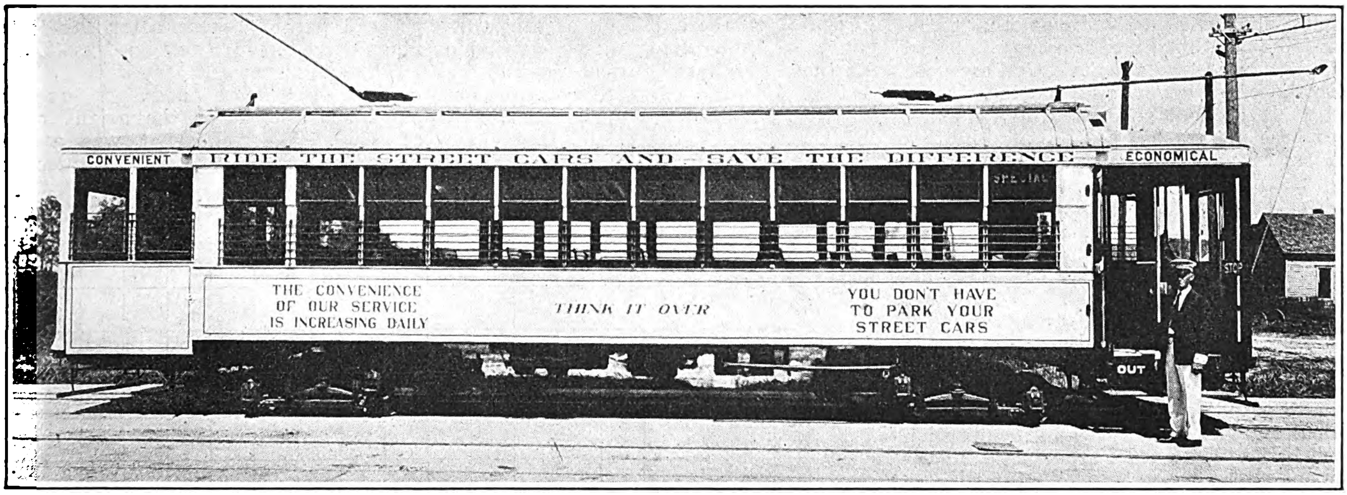
"Don't Forget that Round-Trip Tickets Save You 10 per Cent. Buy Them and Bank the Difference."

"This Train Is Propelled by Electricity—But Is Operated for Your Convenience, With Courtesy and Safety."

DEVELOPMENT OF SHORT-HAUL REAL ESTATE

It is the usual course of events in growing cities for real estate men to promote new residential additions remote from the street car lines, and then start agitation for a street car line to the new addition without inquiring as to the unjust burden it might put upon the street railway company. This company has not been without this source of annoyance in Fort Worth. Due to the activities of real estate promoters, this company in the past built and extended some of its lines until the point was reached where the length of haul became so long that a few lines have shown a deficit.

About a year ago we cast about for some means of checking, at least for the present, this selfish desire on the part of new addition promoters. We made an accurate count of all vacant residential building lots within four blocks in any direction from all our city lines. This count established the fact that there were more than 24,000 vacant residential building lots within four blocks of street railway lines. We limited the territory canvassed to four blocks in either direction from a car line, as we figure that is about the maximum distance, under urban conditions, that a person would care to live away from a car line.


CONVENIENT
RIDE THE STREET CARS AND SAVE THE DIFFERENCE
ECONOMICAL
SPECIAL
THE CONVENIENCE OF OUR SERVICE IS INCREASING DAILY
THINK IT OVER
YOU DON'T HAVE TO PARK YOUR STREET CARS
STOP
OUT

This Shows the Wording Painted on the Side of the Double-Truck One-Man White "Talking" Car

When we secured this information we put it out to the public both by interior car cards and newspaper advertising. In this advertising we used the figure of 20,000 lots instead of 24,000 as the count showed, in order to be conservative. The campaign has had the desired results, as it has brought incontrovertible facts before the public that this company has anticipated its needs long in advance and that with the abundance of building lots adjacent to the street railway lines it is an imposition to ask us to build and extend lines, as our present lines will serve a city of 100,000 more people than we now have.

The result of our efforts is that building lots adjacent to our car lines are booming and the development of short-haul real estate is successfully under way.

NEWSPAPER ADVERTISING TIES IN

We believe in newspaper advertising based on strictly business lines. By that, we mean that we advertise our service at opportune times and not when the newspapers request us to. We do not hesitate to tell the public what we have to offer in the way of service. At times we use big "smash" advertisements and at other times we use smaller ads, all depending on the message to be delivered. Our appropriation for newspaper advertising amounts to about one-half of 1 per cent of our gross revenue.

This newspaper advertising carries two dominant ideas: First, that the service is dependable, safe and economical; and, second, it follows out the "Save the Difference" message and the convenience of our service. This advertising is often tied in with the promotion of real estate additions, the opening of a new street car line, the opening of the baseball season, or special feature sections got out by the newspapers.

We advertise our city and interurban service in all three of the Fort Worth daily newspapers. In addition, we advertise in labor and church weeklies. We also advertise our interurban service in the Dallas dailies, and in 100 weekly newspapers within the Fort Worth trade territory.

100 PER CENT SAFETY CARS ADD TO POPULARITY

This company prides itself on having pioneered the way with one-man safety cars, we having been the first company to completely equip one line with Birney safety cars. Since this original installation back in 1916, we have gradually added one-man single and double-truck cars to all our city lines until at the present time all our city service in Fort Worth, requiring some 200 cars, is one-man operated.

We believe that Fort Worth is one of the few cities of more than 150,000 population which can boast of 100 per cent one-man operated street cars. Of course, this company has gradually brought about the one-man operation over a period of eight years. By so doing, we have completely sold the public on the idea because we have shortened the headway and increased the schedule speed on all lines, until now it is frequently said that Fort Worth has the best street railway service in proportion to its size of any city in the country.

The change to one-man operation has been accomplished without laying off any men, due to the fact that the increased service rendered has provided a place for all. All the car operators are enthusiastic over one-man operation and they would not care to revert to two-man operation of cars.

SPECIAL ADVERTISING PRACTICES

Always having in mind the idea of more riders and more revenue, we never hesitate to take advantage of large public gatherings to have unique exhibits. In the fall of each year a state fair is held in Dallas. This fair attracts people from all over the state, and, as a consequence, our Fort Worth-Dallas interurban and Fort Worth-Cleburne interurban lines benefit by increased riding. Naturally, we are interested in the success of this fair. We always take space and utilize it to promote electric railway riding, as well as to further our safety campaign. The annual Fat Stock Show and Southwestern Exposition which takes place in Fort Worth in the spring is another opportunity which is utilized in the same way.

This company employs a general passenger agent, one of whose duties is to secure special car business over either the interurban or city lines. He has been very successful in securing a good many special car and train movements per month. A good deal of this success is due, we believe, to our practice of hanging large signs on the sides of the special cars or trains which tell who it is that is traveling by special car, and where the party is going. Incidentally, parties hiring special cars like the idea, as it attracts attention to them. These signs are placed on the cars by the company free of charge, as it is good publicity for us.

Every day on which the Fort

Worth "Panthers" of the Texas Baseball League play at home we run a special street car around the city with large signs on either side of it, calling attention to the baseball game that afternoon, and also soliciting the patronage of the fans to and from the baseball park.

This car runs over a definite route while it carries the baseball advertising. It is operated this way for 2¼ hours, after which the banners are taken down, and this car goes into regular tripper service between the business section of the city and the ball park. Thus, the non-revenue car-miles operated by this car are kept small, and its advertising value more than makes up for the cost.

Among other things used to sustain the popularity of our service are painted billboards located in strategic positions, some of these boards being illuminated at night. We rent these boards from a local advertising concern. The copy is changed every three months. At times, the copy on all boards is the same, while at other times it is varied, but all of the copy is based on the same fundamentals that are used in the other advertising matter.

It is difficult to ascertain the exact amount of new business created by this form of advertising, but we do at times get evidence of good will or riding stimulated by the billboards.

We constantly try to be original with our advertising, as we think it is the out of the ordinary which attracts attention. During March of this year several business institutions in Fort Worth, including ourselves, contributed to an advertising display which was on exhibition for two weeks in one of the show windows of a leading furniture dealer. This display was in connection with the "Forward Fort Worth" movement. The theme was a miniature of part of one of our downtown streets. Automobile trucks and street cars and other street traffic were mounted on a moving belt. Each of the firms contributing to this display used the space allotted for advertising purposes. This company had two small street cars on the moving belt. On the sides of each car were small signs about the "Save the Difference" and "Get Acquainted With Your Neighbor" ideas. This advertising display attracted a great deal of attention both during the day time and at night.

Dash Destination Signs

All the cars of this company have illuminated route sign boxes installed in the upper right-hand corner of the front and immediately to the left of the entrance. In addition to these illuminated route signs, for use on cars which do not go through to the end of the line, a special destination sign is carried on the dash as a means to avoid having passengers get on the wrong car. These signs are 12 in. x 20 in. in size, and are made of sheet iron. They are supported on the dash by means of two hooks which engage in loops on the dash. A color scheme is also used in addition to the lettering to help differentiate between cars turned back at different points. The color scheme worked out for a line with four turnback points is as follows:

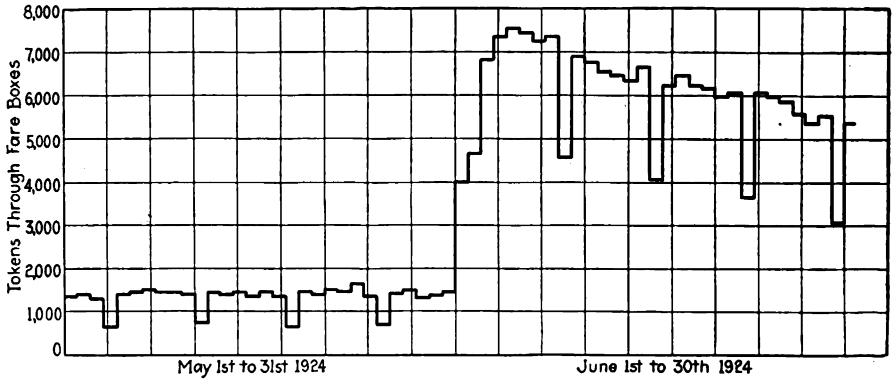
1. White background and black letters, besides denoting the destination of the car, signifies that its destination is the first turnback point on the line.
2. Red background and white letters signifies that the destination is the second turnback point on the line.
3. Green background and white letters, the third turnback point.
4. Black background and white letters signifies that the destination is the end of the line.

While the idea of dash destination signs is not new to the street railway industry, we believe that the color scheme of dash destination signs, as now used by this company, is a new and novel, as well as useful, adaptation of them. These signs have assisted prospective passengers to distinguish their car at a distance and have greatly reduced the necessity for transferring passengers who had boarded the wrong car.

How Token Use Was Increased by Five Times Overnight

Since the inauguration of an odd fare (7 cents) on the city lines of this company, we have had tokens available for those who cared to use them at the cost of 7 cents each without reduction in price. We did not push the sale of the tokens with the result that little use was made of them.

During the early part of 1924 we increased the schedule speed of our cars to a maximum. Upon doing this we decided to try to get the public to use tokens and thus relieve change making on the operator as much as possible. We also came to the conclusion that if we could get tokens out to the public there would be more street car riding for the reason that anyone would part with a token easier than he would with 7 cents in cash.



Graphic Illustration of How the Sale of Tokens Jumped Overnight to Five Times the Former Level

Another reason for desiring greater use of tokens was the installation of traffic control signals in the business district. If everyone used tokens, the operators' job would be easier and the car delayed less; a second's delay sometimes meant a delay of 45 seconds due to traffic being given the signal to move on cross streets.

With the idea in mind of increasing the sale of tokens, we started in to find out why the public did not use more of them. The reason seemed to be that people were afraid they would lose the tokens because they would be scattered loosely in their pockets. The solution seemed to be to give the people something in which or on which to keep tokens. After investigating we finally decided to give away split rings on which tokens could be kept.

On May 31, 1924, the men on our city cars gave every passenger who boarded the cars one of these rings contained in a small envelope. Printed on the envelope were the reasons why the use of tokens would benefit the passengers. About 35,000 of these rings were given away between 5 a.m. and 2 p.m. All the operators were supplied with tokens and every effort made to sell them. The results exceeded our expectations.

Before these token rings were given away, the number of full-fare tokens which went through the fare boxes averaged between 1,300 and 1,400 per day. After the rings were given away and an effort made to sell tokens the number of full fare tokens going through our fare boxes immediately jumped to an average of between 6,000 and 7,000 daily. The chart reproduced herewith showing full fare tokens taken in daily from May 1 to June 30, inclusive, vividly illustrates the increased use of tokens after the token rings were given away on May 31.

The rings cost 1¼ cents each. We ordered 40,000 of them. Rings and envelopes cost us in the neighborhood of $600. We believe it was a well made investment and a good piece of advertising.

We have popularized our service to the extent that we have made it easy to carry tokens and have made the tokens easy to buy, as all trainmen have them for sale and they also may be bought at our ticket offices. The increased sale of tokens has increased the number of our riders and in addition has provided a means of forcibly impressing upon the trainmen that they are the salesmen of the company's product —transportation.

Paint Cars Every Nine Months

We believe in frequent painting of cars as a means of attracting patronage. During the year we have completed our program of repainting every car on the system, both inside and out. On the city cars it was formerly our practice to paint one-man cars palmetto green, but we have discarded this practice and now paint all city cars cadmium yellow, as we believe the latter to be more noticeable.

Since the completion of our new paint shop, we have perfected a painting schedule whereby every car on the system will get into the paint shop once every nine months. This frequent painting keeps our cars looking clean and fresh and has caused considerable favorable comment.

SOMETHING DOING ALL THE TIME

This company does not believe in letting the people of this community forget that there is a street railway company. We are constantly doing something that is real news.

When we completed our new paint shop we entertained the Fort Worth Salesmanship Club at a luncheon in this building. Of course, this gave us the opportunity to conduct all present at the luncheon through the shops and barn and thus explain what it takes to keep up a street railway system.

On other occasions members of this company give talks before luncheon clubs on street railway problems and situations. At other times the traction company will put on all the entertainment at a noonday luncheon club. For this purpose, a number of our talented employees are organized and they never fail to put on an entertaining program which reacts to the company's benefit. Whenever we open a new car line, or finish some big improvement, we stage a celebration to commemorate the inauguration of better service to the public.

We try to be original in our advertising, so much so that the people of Fort Worth often ask, "What will they pull next?"

We believe in boosting for the towns and cities to which we render service by contributing as liberally as possible to all worthy causes, whether it be for charity, buying stock in a new enterprise, such as a new hotel, cotton mill or other civic betterment. In other words, we are counted on as being live wires in this community, and we try to live up to this reputation.

Gaining Public Good Will

We have the public good will in our territory, and all that we have done this year is in line with our policy of being good citizens of the community and such as to continue to merit the good will we now enjoy.

We co-operate with the newspapers in our territory and give them any necessary information they may desire. This company does things which the public and the newspapers are quick to notice and the result is that we receive a large amount of publicity in newspaper stories, which are very beneficial to success in gaining and keeping public good will.

We do not use a press agent to create newspaper publicity for this company; we do not need one; we are constantly doing new things and creating legitimate news which the newspapers are glad to run as news items.

One of the secrets of our success in gaining public good will is to furnish street railway transportation to growing, outlying sections of the city. During the year we built and put into operation the Riverside line, which runs from the business district to the Riverside section of Fort Worth.

While this line was being constructed we ran White buses from the business district to this suburb on a 10-minute headway. The bus fare was the same as the car fare and transfers were issued from one to the other. The daily receipts on this bus line averaged about $50.

When we opened the street car line to Riverside, we withdrew the bus service. The street cars run on a 12-minute headway, but the patronage immediately increased over what it was on the bus line, and the increase has remained steady ever since the opening of the line. The receipts on the Riverside car line average around $110 per day, as contrasted with the bus line receipts of only $50 per day.

That the people of Riverside were happy to be connected with the business section by street railway service is testified to by the reception planned and carried out by the citizens upon the inauguration of service on Jan. 24, 1924.

IT'S A REAL PLEASURE—

To travel over the city's many car lines, and say—

Howdy!

To the thousands of Fort Worth men and women who have shown such sincere interest in the story which we are telling about the convenience and economy of our service.

Today we will be operated over the Lake View-Stockyards and Arlington Heights lines.

WATCH FOR US!

And let us become better acquainted.

Cordially yours,

THE WHITE CARS

OF

NORTHERN TEXAS TRACTION CO.

Our interior messages to you are also very interesting. Read them.

A Typical Piece of Copy Used in Newspaper Advertising in Conjunction with the White "Talking" Cars Stunt

The first car left the business district carrying Mayor Cockrell of Fort Worth, Manager G. H. Clifford of the Northern Texas Traction Company, several other officials of the company, and a score of prominent Riverside citizens. Arriving at the Riverside end of the line, the first car was met by hundreds of Riverside citizens. After several complimentary speeches had been made, the traction company officials were served with coffee and cake by the ladies of the Parent-Teachers' Association. On the day of the opening of this line the Hearst morning newspaper ran a special news section as part of the regular edition, which featured various activities of this company and what the car line meant to Riverside. Of course, the company bought paid advertising in this edition, but the news items and stories ran on the part of the newspaper were of immense value to the company.

On Feb. 25, 1924, another new line, known as the Sycamore Heights line, was opened during a snow storm, which is out of the ordinary in this locality. The fact that we opened the line on schedule, in spite of the snow storm, caused much favorable comment, as it showed that we do things when we say we will. This occasion met with a response from public and newspapers similar to that described for the Riverside line. The Fort Worth *Star-Telegram* got out a special supplement to its regular edition on the day preceding the opening of the line, and this gave us much free publicity.

Much good will was engendered by building a replica of a French box car for the use of a local American Legion organization known as La Société des 40 Hommes et 8 Chevaux. The body was built at cost and the railway donated the truck. The car is hauled around the city during parades and other events and the company charges nothing for the motor car and motorman employed for the purpose.

Another activity which has gained good will is the policy of beautifying the grounds around buildings owned by the company. This was inaugurated two years ago, and so many compliments have been received on the work that we have this year carried it forward on a much more extensive scale than heretofore.

TRAINMEN SCHOOLED IN COURTESY

We have schooled our trainmen in the idea that it is the little things that count and it has brought results from the standpoint of gaining public good will. The company has the reputation of having very courteous trainmen and we annually receive many letters from the public commending this or that act on their part.

Until this year we followed the general practice of holding general meetings of our trainmen; at these meetings the proper care of our patrons was stressed. However, the number of trainmen present was so large that the talks had to be very general. We, therefore, changed to a new policy of holding these meetings by lines, with the meeting in charge of the inspectors of the respective lines. This had two good results: First, it emphasized our policy of treating the inspector as though he was the independent manager of his line, with complete responsibility for it; and, second, since all present were facing the same conditions, the talks and discussions could be more specific. The idea of treating the passenger as though he was a guest has been stressed at these meetings and the results have been very gratifying.

Our power generating station and interurban carhouse are located at Handley, Tex., a small unincorporated village 7 miles east of Fort Worth. This village has no fire-fighting equipment.

Our power station, carhouse and other property at this place are fully equipped with fire-fighting apparatus, including plenty of standard size hose, water and high pressure power pumps.

We have placed all this equipment at the disposal of the citizens of Handley in case of a fire in the village. Many times our employees at this place have laid over a quarter mile of hose and put out a fire, which if not checked might have razed the entire village. Our property is not endangered by a fire in the village because of its isolated position.

Needless to say the free use of our fire-fighting apparatus, together with the efficient work done by our employees in the rôle of fire fighters at times, has resulted in much favorable good will toward this company on the part of the citizens of this community.

COMPANY PARTICIPATION IN CIVIC AFFAIRS

It is a recognized fact that this company is in the forefront of all movements for the development of the city and this policy is the foundation for the public good will we now enjoy. The following are cited as examples of some of the civic events we participated in during the past year.

During November, 1923, the city held a three-day celebration of the 75th anniversary of the founding of the city. The celebration was staged under the name of "The Diamond Jubilee."

The company contributed both money and time to the success of this celebration. Flag decorations were put up on our trolley span wires by our line crews; we worked in conjunction with the general committee so that our cars would not run on streets on which parades were being held. One night during the celebration Alvin Owsley, then national commander of the American Legion, made a speech in Dallas and was scheduled to make a speech in Fort Worth so shortly after his Dallas speech that it would have been impossible to get to Fort Worth in time by our regular interurban service. In line with our policy of being on our toes, we placed a special car at his disposal and brought the commander and his party from Dallas to Fort Worth in the record time of 49 minutes. This one act alone gave us front page newspaper publicity.

During the year the Fort Worth Chamber of Commerce reached a determination that the development of Fort Worth required the enlargement of its manufacturing industries. The manager of this company, together with other prominent citizens, was successful in securing a cotton mill to locate here, contingent upon the residents of Fort Worth subscribing for a substantial block of stock in this mill.

Inasmuch as this company has consistently followed the policy of taking part in all enterprises that would benefit the city, a cash subscription of $10,000 was made in the stock of this new industry. Our attitude in this matter resulted in much favorable comment and confirmed public opinion that we were good citizens. This cotton mill is well on its way to completion and it is expected to be in operation by Sept. 1, 1924.

During the first part of July we decided to get some idea of where the people lived who use our interurban service. We desired to get this information so that we could develop our advertising program in an intelligent manner. In getting this information we only wanted to know where the party lived and his occupation, hence we did not ask for names as they were not essential for our purpose. We decided to get this information by means of cards distributed to the passengers on the interurban trains by the conductor. At the same time we decided also to find out what the patrons of the interurban lines thought about our service, and invited their suggestions and criticisms.

The total number of cards put out to passengers on both local and limited trains was 1,134. Only 9 per cent of this number made any criticism of our service and these were of a minor nature, although in nearly every case of complaint it was due to causes beyond the control of the company. The other 91 per cent of the passengers invariably praised our service and had no fault to find; some of them made suggestions for the betterment of the service, all of which are under consideration.

Among other things done by this company which all tend to gain and keep public good will are the memberships maintained by the company in local civic and luncheon clubs. Members of this organization make it their business to attend club meetings and affairs, and the reaction from this is noticeable in our sustained good will with the citizens of this territory.

We never miss an opportunity of escorting individuals or parties of students through our shops and power house and over the property and explaining the details and thought necessary to provide the transportation for their benefit.

To sum up the story about the good will enjoyed by this company, we have gained it by fair dealings, telling the public our story, and by ever being on the alert to render the relatively small details of service which of themselves may appear unimportant but which in the aggregate make the difference between having good will or not having it.

Taking Advantage of Better Practices and Equipment

From the economies put in practice by this company during the past ten years we are now reaping substantial benefits. The chart reproduced herewith graphically illustrates by car-mile figures the substantial economies now being enjoyed.

The first graph shows the cost of trainmen's wages per car-mile by years from 1918 to the first six months of 1924 inclusive. The period from 1918 to 1920 was one of increasing wages. Since then our trainmen's wages per car-mile have steadily decreased until today the figure is 6.35 cents per car-mile. There has not been any reduction in trainmen's wages. The reduction in trainmen's wages per car-mile has come about solely through economies which have been put into effect, such as the wide adoption of one-man cars and fast schedule speeds.

The second graph shows the kilowatt-hour energy consumption per car-mile over the period from 1918 to the first six months of 1924, inclusive. During the period from 1918 to 1920 we ran a large amount of heavy equipment so that the energy per car-mile averaged around 2.2 kw.-hr. During the period from 1920 to 1921 we added a large amount of light-weight rolling stock. We paid rigid attention to the economies to be effected with coasting clocks, so that since 1921 our energy consumption per car-mile is down to 1.75 kw.-hr. and has remained at this figure to date.

The third graph shows the cost of equipment maintenance per car-mile. This has also shown a material decrease in cost per car-mile due to economies effected by our modernization program. Light-weight rolling stock has been a factor in this. Our program of building new and up-to-date shops, the installation of modern tools and shop equipment, and the educational work carried out with the shop men have all been factors in the steady decline of our equipment maintenance costs from 3.5 to 1.9 cents per car-mile.

The fourth graph shows the cost of maintenance of way and structures per car-mile over the period from 1918 to June, 1924, inclusive. The reduction to the present cost of 1.4 cents per car-mile from the 1920 peak of 2.55 cents per car-mile has been brought about because of the adoption of light-weight rolling stock, the extensive use of track welding equipment and the use of modern track tools.

These reductions in maintenance costs have been achieved in spite of the fact that the wage scale that now prevails on this property is as high as it was in 1920, the standard of maintenance is higher than at that time and the condition of the property has been improved to a material extent.

HEATER CONTROL EFFECTS SAVINGS

All our cars are equipped with electric heaters. Until recently the use of heaters in our cars was carried on without any systematic attempt in regulating when they should be turned on or off. This practice resulted in much waste of electrical energy due to the fact that trainmen would turn the heat on in the morning and then permit it to be on all day in spite of the fact that it might not be needed. Recently we adopted our present system of heater control, from which we are now making a substantial saving in energy used.

At six convenient places in the city we have placed red colored electric lights, known as heater lights. These lights are so placed that at least one of them is passed by cars on every division. When the red light shows it is a signal to all trainmen to turn on their heaters. When the lights are off, it is a signal to all trainmen to turn off the heaters and the division inspectors see that this is done.

The turning on and off of these heater lights is done by the chief inspector, or by some one under his direction. Thus the control of the electric heaters is under one man.

In addition to this, the trainmen report daily on their trip sheets the number of hours the heaters were in use and whether one-half or all the heaters were in use. Knowing as we do the current consumption of the heaters in various types of cars, we compute therefrom the amount of electricity which is used for the electric heaters.

With this system of controlling the heaters, we are saving a considerable sum as compared to our former practice.

EXPANSION OF SHOPS

We are now reaping the benefits of a shop expansion program formulated some four years ago. During this year we completed a new paint shop at our East Front shops. This paint shop is of reinforced concrete construction, with Fenestra sash, thus providing ample light. It is equipped with sprinkler system throughout. Within this new paint shop we can house 10 cars at one time, thus giving us ample facilities to keep our rolling stock well painted.

The expansion of our paint shop facilities has enabled us to expand our carpenter shop also by adding to it the space formerly occupied by the old paint shop. The carpenter shop can now handle 15 cars at one time. This expansion of our shop facilities now gives the mechanical department ample space in which to keep the rolling stock in good shape, so essential to the rendering of high-class street railway service.

A "BOGEY" ON EXPENDITURES

For a number of years we have been operating on a budget system, which we designate as the "bogey." This system, which shows its value year after year, is the means whereby expenses are kept track of daily. Our bogey estimates are made covering the period of a calendar year in advance, and are set up in detail for each month. This bogey covers the estimated expenses per month for each account.

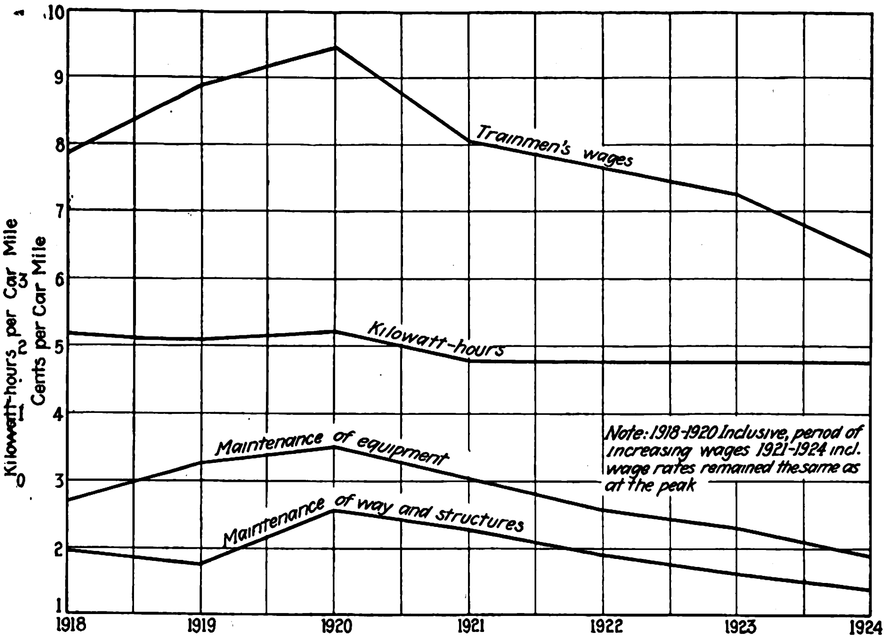
At the time that the revenue and expense bogey is worked up, the construction estimates are also worked up for a year in advance. After this has been approved, the cash requirements of the company by months are also worked up for the ensuing calendar year.

After the bogey has been approved by the manager, the amounts allotted to the various accounts are typewritten on special bogey sheets. A clerk has charge of keeping the bogey. He daily enters all charges, including labor, against the proper accounts. By this method, it is possible to get out a statement on any day showing just how the expenses stand in relation to the amount allotted for the different accounts. The bogey clerk gets out these statements about every six days. The head of each department receives a copy, on which it is stated whether the accounts he is interested in are running under or over estimate, and how much. The department head can then act accordingly.

The fact that one bogey clerk keeps track of the comparison between estimated and actual costs for all departments results in a co-ordination of expenditures which did not prevail under the former general practice of each department head keeping day to day memoranda of his departmental charges. In addition to this, economies are effected at an earlier date than would be secured if a department head was required to wait for accurate cost figures until he received the official financial report for the month.

FIRE PREVENTION

Especial attention has been paid on this property to the prevention of fires, because we recognize the fact that a fire may destroy a building or equipment that is essential to reliable and continuous service. All of our buildings are equipped with all appliances that the location and use makes possible, such as sprinklers, hydrants, pumps, fire hose and the correct type of extinguisher for the equipment housed in these buildings. We have also organized fire-fighting brigades which drill at frequent intervals in order that they may be prepared to extinguish fires.



Curves Show the Results Obtained from Various Modernization and Economy Measures

We realize that "good housekeeping" is essential to the prevention of fires and take especial care to maintain clean premises. In order that proper supervision may be given to this, we have organized a routine of monthly inspection by one of our office employees. This takes into account not only the housekeeping, but the inspector also notes wiring conditions and other items which may be the cause of fires. This inspector's report is made to the superintendent of the company and is carefully followed up to be sure that all defects are remedied.

We believe that this system has been of great benefit to us in preventing fires and is an example of our attention given to insurance matters, which, together with a strict observance of prevention practice, has resulted in a decrease of 20 per cent in our insurance premium at the present time, as compared with the rates in force in 1920.

The East Front Street shops and carhouse of this company cover a square block. The master mechanic and foremen in the ordinary course of their work must communicate with each other at frequent intervals. During January of this year a complete intercommunicating system of telephones was installed at this plant, so that one foreman can call any of the others without leaving his particular shop. The master mechanic can also call any particular foreman or department without leaving his office.

This system of telephones has more than justified the cost and expense of installation. A large amount of time is saved by the foremen in exchanging conversations about their routine duties, and they are able to give closer supervision to their respective departments, thereby increasing their own efficiency as well as that of their subordinates.

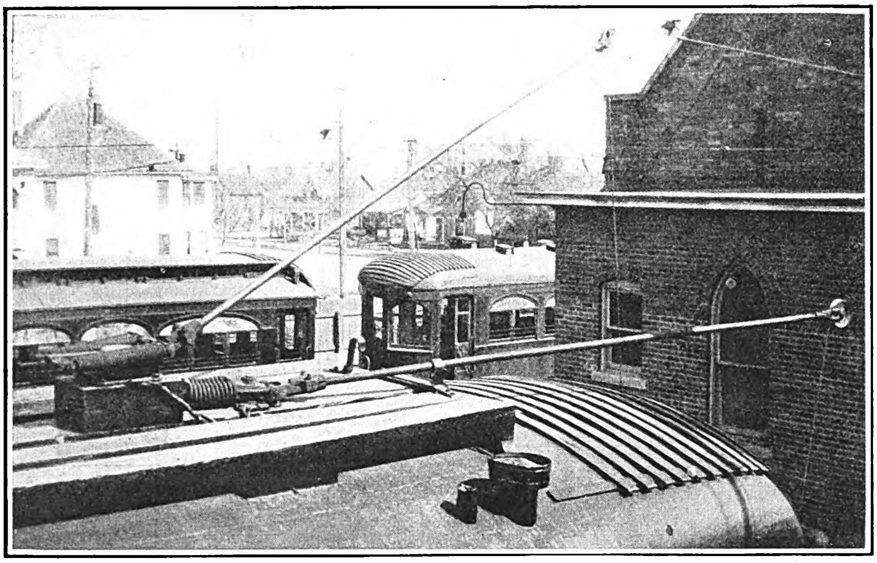
COURT ROOM MODEL OF STREET INTERSECTION

This company has had the same difficulties as other companies in defending suits for damages arising from accidents in which our cars are involved. The jurors in most cases seem to want to be fair to the company and the plaintiff. However, it happens in nearly every case that our lawyers and claim agent have a difficult time to explain by a word picture just how an accident happened, so that the jury will get the correct understanding of just what took place.

In order to eliminate this vexing situation, we built to scale a portable model of a street intersection. This can be taken into court and on it can be illustrated just how an accident took place. One of the streets in this model has double tracks on it and the dummy gage between the tracks is the same gage as the tracks, so that in the event an accident took place on a street on which there is a single track this dummy gage is used to illustrate the single track. The street cars and automobiles used on this model were bought in toy stores and are approximately in proportion.

Of course, this model only shows a tangent track layout, but it is sufficient for our purpose. If we have an accident on a curve, which requires illustrating, we make a drawing of the conditions for the jurors to look over.

This model street intersection is a very effective way to help the jury visualize the exact way in which the accident happened. By means of the model all the conditions at the time of the accident can be shown in a much more satisfactory way than by a long-drawn-out word picture. The jurors appreciate this as they realize it is for their benefit, and that the company is only trying to show them just how things happened so that they can arrive at a proper decision.



Each Interurban Is Supplied with Two Trolley Poles, One Equipped with a Wheel and One a Shoe, to Facilitate Backing and to Avoid Delay from Trolley Pole Trouble on the Road

This model is retained in the claim agent's office and is used by him regularly in discussing with claimants how an accident happened. In many cases our claim agent has been able to make a more satisfactory adjustment of damages through the use of this model, and in some instances has been able to convince the claimant that there was no liability on the part of the company.

CHARTS SHOWING CURRENT USED

On a property of this size the electric current consumed for various purposes, other than car operation, amounts to a considerable sum annually. We believe in using all the current necessary for convenience, but we try to discourage any waste of current.

In order to bring before the employees in the various buildings just what progress they are making in the reduction of current consumption, we post charts showing thereon the current consumed last year as compared with the current consumed over the same period this year. The line showing current consumed last year is in black and the line showing the current consumed this year is in red.

These charts are kept up to date by weekly meter readings. They are posted in conspicuous places in the various buildings. A small notice above each chart, the wording of which is changed frequently, exhorts the employees to do all they can to keep down the light and power bills. The graphic story conveyed by the charts is accomplishing results.

ELECTRIC ARC WELDING

During the present year, in order to meet the ever-increasing uses of the electric welder, we have installed at our East Front Street shops a low-voltage motor-generator welding unit with automatic welding head and control panels.

Up to this time we have used a resistance-type weld with great success where it could be applied, and for other work have used the oxyacetylene torch. With this new equipment we replaced the resistance welder and also handle with it much of the work previously done with the oxyacetylene welder.

The new welding unit is to be preferred over both previous methods. While it does not entirely replace the oxyacetylene welder it relieves the necessity of preheating in most cases, does away with the danger of explosions and is more economical. With the new unit the ordinary welding job can be done much faster; it practically does away with the danger of accident by shock; the equipment is much more easily regulated and requires no helper to operate it; it does not burn up the work and does a great deal better job than the resistance welder.

With the use of the automatic welding head, it is possible to reclaim worn flanges and treads on rolled and cast steel wheels successfully. This item alone means a very important saving in wheel replacement cost through an indefinite extension of the life of wheels. It is an economy which was not available to such an extent with the equipment previously used.

New Construction Standards Save Money

The advent of the light-weight car directed the attention of this company to a consideration of the construction standards in use. Particular attention was paid to track construction. We found that track could be built of lighter steel, and that changes could be made in ballast and foundation which would make these less expensive. In our 1923 presentment to your committee attention was called to some of these new standards as exemplified by sandwich type construction and concrete paving surface.*

During the present year we had to install several new sidings on some of our single-track lines, due to the fact that the headway between cars was to be reduced. It happened that the track on which it was desired to install these sidings was of the solid concrete type construction, with 70-lb. low T-rail, which was a standard type of construction at the time this track was built. We hit upon a plan of installing these sidings at a big reduction in cost over the ordinary method of installing sidings.

The tangent track rails, which were in place, were not disturbed, as we used these rails for the inside rails of the two tracks composing the siding. Of course, we had to excavate a space on either side of the siding. At each end of the siding a small amount of each rail of the tangent rails had to be cut out so that the switch fixtures could be placed. The entire tangent track at the siding, except as noted above, was not disturbed. This method of constructing sidings resulted in about a $1,500 saving per siding installation as compared to the practice of tearing up the tangent track and placing a siding in the ordinary method.

The overhead on our interurban lines is catenary construction and we use trolley poles with trolley shoes for current collection. Until a year ago our practice was to equip each motor car with one trolley base, pole and shoe. A spare trolley pole and a wheel were carried on each car tied to the trolley boards, so that in case the pole in use was jerked out of the base or bent while the car was on the road, the conductor would be able to insert the spare pole in the base and continue on the way. However, this required several minutes time.

The local cars on the Fort Worth-Dallas interurban have to back in or out of sidings to permit the limited trains to pass them. With only one trolley pole equipped with a shoe it was necessary for the conductor to hold the trolley rope in backing up, as it is dangerous to back up with trolley shoes without doing this.

About a year ago we decided to equip all our interurban motor cars with two complete current collecting trolleys, the trolley ordinarily used containing a trolley shoe and the other a trolley wheel. Now when a car loses a trolley on the road and bends or breaks a pole, all that is necessary is to put the other trolley on the wire and keep going. Also when a car has to take a siding, the conductor pulls down the trolley with the shoe on it and lets up the one carrying the wheel. This allows the car to back up without the necessity of the conductor holding the trolley rope. After the car is on the main line and ready to proceed the conductor pulls down the wheel contact and puts up the shoe.

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*Described in ELECTRIC RAILWAY JOURNAL, page 1010, issue of Dec. 15, 1923.

This improvement in construction practice has resulted in a greater reliability of service because it very seldom happens now that a train is delayed on the road due to defective current collecting apparatus.

ACCIDENT PREVENTION WORK

We developed last year a system of analyzing the individual performance of trainmen with regard to accidents.

This work has been carried forward during the past year and the results justify its continuance, as the number of accidents and amount paid out during the year continue to show a decrease over previous years, in spite of the fact that the number of automobiles in Fort Worth increased more than 5,000 and the number of revenue car-miles operated by the street cars increased approximately 100,000 miles over last year.

The educational work done by this company during the past year has also contributed to the good showing made. A feature introduced this year along educational lines was to hold joint meetings between claim adjusters, transportation department inspectors, and other interested employees. At these meetings all angles of claim department work are discussed. This has resulted in close co-operation between the claim and other departments, since there is a better understanding of claim department requirements.

In Fort Worth on certain streets our tracks cross at right angles paved streets on which the automobile traffic is heavy. The automobiles travel at a high rate of speed, at times without thought of the danger lurking in approaching the street car tracks.

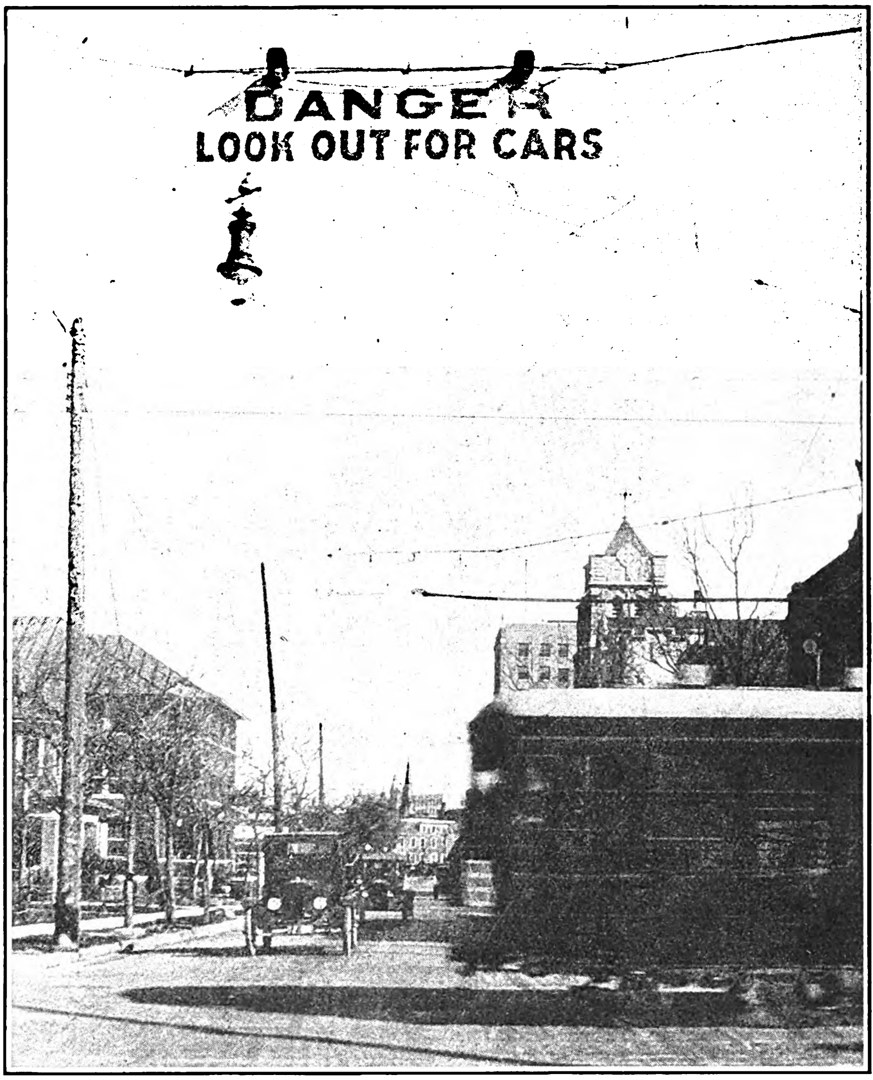
In spite of the fact that our operators approach these crossings with due caution, we had to devise some means of warning the automobilist that he is approaching a street car track in order to keep him from running head on into the side of the street car.

We have put up signs, stretched across the street, visible in both directions and illuminated at night. They read "LOOK OUT FOR CARS" and are painted with a white background and large black letters. These signs have been of great benefit in reducing accidents.

On our interurban lines we have erected signs on the span wires particularly where the interurban leaves the public highway for the private right-of-way. Several of these signs are in use; they also are illuminated at night.

Building Good Employee Relations

This company particularly prides itself on the good relations existing between management and employees. This state of affairs is due to the broadmindedness of the management in treating the employees as members of an organization all working together for the common good. What is good for the management is good for the employees, and what is good for the employees is good for the management. The result of this relationship is evident in many ways. There has never been a serious difference of opinion between the employees and the management of this property.



Warning Signs Placed at Crossings of Car Lines with Heavy Automobile Traffic Streets Have Helped to Reduce Collisions of Motor Cars with Trolleys

The employees have been made acquainted with full details concerning this company and it has been made plain that there are no secrets in the operation of the property. This has resulted in the employees having an understanding of the necessity for inauguration of new economic practices. It has gained for these economies the whole-hearted support that was so necessary to make them successful. The employees realize that the company expects everyone to do more than his duty and these economies have been obtained without the payment in any form of a bonus or a commission. Furthermore, the labor turnover among the employees of this company is very small, which means we have a group of contented, loyal employees.

On the other hand, the management always has the employees' welfare in mind by providing such things as mutual aid for the benefit of those who get sick; educational facilities; clean, sanitary work shops; clean wash and locker rooms; up-to-date tools and equipment with which to render the best possible service to the public; money is loaned when necessary, and last, but not least, a kindly word and the benefit of experience are given when asked for.

If the employees of an organization are in debt they are sure to be dissatisfied with their employment. Working conditions on street railways make it possible for the employee to keep out of debt unless he is improvident, or unless he, or members of his family, become ill.

Sickness in the family is a drain upon the employee, but if the wage earner is able to work it is not so serious as is the cessation of wages through illness of the family head. Recognizing this, we long ago organized an aid society which would pay the employee during his illness.

From time to time the scope and benefits of this association have been changed with the idea of giving the employee the maximum benefit possible. The first of this year we further increased the benefits until now they are as follows:

Payment of $2 per day sick benefit for 120 days and $1 per day for the next 60 days, a maximum of $300 for each illness.

Complete medical attendance, including services in case of major operations, and an eye, ear, nose and throat specialist.

A hospital allowance of $15 per week in

case the association physician believes hospitalization is necessary.

Drugs as prescribed by the aid physician.

A death benefit of $500 in case the employee is a member of less than six months standing and $1,000 after six months employment.

For all the above, the employee pays $1 per month and the company subscribes a like amount. Membership is compulsory with all white, permanent employees of the company.

We have for some time realized that preventive medicine would be desirable and that it would be much better to keep the man well, if possible, than it would be to cure him after illness. Beginning on Jan. 1, 1924, the Aid Society offered its members the privilege of complete annual physical examination, and the company has encouraged all the employees to take this test. Although there was no compulsion, more than 90 per cent of our employees have availed themselves of this offer.

The results of this test have been highly gratifying and the examinations have exposed many conditions which, if they had been allowed to develop, would have resulted in serious illness, chronic afflictions or, in some cases, death. The economic benefit to the employee is evident and the company has been the gainer by reason of the improvement in the employees' health, since we have found that poor health is conducive to accidents.

We have also recently arranged for group insurance of such of our employees as cared to increase their life insurance. Through the Southwestern Life Insurance Company more than 85 per cent of our employees are insured for 70 cents per month per $1,000 of insurance, with certain limitations as to the amount of insurance each employee could take.

VOCATIONAL EDUCATION

This company has developed a real desire on the part of a great many employees for educational work. This educational work has become a permanent thing in the company organization. Beginning on Sept. 1, 1923, we started the second year's work with our three electrical shop classes and they have been conducted very successfully during the past winter.

A number of the employees have started correspondence school courses this year, and a number have finished their courses. Still other employees have taken up educational work with various local educational institutions.

The number of employees taking educational work this year shows an increase over any previous year. At this time 112 employees are taking educational work, which is about 16 per cent of the total number employed. Employees are reimbursed for any money they may have paid out on account of completing their courses.

This company long ago saw the benefits to be gained by the people of Fort Worth if a full time director of vocational education were appointed to direct the work in Fort Worth. We have been interested in getting this accomplished for the past three years and finally on Jan. 1 of this year our efforts, together with that of others, were successfully concluded when the Fort Worth Board of Education appointed a full time director for the work.

DISCUSSION OF A.E.R.A. PROCEEDINGS

It is impossible for all department heads of this organization to attend the American Electric Railway Association's annual convention. However, we have not overlooked the fact that department heads who do not attend the convention would derive much benefit from a knowledge of the papers and discussions which took place at the convention. We believe that we have devised a way by which effectively to bring a digest of the proceedings before all department heads.

As soon as the published proceedings of the convention are received, a general committee of three is appointed from the department heads to review them. This general committee then appoints sub-committees and designates which part of the proceedings the various sub-committees shall handle. Each sub-committee in turn has a chairman. Each sub-committee chairman apportions out the particular subject that each sub-committeeman shall report on and the time.

In this way every subject in the convention proceedings is covered. The digest of the subjects as worked up in a paper by the designated department heads is read before all the department heads. After the paper is read, the meeting is open for discussion on that subject and many valuable points are brought out in this way.

This manner of bringing out the salient points covered by the annual convention was started this year and we believe we have made a forward step by thus acquainting the department heads with the best thought in the industry, and it also stimulates the department heads to think how the ideas can be turned to good advantage on this property.

MEN SUGGEST BUSINESS SOURCES

At intervals the manager of this company has made it his business to hold meetings with all the city and interurban trainmen and acquaint them with the trend of the company's affairs. These meetings have served to make the trainmen feel that they are a vital part of the Northern Texas Traction Company's organization, and as such are entitled to know the trend of affairs. The trainmen are given facts and figures which enable them to give the public intelligent answers to any questions asked them.

At one of these meetings with the city trainmen during the early part of May, 1924, G. H. Clifford, manager of this company, told the trainmen that he would like to have their individual ideas on how to increase the company's business. Each trainmen was requested to send him a letter setting forth his ideas on the subject. Mr. Clifford offered first, second and third prizes of $25, $15 and $10 respectively for the best letters written.

Ninety-five per cent of the trainmen sent in letters in response to this request. Many good suggestions were gained from them. The competition for the prizes was keen, and it was with difficulty that the committee, including the manager, finally decided on the winners.

A similar competition was recently held for the interurban trainmen, and all of them, without exception, turned in letters.

OTHER ACTIVITIES OF THE MANAGEMENT ON BEHALF OF THE EMPLOYEES

This past Christmas a Christmas Tree Party was given for the salaried employees and the members of their families. Presents were distributed to all, after which dancing was enjoyed. This party was most successful and we believe it will be an annual affair.

This company owns a camp at Lake Worth, which is about 10 miles from the business center of the city. This camp is used for the benefit of all employees, mostly during the summer months. The camp is open to the employees free of all charges, which also includes all the equipment contained therein. Hardly a week end passes during the summer that some group of employees does not make use of the camp. Part of the equipment is a motor boat which helps to make the use of the camp still more pleasant.

Every so often some of the employees will get up a swimming party and go to the natatorium in Dallas. On such occasions as this, the company furnishes free special interurban cars for the round trip. Generally before leaving Fort Worth enough food is taken aboard the car or cars, so that on the return trip from Dallas supper can be eaten aboard the train. Such parties as these are participated in by the officials and a good time is had by all.

NEW CAPITAL REQUIRED DURING THE YEAR

We sold $500,000 of five-year 7 per cent coupon notes to our employees and the public during March, 1923. With these funds we were able to carry on part of the construction work required during the present year. The economies herein before mentioned in this presentment have assisted us to finance the balance of our construction program out of earnings. For this reason, it has not been necessary for us to sell securities to the public during the past year. We believe, however, that our position has been strengthened and when new outside capital is required we will be able to obtain it on most favorable terms.

To sum up, we try to be among the first with regard to new devices which will result in economies both from original ideas and from ideas and practices gained from a study of other properties. However, we never lose sight of the fact that such economies as we adopt must improve our service to the public or lighten the burden on our employees.

We believe that service means more than giving a transportation service. The service we offer is fast. The headways are much less than they should be on most lines, but we believe that patrons should wait as short a time as possible for a street car. Furthermore, the frequent headway on our lines practically insures a seat for every passenger carried, and even during the peak hours it is not unusual to note the absence of standees.

We have modernized our property and our service. We have something good to sell—transportation—and we are selling it by modern methods, by advertising and by delivering the goods.

Claims Association Proceedings

The Medical and Surgical Session, a New Feature This Year, Brought Out Many Interesting Facts on Malingering, Re-examinations of Employees and Other Technical Matters—Topics at Other Meetings Included Automobile Hazards, Prevention of Highway Crossing Accidents and the Influence of the Claim Department in Promoting Good Public Relations

THE first session of the American Electric Railway Claims Association this year was held on Monday afternoon because of the setting aside of Wednesday as exhibitors' day. There was a good attendance when President W. H. Hyland called the meeting to order at 2:15 p.m. in Claims Hall on the Million Dollar Pier. An abstract of President Hyland's annual address follows:

President's Address

The history of railway transportation does not tell us at what time the claim agent or adjuster made his appearance in this country. Enough, however, is known of past ages, both from history and comparative conditions of society in our own time, to show that men have been employed from time to time, not to determine the rights of people, but to adjust their grievances and terminate their quarrels.

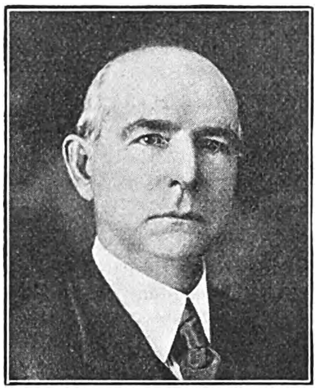
We, of course, are not particularly interested to know when the claim agent or adjuster first appeared in this country, but we are concerned indeed with the causes which made his coming inevitable and the variety of problems with which he has had to deal from his advent to the present time.

For many years the claim department of a railway consisted of only one man who performed the duties of the investigator, adjuster and claim agent. He was the unit of this economic enterprise. There were no interrelations with other claim departments, and the policies and undertakings of one were unknown to the other. Co-operation, which is the purpose of any organization, was absent in any real sense.

In 1904 the situation became so serious, however, that claims men called a meeting in St. Louis, Mo., to consider ways and means of protecting their enterprise and safeguarding the interests of electric railways. At this meeting the "Street Railway Claim Agents' Association of America" was organized.

This event, we believe, marked the first milestone on the highway of progressive claims work. Today the association adequately represents the various advances in all departments of thought and knowledge bearing upon claims work, and we believe that it is a trustworthy and competent interpreter of our needs and of our problems.

By reference to our program it will be noted that there is no joint meeting scheduled for the Claims and Transportation & Traffic Associations. One reason for its elimination this year was due to the belief of your president and executive committee that the medical and surgical committee, being a new committee, should have an entire day to carry out its program. It also appeared that if a joint meeting were scheduled, it would seriously interfere with the remainder of the program of both associations. With the elimination of the joint meeting we were able to revise our program and rearrange our schedule whereby all subjects approved by our executive committee were retained.


W. H. Hyland
Retiring President

At our last convention meeting you will recall that the incoming administration was instructed to take up with the parent association the question of employing a safety engineer or secretary to vitalize and make enduring the work of the Claims Association. Mr. Allison and Mr. Hellmuth were appointed a committee to draft a resolution setting forth the necessity for the employment of such a safety engineer and Mr. Hellmuth presented the resolution at the meeting of the American executive committee in January. The matter was referred to the committee on policy and finance. It was finally decided not to appoint such an official as the budget for the year did not provide for such an expenditure and the finances for the year would not justify it, and it was believed that the parent staff at association headquarters might be of greater service to the Claims Association.

H. D. Briggs
President-Elect

The recommendations of the committee were approved and I therefore presume likely there is some disappointment that the efforts of your committee in this matter did not prevail. But on the other hand, I believe we shall find both reasonableness in the decision and comfort in the thought that the parent association desires at all times to do that which is for the best interests of all the affiliated associations.

Realizing the advantages of an early start, your committees were appointed promptly. In addition to the committees provided for, there was appointed a committee on uniform state law governing the operation of motor vehicles approaching railway-highway grade crossings.

In planning the work of this committee it was the original intention to seek the aid of the United States Chamber of Commerce, the National Safety Council, the American Railway Association and by the appointment of committees in each state directly to take up with prominent state legislators and other agencies within each state concerned in the conservation of human life the imperative necessity of a law governing motor vehicles approaching grade crossings. Later the work of this committee was curtailed to the gathering of data bearing upon the subject and to the drafting of a proposed universal state law. Although the work of the committee is but a beginning, it will have accomplished much good in turning the minds of the people into a channel of thought bearing upon a condition which causes more suffering and a greater sacrifice of human life than any other agency in this country at the present time.

Your officers have received many invitations from associations engaged in accident prevention work to attend their meetings. These invitations were accepted and delegates were duly appointed to represent our association. In this connection I believe we also should establish the practice of extending invitations to officers of other associations engaged in similar work to attend our meetings; in fact, I believe that we should strive to secure for our association as members men engaged in claims work in England. It would be highly advantageous for both the claim agent abroad and the claim agent in America to know the policies and practices of each other, and it would be, I believe, a consummation devoutly to be wished by both.

In conclusion, I sincerely wish to thank all who have in any way helped to make this convention a success, and especially do I thank the chairman and members of committees who have labored so faithfully to furnish us such an interesting and instructive program. And I also wish to express my gratitude to our secretary, Mr. Welsh, and his assistants for the fine helpfulness and courteous service rendered me during my term of office.

The reports of the executive committee and of the executive secretary were then presented. The former was a record of the minutes of the meetings of the executive committee. An abstract of the report of the executive secretary follows:

Report of the Secretary

The following committees were authorized by the executive committee and appointed by the president at the beginning of the year: (1) Accident prevention, (2) claims department aspects of motor bus operation, (3) employment, (4) medical and surgical work, (5) resolutions, (6) subjects, and (7) uniform grade-crossing law.

The committees on employment, resolutions and subjects are standing committees, appointed each year for specific purposes. The accident prevention committee was appointed to continue studies of this subject begun in previous years. The remaining three committees are new, in so far as their assignments and activities are concerned.

The committee on claims department aspects of motor bus operation was appointed as a result of a resolution passed by the executive committee of the American Association, requesting each affiliated association to interest itself in problems common to motor bus operation.

The medical and surgical committee is the result of a generally accepted belief that the doctors should take an active part in the work of the association and have a definite part in the convention program. One entire session of this convention has been allotted to a medical and surgical program arranged by the chairman of the committee.

The committee on a uniform grade-crossing law was instructed to study the laws of the various states and prepare a suggested grade-crossing law which might be considered desirable for adoption uniformly throughout the country.

All of the committees have for presentation here reports of unusual interest to the members of this association. In addition a number of interesting papers have been prepared on subjects recommended by the subjects committee and approved by the executive committee. The net results of the year's activities will be laid before you in these sessions.

As a matter of record, there is given herewith a statement of the Hooper-Holmes Bureau reports, by member companies of the association for the year ended May 15, 1924:

Company	No. of Reports
Cleveland Railway Co.	1,625
Duluth Street Railway Co.	66
Georgia Railway & Power Co.	111
Hudson & Manhattan Railroad Co.	386
Illinois Traction System	7
Market Street Railway Co.	421
Memphis Street Railway Co.	60
New York State Railways (Rochester)	7
“ “ “ “ (Utica)	159
“ “ “ “ (Syracuse)	259
Pittsburghs Railway Co.	160
Tacoma Railway Co.	16
United Railways Co. of St. Louis	1,085
Union Traction Co. of Indiana	99
United Railways & Electric Co. of Baltimore	2,430
Total	6,891

During the year, your president made a special effort to communicate with every representative of your association and sent a special letter calling attention to the work of your medical and surgical committee. In addition, a personal letter was sent to each company's doctor urging him to attend the convention. Your president also designated a representative in each state to stimulate interest in the convention, and letters were sent by him to the various companies in his district. In all of these ways an effort has been made during the year to focus the attention of claims men throughout the country on the activities of the association and to provide for them the fullest opportunity for a discussion of their problems.

It may not be generally appreciated that the membership in your association is equal to that in the parent American Association. In other words, every member company is entitled to send representatives from its claims department to the convention and to designate one as its official representative with the power to vote. It frequently happens, however, that members of your association doubtless do not receive the communications of the association, since under our arrangement but one officer in each company is designated to handle association correspondence for all departments. One way in which the members of your association may have a closer contact with the headquarters office is by taking out individual membership. This will place you on a special mailing list and provide you with an annual subscription to the official magazine and includes one copy of the proceedings of your association.

In conclusion I wish to take this opportunity to say that the services of the headquarters staff are available to the officers, committees and members of your association and that we will be very glad to be of as much assistance as possible in making the work of this association more effective.

The report of the committee on uniform grade-crossing law was then presented. It was read by H. D. Briggs, assistant general claim agent Public Service Railway, Newark, and a member of the committee. An abstract follows:

Uniform Grade Crossing Law

The committee on uniform grade crossing law has followed the work of the national Conference on Prevention of Highway Crossing Accidents, held under the auspices of the National Association of Railway Commissioners. As a result of the study made the committee has prepared a draft for a uniform grade crossing law which is presented as an appendix.

The report was signed by H. D. Briggs, W. E. Robinson and W. G. Fitzpatrick, chairman.

On the motion of John J. Carlin, claim agent Richmond Light & Railroad Company, New York, the association voted to request the American Association to send a copy of the law proposed in the report to the attorney of every member company, so that he might review it and see how it corresponded with the law in his state.

The president announced the appointment of a nominating committee to report before the close of the convention and consisting of: Samuel B. Hare, Altoona, Pa.; W. F. Weh, Cleveland, Ohio; C. B. Hardin, St. Louis, and H. V. Drown, Newark, N. J.

The report on the claims department aspects of motor bus operation was presented by G. T. Hellmuth, claims attorney Chicago, North Shore & Milwaukee Railroad. Before presenting the report, Mr. Hellmuth referred to the recent meeting of the National Safety Council at Louisville which he had attended, and where, he said, important information in regard to methods of reducing accidents from automobiles had been brought out. He commended the work of the National Safety Council to the support of his auditors. He then read the report of the committee on motor bus operation. An abstract follows:

Claims Aspects of Motor Bus Operation

The committee was asked to study the requirements of electric railway companies in the examination of bus drivers over and above such requirements as there might be imposed by state laws and to present information on the aspects of bus accidents peculiar to bus operation and not ordinarily encountered in the operation of rail cars.

Bus and coach operation can be divided into at least three phases: In cities of large population, such as New York, Chicago, St. Louis or Detroit, bus transportation has been intensively carried on along lines similar in some of its characteristics to street railway carriage in these cities, i.e., there is a sufficient volume of traffic to permit of the gathering of much accurate statistical information and to call for the best type of operating management.

Interurban buses may be classified as next in importance as concerns revenue and extent of operation. In this class longer hauls are made on highways outside of city limits, and consequently much greater speed is at times attained.

The third class of buses engage in tours for all-day trips, or for longer periods of time. The company conducting this kind of bus service must particularly look to it that its rolling stock is sent out over the road in first class condition, as much mileage may be covered before the bus is returned to the shops; also the driver must be one who can be trusted to operate with the highest degree of care, even though he knows that he is miles away from headquarters and not under the observation of the operating department. On these long hauls, a higher rate of speed is usually attained than for buses in purely interurban use.

The committee is of the opinion that there is a marked lessening in accident frequency in bus operation in comparison with carriage by car.

Vehicle collisions are relatively very low, due, we think, to the high braking efficiency with the rubber to pavement contact, and also to the possibility of veering in direction, and in this way avoiding a threatening collision.

Passenger accidents fall into the very familiar classification known to all of us, viz., boarding and alighting, personal injuries due to sudden stops and starts, and injuries received by passengers on buses in collision with other buses or vehicles.

Both as to collisions with other vehicles and as to passenger accidents, the experience of two of the committee members' companies shows a very low accident rate. One of the companies in the year 1924 reports a motor bus accident cost of approximately $240 per bus, covering both urban and interurban operation, and the other company reports a total accident cost of $1,000 for the first six months of 1924, using forty buses, largely in interurban operation, but with some urban carriage. The following figures relate to the Chicago Motor Coach Company and the Fifth Avenue Coach Company:

CHICAGO MOTOR COACH COMPANY

Data on accidents for the six months' period beginning December 1, 1923, and ended May 31, 1924.

Collisions between coaches and other vehicles for which coaches were considered at fault — miles per accident	7,702
Collision between coaches and other vehicles for which coaches were considered at fault—passengers carried per accident	29,846
Personal injury cases due to sudden stops — miles operated per accident	65,089
Personal injury cases due to sudden stops — passengers carried per accident	252,224
Personal injury cases, boarding and alighting, for which coaches were considered at fault—miles operated per accident	39,839
Personal injury cases, boarding and alighting, for which coaches were considered at fault — passengers carried per accident	154,381
Cost of accidents per mile	.00695c
Per cent of gross receipts	1.77

FIFTH AVENUE COACH COMPANY

Data on accidents for the twelve-month period ended June 30, 1923.

Car collisions	52
Persons struck	52
Vehicles struck	1,563
Boarding	223
Alighting	167
Other accidents	1,209
Total	3,266
Injuries:	
Passengers	801
Employees	165
Others	104
Total	1,070
Serious accidents included in the above:	
Killed	5
Fractured skulls	1
Broken limbs	2
Other serious accidents	15
Total	23

The Fifth Avenue Coach Company, during the fiscal year ended June 30, 1923, to provide for payment of claims the company charged expenses and credited a reserve at the rate of 1¾ cents per bus-mile from July 1, 1922, to Dec. 31, 1922, and at the rate of 1¼ cents per bus-mile from Jan. 1 to June 30, 1923. It actually expended during the fiscal year $189,374 and there was left in the reserve for the year $10,327. The ratio of money expended for accidents and damages to the total operating revenues was 0.033.

The committee feels that by far the most important portion of its assignment lay in the study of the methods of bus operators whereby maximum safe operation is obtained. This prevention divides itself into three main channels: (1) Careful selection and training of bus operators; (2) proper choice and maintenance of equipment; and (3) public accident prevention.

Some interesting facts on the practice of the Fifth Avenue Coach Company in these particulars are given in a paper read in 1920 by G. A. Green before the S.A.E. (See abstract in the ELECTRIC RAILWAY JOURNAL for July 24, 1920, page 175.—EDS.)

Dr. A. J. Snow, consulting industrial psychologist for a number of industries, has made a study of drivers' selection tests, and states that after giving alertness tests to taxicab drivers for Chicago operators, he has found that those drivers who failed to qualify on tests for alertness are almost invariably the drivers whose accident records are bad. (See also ELECTRIC RAILWAY JOURNAL for Sept. 13, 1924, page 387.—EDS.) Professor Snow feels that mental alertness tests are of great value in choosing men qualified for driving, and he also says that the physical examination must not be ignored in selecting drivers and that "the physical examination should cover sight, hearing, heart and blood pressure, and no man who is seriously defective in any of these respects can be considered a safe driver." Professor Snow considers age as an important factor, and an analysis made by him showed that drivers between the ages of 30 and 39 had fewer accidents than those between 20 and 29. Other particulars are given in an article by Professor Snow in the July, 1924, copy of the *National Safety News*.

The report was signed by C. L. Young, D. M. Finch and G. T. Hellmuth, chairman.

H. C. Davy, assistant treasurer Metropolitan District Railway, London, said that on the London General Omnibus System there are some 3,000 buses which make 120,000,000 bus-miles a year, and the receipts were $45,000,000 per year. The accident costs were about 1 per cent of the gross, or less than that generally reported in America.

H. O. Allison, commercial manager Beaver Valley Traction Company, New Brighton, Pa., then presented the report of the committee on accident prevention. An abstract follows:

Accident Prevention

The committee said that accident prevention as an association study in recent years began with the Claims Association. Later a safety committee was appointed by the American Electric Railway Association and functioned for one year. Then the work of accident prevention was assigned jointly to the Claims Association and the T. & T. Association, and last year a joint report was submitted. This year individual reports will be submitted to these two associations.

The committee recommends that there should be only one accident prevention committee and that this should be a committee of the American Electric Railway Association so that the committee will represent the entire industry and get the benefit of the experience of all departments. Too close association of claims men with accident prevention work, in the opinion of the committee, might be detrimental to their efforts toward adjustment of claims after an accident occurred.

The report was submitted by E. L. Lindemuth, F. W. Mulford, Frank H. Warren, Allison J. Van Brunt and H. O. Allison, chairman.

This report aroused considerable discussion because it was taken by some delegates as the recommendation that claims men should withdraw from organized efforts to prevent accidents and leave this work to other departments of the company. H. O. Allison, chairman of the committee, disclaimed such an idea, but declared the committee believed an accident prevention committee, made up only of claims men, to be wrong. Other departments more directly responsible for accidents should also be members of the committee.

At the motion of Mr. Allison the recommendations contained in his report were then withdrawn, and in their place the association passed a motion made by him recommending to the American Association the appointment of an accident prevention committee, the personnel of which should be representative of the entire industry, and that the committee should function during the coming year.

The afternoon session concluded with an address by Col. H. E. Winsor, superintendent of investigations and adjustments Tacoma Railway & Power Company, Tacoma, Wash., on "What Can the Claim Agent Do Toward Encouraging Better Relationship of the Employees of the Company." This is published in abstract elsewhere in this issue.

Tuesday's Session, Claims Association

TUESDAY'S session was devoted to a symposium on medical and surgical topics. It was in charge of the chairman of the committee on medical and surgical work, Dr. Hart E. Fisher, chief surgeon Chicago Rapid Transit Company, Chicago. Dr. Fisher presented the report of the committee, as follows:

The medical and surgical committee was formed in November, 1923, and its purpose was the stimulation of interest in medical and surgical matters in their relation to the transportation industry. Many companies are far advanced in this phase of their organization; but there are many which are just now realizing the necessity of some medical supervision.

One of the first steps taken by the committee was to obtain the names of the medical representatives of the member companies and to urge their co-operation and presence at this convention. The committee wrote to approximately 350 member companies, and received in reply the names of 600 physicians. From this number, the committee again wrote to 221 of those who appeared to be most eligible to render assistance in medical and surgical work. The response was practically unanimous, and about 50 per cent offered active assistance, listing the questions in which they were most interested. A program of appropriate subjects has been arranged and it is to be hoped that now the work can be carried on with far-reaching results.

The report was signed by H. M. Bascom, M.D., E. W. Miller, M.D., and Hart E. Fisher, M.D., chairman.

Malingering

The first paper presented in the medical and surgical symposium was on "Malingering" by F. L. Mosser, surgeon Third Avenue Railway System, New York. The paper is published in abstract elsewhere in this issue.

President Hyland, in calling for discussion, said there was always danger that malingering will be suspected when it is not being practiced. He instanced an accident on the road with which he was connected in which a passenger fell backward and injured his spine, because the screws which held his seat fast came loose. The company fought the case but lost and had to pay a judgment of from $6,000 to $8,000. The injury was real and the man walks with two canes today.

Another delegate spoke of a case where a young girl who had suffered from infantile paralysis claimed an injury and collected $7,500, but the girl is now back at work and as well as before the alleged accident.

Dr. J. A. Watts, chief surgeon San Antonio Public Service Company, described two or three cases of genuine malingering and also the case of an employee with a stiff back which seemed to be of that kind, but an X-ray showed a deformity which caused trouble under the work of bending and lifting in which the man was engaged. This work was changed, and there has been no further complaint.

A delegate asked Doctor Mosser whether an unfriendly doctor could use a temporary local anesthetic to produce anesthesia during the visit of a company doctor on a patient. The doctor replied that this might be accomplished by a blow or by certain drugs, but except for a blow, it would be difficult to fool the physician.

Dr. J. J. Wymer, surgeon New Orleans Public Service, Inc., told of the case of a man who claimed he had been injured in a collision and deceived a number of leading psychiatrists in New Orleans. Finally, the company paid him $6,500 and inside of two weeks he was entirely well.

Dr. H. L. MacLean, chief surgeon Virginia Railway & Power Company, said that it ought not to be difficult to detect malingerers. They have to be coached by a doctor, and no educated and decent doctor would participate in such a fraud. It would have to be a poor doctor to do the coaching, and it ought not to be difficult to catch him. The practice with his company is to go directly to the doctor in charge of any person injured and get his facts.

Doctor Mosser warned that unfortunately some very prominent physicians sometimes are capable of coaching in cases of this kind.

President Budd Addresses Convention

At this point President B. I. Budd, American Electric Railway Association, entered the hall, and said in part:

"It is a great pleasure to have this opportunity to say a few words to you. The work of the Claims Association is one of the most important of our entire association, not solely because that department of our various member companies involves the expenditure of great sums of money, but more particularly because what they do have a direct bearing on public relations, and public relations are, perhaps, the very most important considerations of every factor that enters into the operation of the utility company. I do not know where there is a better opportunity to convey the best side of the company to the public than where the contact is made with some one who is injured and who not only feels a grievance on account of possible suffering and loss of time, but also a sense of money lost and a sense of a desire to bring retribution on the company which brought about the injury.

"So it requires a great amount of skill in diplomatic work to meet this situation. The claims department has difficulties that would appear to the uninitiated, as they often appear to me, to be almost insurmountable, where the representatives of the department go into an atmosphere absolutely unfriendly. Yet, after the claims representative has entered, it is more than likely that the person is made a friend, one who can be relied upon to control the opinions of a great many people in his or her neighborhood in favor of the company. I have had some very striking examples of this. I had a man who used to write letters to me over a period of a year of the most unfriendly and rabid character. It almost seemed a personal animosity, although he did not know me except as the head of the railroad. None of these letters was such as could be answered, and in accordance with our practice, we never answer letters where there is anything in the nature of a complaint. We always make a personal call, and letter writing is strictly taboo in our organization in connection with complaints.

"Finally, after a particularly strong letter, I met a friend who lived in the neighborhood of this complainant and asked what kind of a man he was. My friend said that he was highly educated and had a nice family and was a very good sort of fellow. I thought it was strange that a man like that could write letters of such an intemperate character, so I asked my friend to invite me and him to luncheon. At this lunch the complainant told me the history of his animosity toward the company. It seems that eight or ten years before, a member of his family was injured, and the claims representative of the road (before I had anything to do with it) not only did not act fairly but made a bad impression upon him. I readily agreed to make an adjustment in the matter. Since that time the man has been one of our best friends. Often he calls me up to tell about inequality of service, that is causing irritation or something that can be corrected to advantage. This indicates that the claims department, though small in size, can be a tremendous force in improving public relations.

The following papers were then read: "Organization of a Medical Department," by J. J. Wymer, surgeon New Orleans Public Service, Inc.; "Medical Survey of Employees" by Alden Coffey, chief surgeon Northern Texas Traction Company, and "Periodical Re-examination" by E. W. Miller, chief surgeon Milwaukee Electric Railway & Light Company. These papers will be found in abstract elsewhere in this issue.

Re-examinations and Personal Injury Cases

At the conclusion of the presentation of the papers on re-examination of employees, one of the delegates asked if Dr. Miller had found any disposition on the part of the employees to object to the medical treatment of the members of their families and also whether such treatment was rendered at the home or at the central medical headquarters.

Dr. Miller explained that the acceptance of treatment for sickness by the men for their families was entirely voluntary, but the department endeavored to give as good service as they would receive from any physician or surgical source, and it was found that this service to the families was appreciated. No attempt was made by the department to supply the services of specialists, just complete medical service, and this was given in the home and in the office. During 1923, some 60,000 house calls had been made without charge. The other physicians in the city had not indicated any opposition to this plan, although the department treated persons able to pay the fees of private practitioners.

Dr. Fischer, Chicago Rapid Transit Company, said that when that company began its periodical re-examination a number of years ago there was some opposition to it on the part of the men, but now they realize its importance and that where any defects are discovered, the company gives men less responsible and hazardous positions where possible. Thus, a man disqualified as motorman can often be used in train service as a conductor or guard. It has been found that as these examinations are continued, the defects discovered have become less with each examination. It will be found also that the death list will decrease. Such a medical survey is conducted every two years and covers all of the employees of the Chicago Rapid Transit Company. To make such an examination acceptable, the company should explain to the men that they are getting without charge something which most men are glad to pay for, and they should really be more interested than any one else in learning whether they have any defects. The discovery of such defects in time will often prolong their lives.

Dr. Miller, in discussing the treatment of personal injury cases, said that the Milwaukee policy, begun long before he went to Milwaukee, was for the company to look out for the medical treatment of all persons seriously injured by the railway, when that was practicable, whether the company knew that it was legally responsible or not. The automobile had greatly increased the number of serious injuries on the street, and the Milwaukee company has in the hospitals now a number of automobile cases, mostly surgical. These patients are receiving whatever treatment is necessary. He was satisfied that this policy was desirable.

Dr. Driscoll, Richmond Light & Railroad Company, New York, suggested that that policy might make a jury think the company was liable in cases where it was not. He recalled the case of a slight collision between two cars where no one was injured, but one woman fainted. He happened to be present and administered some aromatic spirits of ammonia to the woman who fainted. Later she brought suit and his act in administering this simple restorative was greatly emphasized and was largely the cause of a verdict of $1,600 awarded against the company. The company, however, had appealed the case.

Dr. Miller explained that he did not mean that the company supplied treatment to cases where there was no liability, but simply to the doubtful cases. However, if treatment is begun in any case, it is continued except where litigation is brought.

Dr. H. L. MacLean, Richmond, Va., said his company followed the same policy of treating every one injured by the cars, whether the company was responsible legally for the injury or not. He had been asked in court if he was still the physician of a claimant and he always had great pleasure in explaining to the court and prosecuting attorney that it was the principle of the company to extend treatment to any one injured, whether the company was liable or not.

G. R. Whitmore, general claims attorney Illinois Power, Light & Traction Company, Peoria, Ill., said that company at first followed the plan described in Milwaukee and Richmond, but during the last five years applied only first aid service, i.e., for the first 48 hours. In the case of employees treatment is provided during the whole period of disability.

President Hyland explained that on the road with which he is connected, the company doctor visits the injured patient always. Such a visit is required by the New York State law and by the regulations of the Interstate Commerce Commission.

The papers on "Hospital Associations" by Dr. H. M. Bascom and on "Co-operative Hospitalization for Corporations" by Dr. F. S. Macy were then presented. They will be found elsewhere in this issue.

At the conclusion of the session, on motion, a vote of thanks was extended to the attending physicians and surgeons for the information given on various topics, and the association voted to continue its medical section.

Thursday's Session, Claims Association

THE first paper presented at the session on Thursday afternoon was that on "Pelvic Fractures" by Dr. J. A. Watts, San Antonio, Tex. At the conclusion of the presentation of the paper, a vote of thanks was unanimously passed to Doctor Watts for his valuable paper and the hope was expressed that he would attend the meeting of the association in 1925.

In the discussion Doctor Miller, Milwaukee, explained a diagnostic sign for fractured pelvis which was first developed by Doctor Lehman of Milwaukee and was not found, so far as he knew, in any of the books. If the patient is placed on his back with both legs extended and has a fractured pelvis, he cannot raise the heel of his foot on the side of the fracture with his leg in extension.

In answer to requests, Doctor Watts then explained the position of the foot with an upward and backward dislocation of the femur. On request he also gave some facts on the subject of sacro-iliac strain.

C. B. Hardin, general claim agent United Railways of St. Louis, presented a paper on "Automobile Hazard." Mr. Hellmuth then read a prepared discussion contributed by H. K. Bennett. Both of these papers will be found in abstract elsewhere in this issue.

Automobile Hazards

S. W. Baldwin, attorney the Connecticut Company, said that the question of examinations for drivers of automobiles had been considered with great thoroughness at the recent convention in Louisville of the National Safety Council. In the Eastern Atlantic States, from Maine to Maryland, and including Pennsylvania, there is an automobile commissioners' conference, and in all of these states some sort of license to drive a car is required before a person may go on a highway, except under instruction. The speaker hoped that a similar practice would be followed elsewhere.

A discussion developed along the direction of the possibility of accidents to automobiles between blocks and Mr. Hellmuth pointed out that in not all cases is the automobile driver responsible for such accidents. If an automobile proceeding on the track is stopped by something ahead and is run into by the car behind, the railway is responsible. This is also the case where a car attempts to turn in a block and the engine stalls when the automobile is on the track, unless the motorman keeps a proper lookout.

J. H. Handlon, San Francisco, said that 70 per cent of the accidents on the Market Street Railway were in connection with automobiles. A serious danger now is the financial irresponsibility of many automobile drivers, and another is their carelessness even when insured. Eventually, he believes, the insurance companies will have to classify their risks in various ways, as whether the car is operated in a congested district, whether the person owning the car is the exclusive operator, his past experience and past record, the nature of the driver's employment, and whether he drives only occasionally. Premiums for such casualty insurance would vary accordingly. Eventually, he believes also, there will be state insurance and compulsory insurance.

Mr. Carlin, Richmond Railway & Light Company, argued in favor of collecting damages from automobile drivers who injured trolley cars. He thought that, especially in smaller communities, the effect was to make drivers more caretful.

In reply to a question, President Hyland said that under the law of New York State the trolley car has the paramount right between streets because it is a public carrier. This does not mean that this right destroys the last clear chance doctrine. If something is in the way of the trolley car, it doesn't have paramount right until that obstruction is out of the way.

Mr. Handlon, San Francisco, said that of all the automobile accidents of his company, only 19 per cent result in claims. While his company files claims against automobile owners who injure trolley cars, its practice is to confine these claims to cases where the damage is considerable or where the automobile comes in contact with motionless company property, like standing street cars.

Mr. Baldwin, New Haven, did not see that it would create ill feeling if the company insisted only on just claims for damages.

Mr. Hardin, St. Louis, mentioned an arrangement which the St. Louis company made with the owner of a large number of motor trucks, by which the damage to both sides is divided equally. Previous to this time from five to twenty collisions occurred during a month with the trucks of that concern. After that, they practically disappeared because the truck owner realized that if there was an accident, he would have to pay half, whether his driver was at fault or not. The plan worked so well that it has been followed by the company with a number of other large users of motor trucks.

H. V. Drown, Public Service Railway, Newark, says his company believes firmly in collecting damages from automobile drivers where they are at fault. The money collected is substantial; the lesson in carefulness is worth while; and if the driver is insured, the insurance company learns to pay promptly.

Prevention of Highway Crossing Accidents

H. A. Rowe, chairman of the committee on prevention of highway crossing accidents, American Railway Association, and claims attorney of the Delaware, Lackawanna & Western Railroad, was introduced by President Hyland as having saved a great many lives by his efforts. His paper is printed elsewhere in this issue.

Mr. Rowe added a few comments to his paper. He said, among other things, that on the steam roads there is always the danger that a collision with an automobile will derail a long train. The slogan "Cross Crossings Cautiously" had been pushed through posters, pamphlets and talks, and had undoubtedly been effective. It was impossible to eliminate all grade crossings. In the last ten years the company with which he was connected had eliminated 150 at a cost of $96,900 for each crossing eliminated. The effect of the slogan has been not only to induce caution but to encourage the newspapers to place the blame for crossing accidents where it belongs rather than always to place it on the railway. Mr. Rowe said he found that those involved in railroad crossing accidents represented all classes in the community including the learned and captains of industry, showing that all classes were careless at railroad crossings.

In reply to a question as to means for protection, Mr. Rowe said that he favored electric and pneumatic devices operated in conjunction with the approach of the train. Crossing gates are being abandoned because many automobilists seem to delight in smashing them. After the gate, there is manual protection with a man waving a "Stop" sign. This seems better than a flag system because the employees sometimes use the wrong flag and all highway travelers do not know the meaning of the flag. If the flagman waved a white flag, the automobile driver might think that it was an invitation to approach, whereas if the flagman used a red flag, the train would stop. Hence, the stop sign is preferable.

In reply to another question, Mr. Rowe explained that railroad crossing gates were painted in black and white stripes because it was believed these were the most conspicuous colors to use on the average highway. Prior to the adoption of this combination, there was a great variety of colors, and painting was often neglected. With something definite as to color, it is easier for them to be maintained in good order. He hoped that the time is fast approaching when there will be a national uniform system of crossing designations, rules of the road, inspection of cars, inspection of drivers, etc.

A resolution was then passed expressing the thanks of the association to Mr. Rowe for his paper and presence at the meeting.

Nominations

The nominating committee then made the following report:

President, H. D. Briggs, assistant general claim agent Public Service Railway, Newark, N. J.

First vice-president, J. H. Handlon, claim agent Market Street Railway, San Francisco, Cal.

Second vice-president, C. B. Proctor, claim agent Memphis Street Railway.

Third vice-president, J. S. Kubu, assistant superintendent accident department, Cleveland Railway.

For members of the executive committee: S. J. Herrell, claim agent Knoxville Power & Light Company; L. F. Wynne, general claim agent Georgia Railway & Power Company; G. T. Hellmuth, claims attorney Chicago, North Shore & Milwaukee Railroad; Dr. Hart E. Fisher. chief surgeon Chicago Rapid Transit Company.

For convention secretary: E. L. Lindemuth, claim agent Wilkes-Barre Railway.

As there were no other nominations, this ticket was elected.

The new president and vice-presidents were then escorted to the chair, and expressed their appreciation of the honors conferred on them.

A past-president's badge was then presented by Russell Sears of Boston to the retiring president, W. H. Hyland. To this President Hyland fittingly responded, and at 5:30 p.m. President-elect Briggs, who had taken the chair, declared the sessions of the convention to be over.

How the Claim Agent Can Help Better Relations[*]

By H. G. Winsor

Superintendent of Investigations and Adjustments
Tacoma Railway & Power Company
Tacoma, Wash.

H. G. Winsor

Various Ways Are Suggested, Based on Practical Experience, Where the Claim Agent Is Particularly Well Fitted to Help

THE success of our member companies is and always will be dependent to a considerable degree on a good understanding of our problems by our employees and by the public. As to methods, local conditions must govern to a considerable extent. In our own organization we have had splendid success through employee representation in working out our problems.

In June, 1922, we set up an organization which is termed the Electric Company Co-operative Committee and is composed in part by company officials appointed by the manager, and in part by employees elected by secret ballot. We have found this an excellent medium through which we can understand each other better, and secure for both the company and our employees a considerable improvement as regards the conditions affecting operation. We also have a "foremen's conference," and at present are planning a men's conference, both of which will eventually be co-ordinated with the work of the co-operative committee.

The beneficial results of taking the employee into your confidence and discussing with him, frankly, all of the problems you have to face will surprise the most ardent advocate of democracy or the highly developed psychologist.

For several years there has been a rapidly increasing number of publicity advocates in the public utility field. The official who still believes that he must keep secret the most interesting and important facts in connection with the operation of an institution which serves the public is likely to be referred to as a relic of bygone days, and rightly so.

The importance of success in publicity cannot be overestimated, but to be assured of success its direction must be placed in the hands of a man who by education and experience is fully competent to win and retain the confidence of both the management and the public.

What the claims official can do to encourage or assist in the consummation of such an improved condition must of course depend to a considerable extent on the opportunity presented in each individual case. However, we should never overlook the fact that initiative often develops opportunity and furnishes a medium for successful accomplishment.

In our association and contact with the employee we stand, or at least should stand, in the light of an impartial arbiter as well as a friend. While we have no voice or vote in the administration of justice, as between the employer and employee, our estimate of fairness and our influence for a "square deal" is, I believe, generally recognized. We have the responsibility of showing to our employees that it is not only our duty but our pleasure to see that everyone with whom we do business is assured of prompt attention and fair treatment. This applies with equal force to the employee and the public.

In our dealings with the public there are many ways in which we can promote better relations.

The investigator who interviews a witness will leave either an impression of his fairness or the reverse. The form letter mailed from the office carries with it a suggestion of impartiality. The investigation of a complaint and a satisfied customer may count heavily on the right side of public opinion.

Courtesy must not be confined to the platform men. Every official, and especially the claims men, who by the nature of their duties are subject to unusual conditions in business conduct, should studiously maintain a courteous demeanor.

Claims officials should affiliate with civic organizations and take an active part in the work which such bodies are doing. They should be well trained and suitably equipped to develop discussions tending to educate the public in the problems incident to the particular kind of service which is furnished. It is also possible to secure through an affiliation, valuable assistance from the membership whenever it becomes necessary.

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[*] Abstract of a paper before the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 6-10, 1924.

Safety organization and work in the public schools furnishes a medium for improved relations with the community. In our city this work has been going on for eleven years. During that time more than 27,000 pupils have received the safety scout button, which must be earned by passing an examination. Many of the pupils who were in the classes several years ago are now driving automobiles; others are engaged in business or industrial occupation, and the lasting impression made when they were of school age has a most favorable result, where relation with our business is concerned.

Medical and Surgical Session

A Special Feature of the Claims Meeting on Tuesday Afternoon—Prominent Physicians and Surgeons Present Papers on Technical Topics

THE meeting of the Claims Association on Tuesday afternoon was conducted under the direction of the medical and surgical committee, Dr. Hart E. Fischer chairman. Altogether seven papers by leading medical and surgical officers of prominent electric railway companies were presented. The discussion brought out so many interesting points that this meeting will probably be a permanent feature of future Claims conventions. Abstracts follow of the papers presented at the Tuesday afternoon meeting.

Malingering

By Frederick L. Mosser, M.D.

Surgeon Third Avenue Railway System, New York

THOSE of us who are called upon to make decisions concerning malingerers are subject to much criticism, especially by the laity, as to whether we have exercised a sufficient degree of fairness to which each individual is entitled before we make our final decision. Those who under the law are responsible for the results of accidents, in the causation of which they have had no part, should not be subjected to greater burdens than those for which they are legally responsible. With these points as a basis, let me mention the several essentials which are necessary in order to cope better with the subject.

WHAT IS A MALINGERER?

Perhaps no better picture can be drawn to illustrate this than that of the surgical spine, the symptoms and complaints of which, as you know, suddenly disappear after the injured receives his compensation settlement. And right here let me add that there is absolutely no doubt that the number of malingerers has increased, both at home and abroad, since compensation laws have been operative.

There are two kinds of malingering; one which manifests itself frequently in such cases as fractures or strains, or any injury requiring several weeks for convalescence; and the other, the absolute faker, where there is an absolute deception on the part of the subject of both objective and subjective symptoms. In the former class are those injured and confined in railway accident hospital wards, where there has been created a certain amount of friendship among themselves, and everything is very comfortable. They have plenty of time to play games, to smoke, etc. Under these circumstances, they feign all manner of symptoms, first, to prolong their stay and keep away from work, and second, with the idea that they may develop a permanent disability, eventually collecting more compensation.

Some of the artificially created conditions which pass in review are the individuals who deliberately injure themselves. Purposely placing the hand or foot under the wheels of cars is often resorted to. In this, it will generally be found that the wounds are right sided, especially if the individual is right handed. A further point is that self-inflicted wounds have no bruising connected with them. Crutches, spectacles, strappings, trusses, bandages, freshly applied iodine, are frequently used to create the appearance of disability. Frequent complaints of malingering are pain and hyperesthesia. In this we find that the history is unsustained, and ordinary traits of suffering absent.

It is impossible to formulate any symptoms of this malady. A distinction should be drawn between deliberate simulation or exaggeration of symptoms, and that which is unconscious. In the latter variety are those who are morbidly solicitous about their health, chronic invalids, etc., and I have found that persons of intelligence and education have more difficulty in deceiving, as they are bound to express themselves freely. Reticence in these matters should arouse suspicion.

A good way to handle malingerers is to let the patient think he is fooling you. Give him your sympathy, and assist him in exaggerating his symptoms more and more. In other words, give him plenty of rope and he will soon hang himself. The surest means of detecting malingering is to have a thorough understanding of the types of people who actually do it, the way they behave, together with a careful consideration of the circumstances surrounding the case. The vast majority of malingerers are those who exaggerate some actual defect, and it is the problem of the examiner to decide whether the defect complained of is of sufficient cause for the individual to take the attitude he does.

THE TREATMENT OF MALINGERING

In my opinion the treatment of malingering is to prevent it. This in itself is a problem which to a great degree is yet unsolved; but it seems to me that the product of our combined efforts is the essential element to be employed as the panacea against deception.

The Organization of the Medical Department

By J. J. Wymer, M.D.

Surgeon New Orleans Public Service Company

WHEN an attempt is made to operate a medical department as a part of a large corporation many things should be borne in mind. For instance, the location of the department should be as nearly central as possible, or at least in close proximity to, if not in the same building as, the general offices. Effort should be made to get away from excessive outside noises and to have large, ventilated and well-lighted rooms for all parties connected with the department. The equipment should be as modern as possible and all details should be carefully studied out.

Having completed the office and equipment, an introduction of the entire staff with all chiefs of departments should be the next step, so that an acquaintanceship will exist between every working member of the staff and every department head. At this meeting a brief talk by the chief surgeon, explaining in detail the method of examination of new employees and why he rejects for certain physical conditions, will enlighten them and will probably

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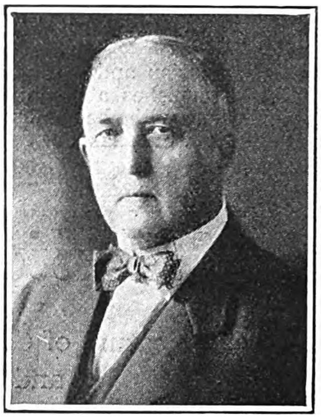

H. M. Bascom, M.D.

later result in a very close co-ordination. In the organization of the medical department it should be generally understood that every new employee, regardless of position, shall be referred to the medical examiner for examination. Subsequent examinations should be required of every employee in the service at least once every two years, and if any defect is found which would make an employee a hazard, a careful notation should at once be made of it on the record and the head of the department to which he is attached notified. At the same time an opinion should be given as to the employee's capability of carrying on in his former occupation.

The medical department should be open all day, and after closing hours some member on the staff should keep in touch with the switchboard to take care of any emergency. At the same time the switchboard operator should know at the end of each day who will be on duty after the closing of the office and where he can be found.

When treating an injured employee the company's physician should try to remember that the man probably comes because he has been directed by his superior to call upon the company's physician for medical or surgical assistance, and that otherwise he would probably seek relief from his family physician or some institution. This means that every effort should be made to render him as free from pain as possible, and certainly to have him leave the office with a feeling that he has not only found a good doctor but at the same time a friend. In all subsequent visits he should receive the same degree of courtesy, whether treated by the head of the department or his assistants.

When it is necessary to send back to work a man who is not entirely well but is physically qualified to perform some labor, he should he told that this is being done for his own good and that a certain amount of work, forcing him to use the injured limb, will be a means of his getting 100 per cent recovery, which he probably would not get if he remained at home. When the department is returning a man not physically fit to do full labor, a note should be written to his foreman or the head of the department, setting forth what the man is capable of doing. This will help to eliminate any friction which may occur between the foreman and the employee.

If the medical department is located in a large city, it should not attempt to do the work of an old-time practitioner. If a man with a foreign body in his eye or any other accidental eye injury comes for treatment it is better to turn him over to an eye specialist, one who is known to be capable of handling such injuries. The same applies to the ear and nose. This may be the means also of saving the company doctor considerable embarrassment, should a damage suit result, following termination of the case. It is a good policy to X-ray all joint injuries, show the man the plate and discuss it with him freely. In fracture with displacement, it is well to get the skiagraph before the reduction, if possible.

The medical department should make periodic sanitary surveys of the properties, reporting the physical sanitary defects to the general manager, at the same time sending a copy of the list of such defects to the head of the department. This report should cover building, lighting, toilets, urinals, drinking founts, disposal of rubbish and drainage.

At intervals throughout the year, lectures should be given to the foreman on first aid and resuscitation, and a heart-to-heart talk on the conservation of health of the employee by promptly reporting all types of injuries, regardless of how minor they may seem at the time of the accident. Stress should be laid on the facts that in giving first aid the promiscuous use of iodine, thrown pell-mell over the injured member, is not good and is likely to cause iodine burns, which are more difficult to handle than the original injury; that loading an abraded surface with raw cotton as a first aid measure is also bad because it is so difficult to remove when the patient reaches the surgeon's office, and that there are other points which the layman considers good treatment but are decidedly bad from a surgical standpoint.

To handle all personal injury cases, which comprise injuries sustained by the riding public or track accidents to pedestrians, the medical department should ascertain the full extent of injury and advise the claim department so that a settlement may be made and release obtained in cases where the company is liable before the claim finds its way to a shyster lawyer. The department should also assist the company attorney in formulating questions to ask the expert witness for the plaintiff.

The medical department should further examine any employee who is sent to the office by the head of another department to determine if the employee is capable of performing the work assigned to him. This need is occasionally brought about by employees complaining that the work assigned to them is too heavy and that they are physically unfitted to do it. When an employee finds or knows his inability to do the work assigned to him will probably result in a call at the office of the medical department, and if he is unable to fool the doctors, he will think twice, and the result will be better co-operation between the men and the heads of the departments.

The writer is of the opinion that all personal injuries should be taken care of by some member of the staff. But no attempt should be made to treat the injured individual other than giving him first aid, if the company physician happens to be the first one to see him. The injured individual should then be advised to employ his family physician, and it might be well in some instances to learn who the family physician is, so as to be able to communicate directly with him. This method of procedure unquestionably will make the general practitioner feel more kindly disposed toward the company, and in the event that he sees the case first it will be less difficult to obtain information from him concerning the injury and also his permission to examine the patient.

Another reason for not continuing in the treatment of the injured individual is the likeliness of the courts or juries to attach liability to the company at times when no liability exists.

The writer does not believe that the system used by some companies of having a number of doctors of a district appointed and to have one see the case for the company is as good as a medical staff. The argument against district doctors is that the company incurs the enmity of many physicians living in the same district, and they make it exceedingly difficult for the company to get any information on the case. It is not advisable to pay for any information which the doctor is

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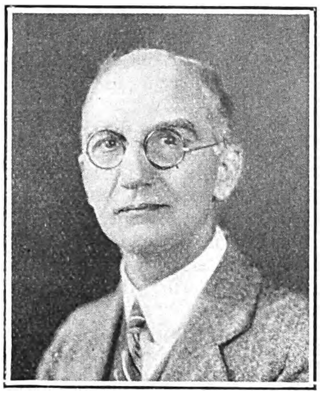
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willing to furnish, because bought information is not worth much when held before court or jury.

When medical information is obtained for the claim department from another physician it is well to quote that physician's statement verbatim, then, if it does not agree with that of the company's physician, it would be well for him to render his opinion on a separate piece of paper, marked confidential.

It is not desirable to have regular specialists on a company medical staff. A better plan is to have a working agreement with as many as possible in the city in which the company operates, to see cases sent to them and render opinions. The testimony of such a specialist in open court has considerably more weight than if he was attached to the company's medical department. The services of the specialists should be only for the examination and opinion and should not include treatment.

X-ray examinations may be made in the office of the medical department, if it is provided with proper equipment, and in cases of personal injury, the negative should be carefully marked at the time the plate was taken, so that there will not be the slightest question as to identification of the plate if it has to be presented in court. Should the personal injury case terminate in damage suit it is always well to have the plate studied by one or more independent radiologists and their written opinions submitted to the company's attorney. The radiologists should be advised, at such a time, that they may be required to give testimony in open court upon their findings.

Periodical Re-examinations

By Ernest W. Miller, M.D.

Chief Surgeon the Milwaukee Electric Railway & Light Company

PERIODIC re-examinations should be undertaken from the standpoint of the benefit to the individual, whether made for the corporation, a benefit association or by an individual physician as a purely personal professional matter, since improvement in the physical wellbeing of each individual as a cog in the wheel of industry will mean added efficiency to any industry.

Physical examination for employment has become quite universal among larger industries. The Milwaukee Electric Railway & Light Company has for twelve years, to my personal knowledge, required physical examination for employment of all trainmen, and I am told that such examinations date back approximately 20 years. A definite amount of work has been done on re-examination, but not in any sufficient amount to warrant tabulation of statistics.

The physical re-examination of employees may be divided into (1) the scope of the examination, (2) the analysis of the findings, and (3) the disposition of the defective.

The scope of the medical examination should not present any possibilities of argument, yet many so-called thorough physical examinations are frequently cursory affairs, and the individual who has submitted himself to examination leaves the office of the physician with a feeling of false security. As chief surgeon of the Milwaukee Electric Railway & Light Company, with an employed personnel of over 5,000 and a well-organized Employees' Mutual Benefit Association, we have possibilities of knowing more about the physical wellbeing of our employees than some concerns which have undertaken systematic periodic re-examinations. The close personal contact of the medical department with the employed personnel has been for some years past a source of great gratification to me. We learned very early in the existence of our benefit association that preventive medicine could best be practiced by taking medical care to the individual rather than permitting the individual to seek medical care, and by this means alone the days disability per member per year were reduced 50 per cent during the first three years of the operation of our benefit association.

Our next great step has been the extension of medical and surgical service to the members of families of our employees. Frequently through this channel have we been given information concerning incipiencies of conditions which might have been most difficult to determine by physical examination. This contention is borne out by the marked reduction of days disability per member per year, since the introduction of preventive medicine to the members and the medical and surgical service to families of married employees. I do not in any way wish to detract from the advantages of physical re-examination, but merely cite the possibilities of the plan of procedure as we have developed it.

If any corporation is to undertake physical re-examination, every known means of diagnosis must be available. Not many years since a physical examination could have been called complete which today would be considered less than cursory. A complete history, in my opinion, is as essential as a thorough physical examination. In suspected cases, the X-ray examination would be paramount. Obscure gastro-intestinal cases, as well as chest cases, must necessarily be fluroscoped and plated. Many cases would require a blood Wasserman and some cases both blood and spinal Wasserman. Routine urinalysis need not be mentioned seriously, since no examination would be complete without both chemical and miscroscopic urinalysis. Examination of the teeth must be made in the light of our knowledge of focal infection, and in doubtful cases the examination should be referred to a dentist, who in turn may demand dental X-ray, dental transillumination, or any other modern means of dental diagnosis.

The history in any given case may lead us to some premature conclusion, which can be substantiated or disintegrated by the clinical and laboratory examination. Too often are we misled by the history of a case and often influenced in our physical examination, as well as our conclusions.

My early experience in the industrial medical world was among foreigners, with whom I could scarcely converse at all, and physical examination with all the means at my command at that time for diagnosis were necessary. I have always felt that this early training made for better final results to the patient, since it was necessary for me to make all examinations with an absolutely open mind and uninfluenced by any history. However, with the added advantages of laboratories, X-rays, etc., I believe it is an easier matter for the medical man of today to make physical examinations without prejudice and without being influenced toward any one pathological condition which he may suspect from the history.

The Analysis of the Findings

Subsequent to a complete physical examination, supplemented by all the diagnostic adjuncts, we have a second problem which confronts us, namely, that of the analysis of the findings of the examinations. It would be wholly unfair to the examining physician or to the patient to draw a snapshot conclusion as to the findings.

My plan of procedure subsequent to examination of a group of employees would be to have each case carefully analyzed in conference between the examining physician, the surgeon in charge of the corporation, and in many instances, the added knowledge of the individual in charge of personnel relations. Needless to say that the chief surgeon of any corporation of size cannot make the routine physical examinations, but his experience should lend itself in conference to the findings of the examining physician for a final determination of the existing conditions. At this time the character of the work of the individual should be considered and his home conditions should be understood, since too often conditions which on the face of them seem to be purely physical are the results of home conditions, financial worries or other matters which no medical history would necessarily bring forth. The habits of the man which should be incorporated in the history may well be studied in conference. This is especially true of our younger employees, as we are quite thoroughly familiar with the habits, etc., of our older employees.

One of the most difficult conditions to analyze, in my experience, has been what is so frequently called "man failure." I have never been able satisfactorily to dissect or analyze this particular condition. Men who have gone along for years as trusted employees in our public utility, whose accident record has been clear, whose physical condition has been excellent and whose home surroundings, we have every reason to believe, are of the best, now and then have a bad accident, which after the most careful analysis has been attributed to "man failure."

In dealing with public utility employees a factor which plays a large part not only in our own physical well-being but also in the safeguarding of the patrons of a public utility is the "human element." This human element may be a pathological condition, and I shall be very much pleased if some one will assist me in the proper analysis of the physical findings in any given case, so that I may be able to determine the existing human element in any given individual.

It may be true that in respect to the problems presented by "man failure" and "human element" it will be found of large importance to make use of the social facts which can be contributed by the personnel relation representative, by foremen and by others who have intelligent knowledge of the habits and living conditions of those who present such problems.

The Disposition of the Defective

Having carefully analyzed the results and findings of the physical examinations, the most serious problem of all confronts us for solution. Public utilities must be operated, and, with all the regulations which surround us, it is sometimes quite difficult to maintain operation. Doubtless there are many employees who are working daily with a full knowledge of their condition and of the fact that their employment is a serious drawback to their physical recuperation, yet in many instances their family at home, or other conditions, make demands which spur them on to greater activities, in order to cope with the complexities of our life of today.

All of us who have had experience of any length have met this problem, knowing full well that it is to the best advantage of the given individual to cease work entirely, yet he pleads for an opportunity to maintain his position in the industrial and social world. Change of employment from one field to another looks simple on the face of it, yet too much change seriously hampers the effective and efficient operation of any public utility. With unlimited means and unlimited men, there are many theoretical dispositions of this problem, but a practical disposition is one which I am not in a position to offer for its complete solution. One individual, or two individuals, can be easily disposed of, but it is safe to say that 2 per cent of the employees of almost any concern should not be allowed to work for a given period of time, subsequent to any thorough re-examination, and in all probability from 5 per cent to 10 per cent would be materially benefited by a change in occupation.

It seems to me clear, however, that the disposition of defectives will be materially easier as accurate knowledge concerning their physical conditions is developed through periodic health examinations. Surely, with such increasing knowledge, at least the intelligent employees concerned can be the more readily convinced of their own personal interest to accept suitable changes in their employment. In other words, the educational methods to be adopted may be more clearly indicated by such extensive and accurate knowledge than could be the case without the information gained by such periodic re-examinations.

I am certain from my own personal experience that cold-blooded, blunt decision in any given case will result only in a deleterious effect upon any well-organized medical department of an industry, until such time as the employed personnel has been sufficiently educated to understand the full meaning of re-examination and to realize fully the benefits to be derived therefrom and further education has been undertaken to dispose satisfactorily of conditions which may be discovered through such re-examination.

It is most natural that subsequent to re-examination of any group, in the event of change of occupation or request to cease work even temporarily, the reflection of the individual in question will rest on none other than the head of the medical department, whether the individual be advised of the condition which exists and the benefits to be derived by cessation of work or change in occupation by the head of his immediate department, the chief executive of the given company or the head of the medical department itself. The unthinking and uneducated individual immediately reflects his condition upon the results of the physical examination of the medical department.

I am heartily in accord with any complete physical re-examination which may be instituted, provided all of the means of diagnosis are available, provided sufficient time can be given to the analysis of the findings and provided sufficient education is forthcoming to make voluntary examination and disposition of defectives a popular procedure with the employed personnel of any industry.

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Hospital Associations

By H. M. Bascom, M.D.

Chief Surgeon Illinois Power & Light Corporation, Peoria, Ill.

ACCIDENTS, industrial diseases, sick benefits, health insurance and compensation acts demand that the managers of all operating companies pay close attention to the physical conditions of their employees. Examinations of applicants for employment will save many dollars in claims later. Re-examinations are necessary in railway work, especially for sight and hearing.

The organization of hospital associations helps to keep the management in touch with the employees, so that loss of time can be averted. After reviewing the work of a good many hospital associations, we are more than satisfied with the Illinois Power & Light Hospital Association, organized by the Illinois Traction System for its several properties seventeen year ago, and now operating over all the properties of the Illinois Power & Light Corporation, having over 3,800 members, and constantly increasing. The employees contribute each month to the association, paying 1 per cent of the first $100 of wages and ½ per cent of all amounts above $100, with a maximum of $3.50 a month. All the employees of the Illinois Power & Light Corporation and Illinois Traction, Inc., are eligible to membership in the association, examination having been made before employment.

There are two separate features to membership, namely, medical and surgical benefit, and death benefit and total disability fund. The former provides for care in case of sickness or injuries received while not on duty; the latter provides $1,000 in case of death or total disability. The medical and surgical benefits of the association include (a) medical treatment with medicine during sickness, (b) hospital treatment when deemed necessary by

a regular hospital association physician or surgeon, by reason of sickness or of accident not covered by a compensation act, (c) surgical treatment when necessary by reason of sickness or accident not covered by a compensation act. This is in addition to any amount the employee might receive from usual compensation for such disability.

No payment is made for time lost during sickness, and the local physician determines the ability of the employee to return to work.

The results obtained from such associations are many. The average employee fears loss of employment, sickness and poverty of old age. Statistics show that 95 per cent of workmen are dependent at 66 years of age. Membership in the association brings the employee and employer nearer together. A satisfied employee is a better workman and less liable to accident than one who worries all the time. If in case of sickness he knows he will be provided for and some one is looking after his health he will be fewer days off the payroll. The labor turnover will also be less. The death benefit and total disability provide a fair amount to him for the future.

We make contracts with local hospitals instead of operating our own, believing it is for the benefit of the employee and any one injured on our right-of-way to be transferred at once to the nearest hospital.

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Pelvic Fractures

By J. A. Watts, M.D.

San Antonio, Tex.

THIS subject is of growing importance by reason of present traffic conditions. It divides itself into two general classifications, i.e., fractures of one part of the pelvic bone, without loss of the weight-bearing pelvic ring, and fractures of bones, with loss of the pelvic ring support. Both bring about instant complete disability, pain, deformity and shock.

The cause of pelvic fractures may be direct violence from a blow, or crushing injuries, such as automobile accidents, train or street car accidents, or it may be indirect violence such as a fall from a height, this violence transmitting through the thighs. The treatments recommended are: (1) Swathe with sling on Bradford frame, (2) long wooden splint from asilla to heel, (3) Bradford frame and weight extension, and (4) wiring, where comminuted with great deformity.

The following conclusions may be added: (1) That we are prone to expect discouraging results; (2) that disability periods given in these cases both total and partial are too long; (3) the most important point to my mind is that in an examination of a patient's terminal X-ray picture. We are prone to be guided by the amount of callous formation at the site of the fracture in gaging the firmness of union, losing sight of the fact that not much callous is thrown out in this region, and union is a great deal firmer than the picture as taken would indicate.

Co-operative Industrial Hospitalization

By Frederick S. Macy, M.D.

Medical Director the Brooklyn-Manhattan Rapid Transit Corporation

THE progress of civilization has been marked more by increased consideration on the part of the fortunate for the unfortunate than by any other one characteristic, and the tendency is growing to accept as an article of social faith a belief that those who have are under a certain obligation to foster the welfare of those who have not. Charity is beginning to mean not mere tolerance and giving, but the conservation of human energy, emotional, material and spiritual, and implies no shame, for there is no man who is not an object of it.

Probably the greatest necessity at present is the strictly industrial hospital. There are comparatively few workmen who can afford to pay from $25 to $100 a week for private service, or even the modest sum demanded for a bed in a ward. When the workman is ill his pay stops, generally, not only because of the necessity that drives his employer but because of the fact that otherwise many men would never be well enough to work at all. The employee who first weakens and then falters drives on until utter incapacity or constant pain forces him to a physician. Probably he has waited too long, but the rent had to be paid and the children fed and clothed, and he worked as long as his hands would answer to his will. In the meantime, his savings for a home or the education of his children are drawn upon for the supply of daily needs in addition to the cost of illness. Often the end of the hopelessly ill, is the charity ward, the public aid societies, the street and the poorhouse. The general public may think these are extremely rare cases. The social service department of every corporation knows they are not.

This is where the strictly industrial hospital comes in; not as a complete solution for all problems, but as a step toward it. The necessity for it implies neither incompetence nor uncharitableness on the part of other hospitals and the medical profession. The industrial hospital would supplement both, working with them instead of against them. It would minimize the drain of free wards upon the slender purses of hospitals in general, which are so seldom self-supporting that when one is it becomes an object of curiosity. On the other hand, the workman who could afford to pay for hospital treatment and preferred to go to some other than the industrial hospital could still do so.

Many corporations are already doing a great deal in this direction. The company which I have the honor to represent, as one example, conducts dispensary service for the care of both disease and injury. It employs a staff of physicians to visit and treat employees ill at home if such care is desired. It co-operates with family physicians and hospitals. In spite of receivership and adverse municipal conditions, it has spent enormous sums annually in sheer gratuities to employees, pensioners and families. Yet the misery and want that still daily appeal to it are financially beyond the power of its most generous impulses to relieve.

Even very large corporations have had to abandon hospitals of the conventional plan and scope after actually operating them because of the expense. But those of us who have had experience in hospital management know that the greater the number of occupied beds, if other factors are equal, the less the proportionate overhead is, and it is not unlikely that a hospital comparable with the best and even prepared to assume at least a portion of the tremendous burden of civilization that this proposal contemplates could be adequately supported by the co-operation of several companies, for not only would the cost of maintenance diminish proportionately as the number of occupied beds increased, but the available resources should increase in a greater ratio than the number of patients.

Such a co-operative industrial hospital could supply medical and surgical service to the employees of the co-operating concerns and possibly of their families, could study industrial diseases and injuries with the aim of reducing compensation losses and increasing the profits of production, could examine applicants for employment and re-examine all employees at suitable intervals and could care for crippled and pensioned employees possibly at a colony or camp in the country.

Outside of the contributions from member corporations for the support of such an institution, there are the following possible sources of revenue: Regular hospital rates to be paid by members for the care of their compensation cases admitted to hospital or camp; such fees as could justly be collected for the care of employees' dependents, if they preferred this hospital to others or if necessity forced them to it; fees for hospital care paid by benevolent orders in the case of employees who belonged to them; returns, if any, from agriculture and other activities of the vocational camp; donations, and the profits of "drives," as in the case of other hospitals.

Nothing a corporation could possibly do in any other way could gain for it such a large measure of public confidence and good will, even affection, as identity with such an enterprise would bring it. Nothing could so enhance the standard of loyalty and general excellence of its employees, or bind them as firmly to it in time of stress. As for science, such an institution would do far more toward standardizing industrial medicine as a specialty than any college or school could ever do. As far as the community is concerned, it would furnish a stronger guarantee against strike disorders and anarchy than any other single influence.

Perhaps the ideal could never be attained. The best that could be done might be only the subletting of a ward in a pre-existing hospital. But the ideal is an admirable objective, whether it be in matters of relief or in doing.

Medical Survey of Employees

By Alden Coffey, M.D.

Chief Surgeon Northern Texas Traction Company, Fort Worth, Tex.

Although in the past we have always had a very rigid entrance physical examination on the Northern Texas Traction Company, and have rendered medical and surgical treatment to the employees to the best of our ability, we have occasionally found some of them suffering with a disease that could have been diagnosed earlier and probably responded to treatment better. We have also found that quite a few employees are not prone to consult any doctor so long as they do not suffer pain or are not incapacitated for work. There are perhaps other good reasons, but the above were sufficient to incite us to begin our first medical survey this year.

The percentage of our finding, as shown in the accompanying table, may seem to be rather large, or perhaps we have not been as thorough in our entrance examination as we should have been, but we believe that our percentage is about the average.

To make a proper medical survey of employees of a street car company we mean to make an individual study of every employee regardless of what position he may occupy. This is important in order that we may arrive at an average of each ailment that affects the men as a whole, or affects employees of different departments, or to determine if there is an occupational disease among them due to their environments or work. Again, by this survey we are able to determine the loss of time of each individual and what we can do to prevent it.

The classification we have arranged is as follows:

Class A, men without defects or diseases.

Class B, defects or diseases of slight importance.

Class C, defects or diseases which handicap them temporarily and should be corrected.

Class D, defects or diseases which handicap them permanently but still able to work.

Class E, defects or diseases which render them unfit for work.

Class A is self-explanatory, and in this class we find very few, as will be shown later in the figures of our survey.

Class B are those with diseases of slight importance, such as bad teeth, enlarged tonsils, slight varicocele, slight defects in hearing and vision, relaxed inguinal rings, slight varicose veins. In our survey we find the largest per cent in this class. This we believe is due to our strict entrance examination and follow-up system of medical attention during the past fifteen years, in spite of the fact that our average age this year is 44 in comparison to an average age of 37 or less during the past five years.

In Class C we place those men who are suffering with acute troubles which temporarily renders them unfit for service and which are readily amenable to correction. This will include acute tonsillitis, crystatis, acute conjunctivitis, acute food poisoning, boils, abscesses, bone felons, bad pyorrhea, acute appendicitis, skin diseases and venereal troubles. In this class we will add moderate defects and slight injuries such as hernias, burns, simple fractures, lacerations and contusions.

In Class D are found diseases of more importance, on account of their being permanent in the individual. This also includes those diseases of an insidious nature which gain a foothold before their presence is apparent to the individual. Some are as follows: Bright's disease, diabetes, symptomless heart disease, hypertension or high blood pressure, chronic stomach or intestinal troubles, tuberculosis and such defects as bad hernias..

The last class, or Class E, takes in diseases or defects that render them unfit for work, and in that we place those men who are suffering with any of the above diseases or conditions in an advanced stage, mental disease such as insanity, and diseases and conditions incident to old age. In our survey there occurred only two in this class, and they of course were relieved from duty permanently. One was due to insanity and the other to senility.

Department Heads Examined First

In attempting a medical survey of this character the first and most important requisite is co-operation on the part of the men and officials of the company. It is a matter of education particularly on the employees' part, because there are always a certain few who are suspicious of any activities sponsored by the officials of the company. They will think, perhaps, that the company is trying to arrive at their true condition so they may be replaced by others, but such action was never contemplated in this survey. In overcoming this and other objections which were raised we carried on an educational campaign before beginning the actual physical examinations. This was accomplished by a series of meetings of the heads of the different departments, at which the plan was fully outlined by the officials and the members of the medical department. It was then carried to the men in open meetings, the plan fully explained, the individual personal benefits to be derived therefrom, and their hearty cooperation was evidenced in a very gratifying manner by the number taking the examinations.

The men were taken by departments, the heads of departments being examined first, and an effort was made to impress them with the thoroughness and importance of such an examination, so that they in turn would "sell" the idea to the men under them. In the examination, the men were admitted, registered and sent to the laboratory, where a complete blood count and a routine urinalysis were done. Following this the eye, ear, nose and throat specialist carried out his examination and on his special form entered his finding. Finally the general physical examination, including a complete family and personal history, was carried out and a record made on convenient form, which can always be referred to for after-treatment.

In the nearly 400 men examined, we found 1,092 defects or diseases, or 3.03 defects per man, as follows:

	Per Cent
Nose and throat	21.3
Digestive system	14.8
Eyes	13.6
Ears	11.6
Miscellaneous hernia	10.2
Mouth	9.3
Cardio vascular	7.3
Genito urinary	7.1
Skin	3.0
Respitory	0.8
Mutilations and deformities	0.8
Nervous system	0.2

It is interesting to note that 46.5 per cent of these defects were found by the eye, ear, nose and throat department, 3 per cent by the laboratory and the other 50.5 per cent by the general physical examination. Although only 3 per cent of these were brought out by the laboratory, this department should not be underestimated, as the most serious diseases are usually discovered in the laboratory.

The examination as conducted showed the men to be in the following classes, as given below:

	Per Cent
Class A	2.2
Class B	45.5
Class C	43.3
Class D	8.5
Class E	.5

We consider this a very excellent showing on account of the age of the men examined, as referred to earlier in the paper.

The number of deaths during the past five years has been 14, with the following causes: Bright's 4; tuberculosis, 3; cancer stomach, 2; apoplexy, 2; spinal menengitis, 1; acute indigestion, 1; murder, 1.

It is very readily seen that the first four diseases, which were responsible for eleven deaths, might have been prevented, or at least the disease held in check and life prolonged, had there been a comprehensive survey 5 or 10 years ago. This point can be shown by the fact that our examination showed there were 3.3 per cent with nephritis in a stage which can be benefited by treatment and which is now under treatment, also we found 0.6 per cent with active tuberculosis. 0.6 per cent with suspected turberculosis. Hypertension or high blood pressure showed 7.8 per cent. In a few years from now probably the same number of men would die or be beyond treatment.

This paper concludes those presented at the medical and surgical session of the Claims' convention. Papers presented at other sessions appear on the following pages.

Automobile Hazards*

By Charles B. Hardin

General Claim Agent United Railways Company of St. Louis, St. Louis, Mo.

In St. Louis Street Car Accidents with Automobiles Have More than Doubled in Five Years—Courts Are Getting Farther Away from the Doctrine of Imputed Negligence

IN THE year 1918 my company had 13,730 accidents reported, of which 4,698, or 34.22 per cent, were with automobiles. In the year of 1923 we had a total of 25,349 accidents reported, of which 12,609, or 49.74 per cent, were with automobiles. You will note an automobile increase of 12.76 per cent of our total. Many other claims men reported a similar condition. Thus you see it is a very live subject with us.

How to combat this hazard is uppermost in our minds. Most of our trouble comes from four sources. First, the partly or wholly intoxicated driver. Second, the under age driver. Third, the Saturday afternoon and Sunday driver. Fourth, the physically disabled driver.

The first class mentioned can best be reached by the enactment of proper laws and the strict enforcements thereof. The second class needs proper educational work among the parents. We should inform them of the law, for many of them are ignorant of it, and hold before them the sureness of punishment of their offsprings if a violation is detected. The active co-operation of the police department, the newspapers, the safety councils, can be enlisted in this laudable work.

The third class congest and "infest" our thoroughfares on the first and last days of the week, and not being experienced by daily driving and thus not capable of proper actions when an emergency arises, load us up on Monday mornings with an unusual number of catastrophies involving not only the chauffeur but his family and very often his neighbor's family.

The fourth class is likewise very numerous. Unless there is a statute regulation requiring a certification of ability which is based upon a careful physical examination, we have no relief from this cause. We should advocate the enactment of such a statute in our various states and should watch its enforcement. The examination should be a thorough physical and mental one. I have added "mental" because some persons who own and operate automobiles, are not mentally balanced. I know of one man living in our city who is subject to epilepsy, yet he drives an automobile and has had one fatal accident. We have no legal way of keeping him off the streets.

Our greatest "hazard" is the crossing accident. Arkansas has recently enacted a law requiring motorists to "stop, look and listen," at all railroad grade crossings, and as a result of a safety conference in Ohio recently a somewhat similar law will be proposed at the coming session of that state's Legislature. Another serious hazard is the "parking hazard." The ideal remedy is prohibition of all parking in the congested district and on busy car line streets between the hours 7 a.m. to 7 p.m.

With the large increase in the automobile accidents comes a corresponding increase in litigation. At present almost 37 per cent of our litigation arises out of automobile accidents. In the year 1918, 14 per cent of the money we paid to obtain all classes of releases went to automobilists, while in 1923, 29 per cent was so expended. The increase in damage litigation has caused an increase in trial courts to hear the same, and our Appellate Courts are crowded, resulting in the appointment of commissioners or the adoption of other makeshifts to assist the regular judges. What is the result? An inferior quality of production, of course, consisting of inaccurate and ill considered opinions not in harmony with the law as expounded in prior decisions and leaving us in a state of uncertainty what to do and increasing our expenses enormously.

We seem to be getting farther and farther away from the doctrine of imputed negligence in our jurisdiction. Our courts have even gone so far as to hold that the contributory negligence of the chauffeur cannot be imputed to the owner of the automobile in a suit filed on his behalf for recovery of damage to his automobile if the chauffeur was not acting as the agent of the owner or was not on the owner's business at the time the damage was suffered; that the status of the owner and chauffeur is that of bailor and bailee, and in the absence of knowledge of the inefficiency of the bailee in his use of the automobile the bailor can assume that the bailee will conduct himself carefully and prudently. See Stoeckle vs. St. Louis & Hannibal R.R. Co., 258 Southwest, 58.

We must recognize the fact that the automobile as a pleasure and business vehicle is here to stay, and that the saturation point has not been reached, so we will see our streets and roads more congested for some time to come. Therefore, it is our duty to increase our efforts along the lines of safety, work with and among our co-employees, work with the constituted authorities for law enforcement and support liberally and work with the various safety councils. While we cannot hope to eliminate the automobile "hazard" through these various channels we will be able to lessen it.

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*Abstract of paper before the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 6-10, 1924.

Automobile Hazards Discussed†

By Harrah K. Bennett

Safety Manager United Electric Railways, Providence, R. I.

Automobile Parking in Congested Streets, Careless Operation at Cross Streets and Incompetent Drivers Are Conspicuous Hazards, Suggestions to Reduce Danger Offered

THE Rhode Island registration of automobiles rose from 16,362 in 1915 to 108,160 in 1924. The use of city streets as garages is one "hazard" that must be eliminated. In the city of Providence, on the principal street, a one-way street, parking is allowed on both sides while in the center is a car line. Imagine how fast traffic proceeds. Add to all this the fact that through the business section serving the principal stores, the width of the street averages 24 ft. and what a picture of confusion confronts us. With a 60-minute restriction of parking, which is openly violated, the picture does not clear. On June 17, 1924, the revision of the city ordinance went into effect and provided, among other regulations, an all-rolling period between the hours of 4 and 6:30 on the principal thoroughfares of that city. Previous to this, automobiles were entirely excluded from certain streets. The result of this has been that there is a great dimunition of traffic congestion at several points, one prime feature attained in the all-rolling scheme being that vehicle and street car traffic travel, in nearly all instances, in the same direction, there being few places where one class of traffic is going against the other.

One great "hazard" is that vehicles entering from a right-hand intersection have the right of way. By no stretch of the imagination can I conceive a more dangerous rule. Parking at corners, parking just around a curve of a street railway track in another street, allowing automobiles to pass on the left of electric cars on streets having one or two tracks in the center of the highway, are also dangerous "hazards."

The intoxicated individual who used to "blow out the gas" but now "steps on it," unregistered cars, unlicensed drivers and drivers under age have also added to the colossal growth of the automobile menace.

As to the point of saturation in this industry, statisticians agree that there are between 24,000,000 and 25,000,000 families in the United States at the present time, but common sense says that every family in the United States cannot own a car. Statistics also show, there are only 225,000 people in the country who have incomes of $10,000 a year or better, and few people getting less than $10,000 a year can afford to keep two cars. The writer assumes that the highest estimate of saturation, therefore, is somewhat under 25,000,000, but more conservative persons have placed it at 16,000,000.

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†Abstract of formal discussion before the annual convention of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 6-10, 1924.

All this leads to the important question of how we can best keep a step ahead in so far as accidents are concerned in order that, although the motor vehicle may increase materially, the accidents and fatalities may decrease. To my mind, the street railways must co-operate with every agency that is working for the prevention of accidents. Each locality should solve its own problems, generally speaking, but there should be standardized recommendations looking to this end. The six traffic suggestions which are recommended by the traffic planning and safety committee of the National Automobile Chamber of Commerce are worthy of serious consideration by every committee. They are: (1) Deprive the careless motorists of their automobiles, (2) instructions in wet weather driving, (3) appoint traffic administrators, (4) better guardianship of children, (5) adjust headlights properly and (6) keep records of fatality causes.

A driver observing a red light regards it only as an indication that he must turn to the left. Red should mean but one thing—stop! The teaching of crossing and highway safety should be a part of the curriculum of every school.

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H. D. Briggs New Claims President

H. D. BRIGGS, the new president of the American Electric Railway Claims Association, has been active in the work of the association for more than fifteen years. During that time he has served on many committees, including the subjects and the executive committees, and while serving in the capacity of first vice-president of the association he contributed a series of articles to *Aera*. He has also written for the local New Jersey Section and has served that body in other ways.

Mr. Briggs' official position is assistant general claim agent of the Public Service Railway. His activities embrace all branches of claim work, including accident prevention. So he enters upon his duties as president of the Claims Association with broad experience and enthusiasm for his work.

Mr. Briggs entered electric railway work in September, 1902, with the Rhode Island Company, Providence, in the claim department. He worked through the various branches of the department, but specialized in the preparation and handling of litigated cases. Later he became claim agent of the property. Subsequently, he was made assistant general traffic manager in charge of freight and helped to coordinate the freight traffic of that company with that of the New York, New Haven & Hartford Railroad.

In September, 1907, he joined the forces of the Public Service Corporation of New Jersey as assistant general claim agent where his experience has been extended in the gas and electric claim work, although the bulk of his time has been put in the railway organization. Having previously taken a course in military training at Plattsburg he volunteered for service in the great war and was assigned to Fort Meyer, Va., but he did not get overseas, however, owing to the revolution in Russia and the withdrawal of that country from the conflict.

Mr. Briggs was born in 1879 in Hopkington, R. I. As a youth when not at school he worked some years as a clerk and later as a bookkeeper in a general country store. He next engaged in the bicycle business. He attended the Moses Brown school, a Quaker institution in Providence and was graduated from Brown University with the degree of Ph.B. in 1902. While in college he specialized in law work and after moving to New Jersey he spent a year in attending night courses at the New York University Law School.

In addition to his business activities Mr. Briggs has found time for fraternal and other work. In 1915 in San Francisco he was elected national president of Zeta Psi Fraternity with jurisdiction over the affairs of its chapters in the United States and Canada.

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Railway Crossing Accidents[*]

By H. A. Rowe

Chairman Committee on Prevention of Highway Crossing Accidents
American Railway Association

In Spite of Their Right-of-Way, Railways Have a Responsibility to Do What They Can to Make Crossings Safe —Helpful Suggestions Made

IT IS my pleasure to be quite at home among you as my early experience as a claim man was obtained on the Brooklyn Heights Railway. Our street railways had crossing problems then, but of vastly different character. Our claim disbursements at that time for crossing accidents were but a moiety of today's.

Let us start off with an understanding of what we mean by a crossing accident. It is my conception we are referring to collisions between vehicles operated upon rails by a duly franchised carrier for hire, and travelers either pedestrian or vehicular upon a public highway intersecting the tracks of the carrier.

Primarily man by the repetition of numberless footfalls prepared the beaten path for his convenience in going from place to place. The use of beasts of burden, the invention of the wheel, the development of the cart, wagon and coach, demanded improvements and extensions of his beaten path, resulting in roads and highways without number.

The past century gave us probably the greatest of all useful inventions—the steam engine—and man was obliged for its development and his personal protection to relinquish some of the rights coming down to him through custom from past ages and permit the iron horse to establish and maintain its right of way over highways and byways through the length and breadth of nations. These rights of ages were not given up entirely, however.

We have the primary right of the traveler to the use and enjoyment of the highway, plus the inherent and legal right of the carrier for hire to traverse the highway upon compliance with its fixed obligations to warn of the approach of its engines and cars. The American Railway Association, in its three recent campaigns, has forcefully stressed the necessity for unstinted performance of every duty by the railways and their employees as fundamental to crossing safety.

Where legal obligation rest upon the railroads to protect crossings by manual means, we should employ men for that purpose of a type commensurate with the character and extent of the highway travel. Where mechanical warning devices are used, they should be of a uniform, standard character, properly displayed and perfectly maintained. Necessary and desirable protective features should come in advance of legal or public demand. Constant surveillance of operating employees is necessary.

Co-operative relations should exist between the carriers and police, street and highway department and the local judiciary. The removal from the vicinity of railway crossings of distracting commercial advertising should be advocated. We should constantly urge higher standards of driving ability, the licensing of all drivers only after fair examinations as to physical, mental and technical qualifications.

The driver, owner and insurance carrier of every car involved in serious or fatal highway accidents should be obliged to report to his state department, that complete data as to the causes of such accidents may be obtained, means of prevention ascertained and the incompetent excluded from the highway. Automobiles approaching steam and interurban railroad crossings should be under such control that they can be brought to a complete standstill 25 ft. from the crossing. The red light upon the rear of an automobile should be abandoned and some other color substituted in its stead. Today a driver observing

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[*] Abstract of paper before the annual meeting of the American Electric Railway Claims Association, Atlantic City, N. J., Oct. 6-10, 1924.

Accountants' Association Proceedings

Better Classification of Operating Accounts Urged—Recommendations Presented for Closer Reconciliation Between Stores Records and General Ledger—Necessity of an Analysis of Maintenance Costs that Will Permit a Closer Check on Economy

AT THE opening session of the Accountants' Association Convention, Oct. 4, the first order of business was the reading of the presidential address by President E. M. White. An abstract follows:

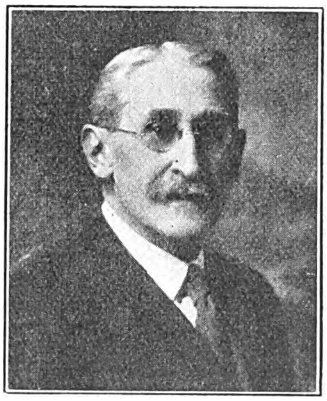
President's Address

We are today opening the twenty-seventh annual convention of the American Electric Railway Accountants' Association. At the last convention of this association the title of president was conferred upon me, an honor that I certainly appreciate. The association was organized in Cleveland, Ohio, in 1897 as the American Street & Interurban Railway Accountants' Association, and I have been a fairly regular attendant since the meeting in Boston, Mass., in 1898.

Possibly you may be interested in looking at a group picture taken in September, 1898, of some of the active members of the Accountants' Association. Look them over and see how many you know. Papers were presented on "Statistics, Their Use and Abuse," by E. D. Hibbe, auditor North Jersey Street Railway, and on "Car Mileage, How Arrived At and Its Use," by A. H. Ford, secretary and treasurer New Orleans Traction Company. There was also a report from the committee on "A Standard System of Street Railway Accounting." These features covered four sessions. An exhibit of blanks and forms was also a feature, more than 25 companies being represented. In the discussion on the classification, there seemed to be quite a difference of opinion on several points, one of them being "whether taxes and interest should be included in operating expenses or deducted from net revenue?"

The question of depreciation received no official recognition until the meeting in Columbus, Ohio, in 1906, and this was a closed meeting. In 18 years depreciation has grown to be a very live topic with accountants, but I regret to say that in practice it has not reached anywhere near 100 per cent. In other words, many still neglect to use it as they should.

Speaking of depreciation, we will all have to recognize it when we get into operating bus lines, for there we have an equipment that will not stand up for 20 years or more, even if properly maintained. There are several other points on bus accounting that I hope will be thoroughly discussed, and if the members have only thought and brought along their blanks on bus accounting we can all get some real good out of the convention. Here is where the "stay-at-homes," who think they can get it all from the report of the convention, lose out. Members, you cannot do it, you have got to be right in the convention hall and talk it out. Get into the spirit, which you can't do by just reading a report.



E. M. White
Retiring President

Another thing the "stay-at-homes" are going to miss this year is the practical demonstration of labor-saving devices for the office. Our work can be made much easier and can be done more rapidly as well as more accurately by adopting modern office appliances.

The program this year seems to me to be one that cannot help but be interesting to all. Members, if you have any thoughts on the various papers that are presented, please do not hesitate to get right up and tell us. It may start something, and that is what the papers are for.

The report of the executive committee was read by O. H. Bernd. In the absence of Executive Secretary J. W. Welsh, Mr. Bernd also read the report of the secretary. This report called attention to the various committee reports. It was pointed out that membership in the American Association also carries with it membership in the affiliated associations, so that all member companies can have representation.

W. L. Davis
President-Elect

In order to insure that some member of the accounting staff shall keep in contact with association headquarters, and receive all material it was urged that individual memberships be taken out.

The proposed code of ethics was not presented to the committee on policy of the American Association in time for action at the convention, so President White announced that it would have to go over for another year.

The report of the committee representing the Accountants' Association at the annual convention of the National Association of Railway and Utility Commissioners was read by Chairman W. L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa. An abstract of the report follows:

Representation at Conventions of the National Association of Railway and Utilities Commissioners

The chairman of this committee had made the necessary arrangements to attend the convention of the Utilities Commissioners in December, 1923, but on account of a railroad accident was unable to go. As no other member of the committee could make the trip, R. A. Freeman, of the accounting department of the Lehigh Valley Transit Company, was requested to do so and prepared a report, upon which this report is based.

In his opening address, President Lewis referred to the increase in the use of motor trucks and buses for freight and passenger service and the necessity for its regulation through the state commissions. There are at present only a few states where there is such regulation, and it is apparent that our association should continue its work in connection with a uniform classification of accounts for motor transportation.

The report of the committee on railroad service, accommodations and claims contains an item of interest to our association in stating that carriers often seek to credit a branch line with only the actual amount earned within its length. The committee suggests that the branch line should receive credit for a proportion of main line earnings, especially for that portion of the revenue originating at or destined to points on the branch.

From the report of the committee on valuation it can be seen that the National Association is following up this matter very closely. It appears that the steam railroads are now and will be in the future required to keep their accounts in such a way that valuations can be kept current by means of cost statements from carriers subject to supervision from regulatory bodies. It also appears that methods used by carriers in defending valuations of their own are being followed up. The committee has also directed attention to valuation proceedings in connection with lines which should not have been built and which could not, on any schedule of rates, earn a return on either original or reproductive values, stating that in such instances capital has been lost and valuations should reflect such conditions.

The suggested uniform law for motor vehicle regulation as submitted in the report of the committee on motor vehicle transportation contains provisions for annual reports, etc., as required.

The report of the committee on public utility rates emphasizes the necessity of reviewing in detail the operating expenses as reported by companies in determining the actual returns received on the property. Among the various items may be mentioned the following: Accounting in connection with depreciation reserves, particularly to determine whether the amount is excessive and the purpose for which the reserve is spent; exclusion from operating expenses of donations to educational and charitable institutions and for political purposes; survey of expenses in connection with advertising, and determination, from accounts, of any factor of inefficient operation or management.

The committee on statistics and accounts of railroad companies brought up a proposed revision of classification of accounts for steam railroads, a study of depreciation reserve charges and credits, a comparison of Interstate Commerce Commission requirements on depreciation and revised requirements in connection with intrastate statistical figures on interstate roads.

The report was signed by C. S. Mitchell, B. W. Fernald and W. L. Davis, chairman.

The report of this committee provoked a lively discussion. There was a general feeling that the time elapsed between the utility commissioners' convention and the A.E.R.A. convention is so long, being nearly a year, that much of the value of the information obtained by the representative is lost. Mr. Davis explained that he had attended the last three conventions of the utilities commissioners, twice as chairman of the committee, and once as special representative. In the meetings he had taken no active part, considering that, as an honorary member representing this association, it might be out of order to do so. He felt that the situation should be looked into and clarified. The report, he said, can be completed soon after the convention and subjected to such action as may be determined on by the association or its executive committee.

F. E. Webster, Massachusetts Northeastern Street Railway, considered that to have the report of these meetings available is a good investment by the association. He suggested that the report of this committee be put into circular form and mailed to the members of the Accountants' Association as soon as it is available. This was put in the form of a motion, which was amended to include the circulation of any reports referred by the executive committee and the president to Secretary Welsh. The amended motion was carried.

The report of the committee on standard classification of accounts was presented by Mr. Bernd in the absence of Chairman R. N. Wallis, treasurer Fitchburg & Leominster Railway. An abstract of the report follows:

Standard Classification of Accounts

The committee has considered with the bureau of accounts of the Interstate Commerce Commission such requests for rulings as have been submitted. In January, the division of depreciation of the bureau of accounts of the I. C. C. took up with the committee the matter of the brief previously filed by this committee concerning the determination of depreciation charges under section 20 of the transportation act of 1920. In the meantime the committee on national relations of the American Association had been following this matter with regard to railroads through the hearings at Washington. To avoid duplication of effort the work of the two committees in this matter was merged. With the approval of President White, W. F. Ham was appointed to represent this committee on a sub-committee of the committee on national relations which is now handling the interests of the association and industry with the I. C. C. with regard to required depreciation charges under the act.

The tentative classification of accounts for motor bus operation submitted by this committee to the last convention has now had the test of a year's use by such companies as are operating motor buses and are using this classification. A further discussion of the principles involved will assist in making changes which will give it a permanent form that can be recommended for our accounting to the Interstate Commerce Commission and other regulatory bodies.

The report was signed by R. N. Wallis, chairman.

M. W. Glover, West Penn. Railways, Pittsburgh, Pa., read a written discussion on the report, in which he referred to the tentative classification presented at the last convention, but stated that so far as he was advised no action had been taken and no uniform classification adopted. The necessity for this step, he felt, is evident to all systems operating buses. He urged that something should be done to provide for the members of the association a classification that could be used by electric railways and by independent bus companies as well, in order to secure uniform accounting and to make any statistics of motor bus lines of some value for comparative purposes.

Mr. Glover brought out that the classification mentioned in the report as being adopted last year was instead referred back to the committee for further action. The report of the committee was then received by the association.

The report of the committee on stores accounting, R. A. Weston chairman, was then presented.

Stores Accounting

Outlines and recommendations for closer reconciliation between the stores records and the general ledger were presented by the committee. It was recommended that all charges against the stock account of a local store should be permitted so far as possible to originate there and that all material issued out of stores on store requisitions should be credited to local stores account and charged to accounts benefited as shown on a monthly report from the local store to the accounting department.

Such a system would contemplate a monthly balance sheet being forwarded from the local store to the accounting department, starting off with the balance on hand at the close of the preceding month; to this would be added as debits all charges to stock during the month for purchase invoices passed, invoices for material received from other company stores, freight, express and cartage bills, labor charges from payrolls and materials returned to stores, once having been charged out.

Each of these groups would be shown in a detailed list showing the store department number for each separate charge to the stock account, thus enabling ready check by the accounting department. On the credit side of the balance sheet would be shown the stores issues for the month, material sold to outside parties and represented by bills rendered and materials transferred to other company stores. To illustrate the system outlined two sets of forms were shown in the report.

The committee favored the system used by a number of companies which periodically check a certain part of the stockroom and compare this inventory with the card or stock sheet record, reconciling the differences so found by a partial inventory adjustment. It also reported in favor of a complete annual inventory, even when monthly partial inventories are made, as it was held that a complete annual inventory brings to light many things with regard to the stock of unapplied material on hand that are not brought to light in other ways, and results in a thorough overhauling of stock and an improvement in the arrangement.

In the subject of rendering store distribution on charges to construction in such a way that the work of the fixed capital records department might be facilitated, the committee illustrated a form of summary sheet for material distribution in its report. Two forms of this character were shown as used by two different electric railway companies. There was included in the report a discussion of a detailed method of keeping store account records for preparing monthly classified material reports. Such reports are to show in cases of construction work deferred or suspended, the amount of material tied up, and to enable proper allowance to be made in considering the amount of the stock carried for maintenance and operation. The whole purpose of the statement is to serve as an aid in the control of the amount of the investment in materials and supplies.

The report was signed by C. L. Bartlett, A. E. Hatton, J. S. Pardoe and R. A. Weston, chairman.

In the discussion which followed, Mr. Davis stated that his company found it necessary to take an annual inventory, although it is taken by sections and not all at the same time. The inventory is adjusted to the various storeroom accounts and the general ledger accounts through a number of controlling accounts. On the subject of adding overhead or stores expense to the actual costs, it was brought out by T. B. MacRae, Chicago Rapid Transit Company, that the Interstate Commerce Commission accounting requires that this expense be charged into general accounts. He does not, however, agree with the I. C. C. and does not do this, the entire expense being charged monthly into an account known as storehouse expense. H. C. Moore, Jr., Richmond Light & Railroad Company, New York City, pointed out that under the telegraph code the I. C. C. does use supply expense loading and that the practice is thoroughly legitimate. Mr. Glover stated that while the I. C. C. does not specifically authorize the practice it cannot prevent it, there being a statement that companies are at liberty to distribute the accounts if they wish.

The minutes of the executive committee meeting held on Oct. 5 were then read and approved.

Executive Committee

The Accountants' executive committee reported that it had held a meeting on Oct. 5 at the Marlborough-Blenheim Hotel, with the following members present: E. M. White, L. E. Lippitt, T. B. MacRae, O. H. Bernd, E. H. Reed and J. W. Welsh.

On motion of Mr. MacRae, it was decided to eliminate the presentation of the new accountants' code of ethics from the program of the sessions of this year's convention.

A special committee consisting of M. W. Glover, general auditor West Penn Railways, chairman; J. M. Joel, general auditor New York State Railways; C. R. Mahan, auditor Chicago, North Shore & Milwaukee Railroad; N. E. Stubbs, auditor United Railways & Electric Company, Baltimore; H. G. Kimball, chief accountant Washington Railway & Electric Company; P. R. Jacques, auto and bus accountant the Connecticut Company, and C. W. Stocks, editor *Bus Transportation*, was appointed to prepare a standard classification for bus accounting. The activities of this committee will be distinct from the work of the standing committee on standard classification of railway accounts and will be directed toward other ends.

O. H. Bernd, secretary Des Moines City Railway, Des Moines, Iowa, was appointed convention secretary. Mr. Bernd was also made chairman of a new committee on freight accounting, and will appoint the other members of the committee.

I. A. May, the Connecticut Company, moved that with the appointment of the new committee on bus classification the question of bus classification be withdrawn from the regular classification committee. The motion was approved without discussion.

Upon motion by Mr. MacRae the scope of the bus committee was broadened to include all matters pertaining to bus accounting that the committee on the latter subject might take into consideration. This was deemed desirable so that all such matters would be considered by men thoroughly familiar with bus operation.

The following convention committees were appointed:

Nominations: M. W. Glover, chairman; E. A. Tuson, A. E. Dickson and W. T. Brown.

Resolutions: L. E. Lippitt, chairman; H. C. Moore, Jr., H. C. Kimball.

Tuesday's Session, Accountants' Association

FOLLOWING the session on joint engineering-accounting, which was held in connection with the Engineering Association (see ELECTRIC RAILWAY JOURNAL for Oct. 11, page 638), the accountants opened their session on Oct. 7, with a paper by Henry S. Day on the subject of segrations in cost accounting from the viewpoint of the manufacturer in reference to maintenance accounts. This paper is abstracted elsewhere in this issue. Mr. Day mentioned that the figures included in his paper had been taken from books of operating companies and that he could vouch for them.

In the discussion which followed I. A. May had the opinion that local conditions should be taken into account to a greater extent than was allowed for by Mr. Day. Mr. Day mentioned that allowance for differences in weather should be made in comparisons of maintenance costs, but did not believe that this would explain the great variations in maintenance costs of companies operating in adjacent territory. He feels that traction companies are facing a period in which they will have to change their maintenance methods materially in order to cut down operating costs. The I. C. C. classification, according to Mr. Day, does not lend itself well to close figuring, and he feels that the master mechanic or the electrical superintendent must figure costs down to details in order to tell where he is going. Last year, Mr. Day said, he went over some 50 railroads and found a wide variation in methods and an equally wide variation in the closeness with which the operating men could figure the true costs of the equipment.

Cost accounting came into its own in England during the war, according to Alfred W. Green, Metropolitan District Railway, London, England. People came to realize that cost accounting is most important, he said. To make comparisons it is important that all companies have a uniform cost system, else it is not possible to tell when one has efficiency. Mr. Green mentioned in particular the spirit of co-ordination and co-operation among American electric railway men, which, he said, was not so apparent in England.

The difficulty of keeping accurate maintenance accounts on a small road where motors, bodies, wheels and trucks are interchanged indiscriminately was described by C. E. Kohlhepp, Wisconsin Public Service Corporation. Mr. Day felt that despite difficulties accurate accounts should be kept. As a comparison of different maintenance practices, he referred to figures of $1,780 and $1,150, the actual costs for maintaining a car a year on two properties within 300 miles of each other. Local conditions, such as weather, were practically the same. But on the property where the costs were higher, the master mechanic did not know what his real costs were.

I. N. Merritt, city of Detroit, questioned the value of comparative cost figures, stating that conditions vary so that they are not valuable. Mr. Day replied that in many cases railway systems are not keeping accurate figures, and the comparison should provide the information to tell the officials what they are doing. He pointed out that many companies are doing manufacturing on a small scale, and figuring that they are making a profit, whereas if the proper overhead expenses were added, it would be found cheaper to purchase parts outside. In some cases where the job is specifically a railway shop job, such as turning wheels, Mr. Day felt that a cost analysis would show up an inefficient machine that was costing so much to run that it would be economy to throw it out and purchase a modern machine.

An illustration of this was given by E. H. Reed, Brooklyn City Railroad. This company had a new mechanical man look at armature practices. He found that to send armatures out to a winding shop to get them put in shape would show a saving of 30 per cent over having the work done in the home shop, regardless of overhead. As a result the armatures were put in good shape and the method of handling work in the shop was revamped, so that today more armatures are being handled than ever before, and at a lower cost.

Homer A. Dunn, Haskins & Sells, felt that more attention should be paid to the item of overhead in figuring shop costs. It is not a question of loading on everything that an engineer can think of, but of determining the correct figure.

PRESIDENT BUDD ADDRESSES CONVENTION

President Budd of the American Association addressed the meeting briefly, stating that he regards the accounting department as one that is almost more vital than any other, since the accountant is more responsible than any other for the morale of the organization. He should be the warning signal for slipshod, wasteful, inefficient or unbusinesslike practices. In addition, the accountant, and more particularly the engineer-accountant, ties in the executive with the business operations.

A paper on accounting as related to administration and proprietorship was read by Homer A. Dunn. An abstract of Mr. Dunn's paper appears elsewhere in this issue.

In the discussion the advantage of comparing two 12-month periods in addition to the current month and the corresponding month of the previous year as compared with the more usual method of computing the year to date was brought out by Mr. Dunn. He also called attention to the value of publicity in connection with the accounts of a company, not only once a year, but continuously.

Charles Roser, Public Utilities Bureau, Louisville, did not agree on the value of newspaper publicity. He outlined briefly the work of his bureau, indicating that it had assisted in improving the local utility situation. As to the inclusion of overhead in costs, he pointed out that this is dangerous when a valuation is in question, and hostile lawyers have a chance to examine the figures. He felt that all overhead should be absorbed in the final cost figure whenever it is possible for this to be done.

Mr. Sharp, Pittsburgh, proposed for the ensuing year that attention be paid to the establishment of committees on fixed capital records and on budgets. Mr. Glover suggested that the subject of cost accounting be added to those already mentioned.

In response to a query. Mr. Glover explained the work of the committee on bus accounting. This committee was appointed a year and a half ago but has taken no action during the past year.

The new committee, however, already has held a meeting, he said, and is inviting every company operating a bus, whether railway or independent, to send in any information or data that will help in getting up a standard classification that is satisfactory. This he hopes to have published in tentative form prior to the next convention.

Leonard Tait, manager London Street Railway, London, Ont., stated that similar work in classifying accounts is being done by the Canadian Association in connection with steam railroads and motor buses. He felt that by standardizing accounts under heads such as maintenance of equipment, transportation, car operation and general expense much unnecessary work will be eliminated.

Thursday's Session, Accountants' Association

THE session opened with the reading of a paper by C. B. Couchman, C. P. A. of New York City. His paper is abstracted elsewhere in this issue.

M. W. Glover, chairman committee on relations with other associations, reported that his committee had no duties assigned to it and for that reason had tendered its resignation to the executive committee. If it was desired to continue the committee it was suggested that the executive committee authorize the president to correspond with chairmen of the corresponding sections of the National Electric Light Association and the American Gas Association, with a view to determining if there are enough questions affecting the accountants of the three utilities to continue this committee.

Agreement with the report was expressed by F. E. Webster and C. E. Kohlhepp. T. B. MacRae proposed the inclusion of the accounting association of the steam railroads, but after some discussion the report was approved as presented by Mr. Glover.

Resolutions

The report of the committee on resolutions was read by Chairman Lippitt. The work of the officers of the American Association and of the Accountants' Association in preparing for the convention and securing speakers was commended.

Thanks were extended to the technical press for the interest taken in having representatives present at the meeting and in reporting the proceedings.

The pleasure of the association was expressed at having Messrs. Budd, Welsh and Green present at the meetings, and for the remarks made by them.

Thanks were extended to O. H. Bernd for his work as secretary during the convention.

The report was signed by H. C. Kimball, H. C. Moore, Jr., and L. E. Lippitt, chairman.

The report of the committee was accepted as read.

Chairman M. W. Glover of the nominations committee presented the report, after which the following officers were elected to serve during the ensuing year.

OFFICERS ELECTED

President, Wallace L. Davis, auditor Lehigh Valley Transit Company, Allentown, Pa.

First vice-president, John J. Duck, general auditor Chicago Surface Lines.

Second vice-president, L. E. Lippitt, auditor-treasurer Auburn & Syracuse Electric Railway, Auburn, N. Y.

Third vice-president, T. B. MacRae, general auditor Chicago Rapid Transit Company.

Secretary-treasurer, J. W. Welsh, executive secretary American Electric Railway Association, New York City.

Executive committee: O. H. Bernd, Des Moines, Iowa; E. H. Reed, Brooklyn, N. Y.; C. E. Yost, Wilmington, Pa., and J. E. Heberle, Washington, D. C.

President-elect Davis and the other new officers present made a few brief remarks, after which Mr. Davis presented the past-president's badge to Mr. White.

Cost Accounting for Electric Railways*

By Henry S. Day

Manager Transportation Division
Westinghouse Electric & Manufacturing Company,
Boston, Mass.

Henry S. Day

Electric Railways Require a Cost Accounting System Which Is Flexible and Comprehensive Enough to Inform the Executives of the Various Departments How Money Is Being Spent and the Results of the Expenditures

THIS paper has been written to bring to the Accountants' Association an operating man's belief that more cost accounting will help the electric railways. In any engineering project, construction program or operating plan, the engineer, contractor and operator are, to a large extent, dependent on the accountant, and no one of these is more dependent than the operator. The bigger end of operation is upkeep, or maintenance. The men who are responsible for maintenance spend their time turning dollars into material and labor, and the success with which they do this depends largely on whether the system of accounting shows clearly where and how the dollars go.

Few electric railroads have cost systems which treat maintenance costs as the manufacturer must treat his production costs. A street railway shop is chiefly concerned with repairs, and the men in charge of this work should know what these repairs actually cost. A superintendent of equipment should know when a motor or truck reaches the point where upkeep costs are entirely unwarranted. Approximate figures only keep him in doubt and uncertainty.

The same thing applies to bridges, track or line. Accounting must do more than this; it must, by exactness and thoroughness, show where one method is costly and where another is not. The correct methods cost the least in the end—and it is the cost in the end, as well as the day-to-day cost, that the accountant has to show up.

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*Abstract of a paper before the annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 6-10, 1924.

The engineer and the superintendent, in keeping pace with development and design, constantly add new types of equipment, and to find out whether a new type is a success, must go to the accountant for the cost. If new equipment operates well and does not cost excessively it is a success; if it operates and does cost excessively it is not a success, and the accountant's figures hold the answer.

The electric railway may not need as comprehensive and elaborate a system of cost accounting as a strictly manufacturing plant, but it must have a system flexible enough and comprehensive enough to tell the man who is spending money for maintenance exactly and in detail how he is spending it. An operating official should be just as familiar with productive and nonproductive hours, overhead, obsolescence and depreciation as a manufacturer, and this information must come from the accountant. If the operator believes he can manufacture a part or make a repair cheaper than he can buy the part or send the repair work to be done outside of his own organization, because his prime cost of labor and material have been given an overhead charge of 10 to 35 per cent when it was actually 75 to 125 per cent, he cannot conduct his department efficiently, and this is not infrequently found to be the case.

It is not likely that the suggestions and criticisms contained in this paper will be met with the thought that to go into the detail of accounting suggested, the average road would acquire an additional expense to its present cost of accounting that would not be warranted. This is not believed to be so, and with the help of the many practical labor-saving devices that are available to the accountant today, it is the speaker's belief that a proper system of cost accounting would entail little additional expense, if any at all.

*Accounting as Related to Publicity and Administration**

By Homer A. Dunn
Haskins & Sells
Certified Public Accountants

H. A. Dunn

The Accountant Mind, the Economic Mind and the Advertising Mind Should All Work in Harmony to the End that Political Demagoguery May Be Overcome

ELECTRIC railways have been greatly burdened with economic troubles during recent years and have been industriously engaged in efforts to meet them. Only a Gilbert and Sullivan operatic satire or a Shakespearean tragedy could do justice to their situation from a political point of view. Politicians keep themselves in the limelight by sensationalism. They find it expedient to play for votes by picturing utilities, and particularly electric railways, as seeking to crush the crowd under a juggernaut of iniquitous wealth and conspiracy. Whatever is sensational naturally appeals to the public press and so it is led into aiding and abetting.

There is no way to overcome publicity misinformation, other than by publicity of the facts. If you accept the conclusion that there is no other way, you should accept responsibility for full co-operation in the work. Development of ability to look upon the public as having a composite mind will aid in the formulation of financial and statistical data that will carry a correct and comprehensive message. The composite mind needs to be visualized as containing the angles of view that are common to the banker, the investor, the patron, and the government commission. In the patron you will find a large part of the crowd mind. When these have been covered in financial data and statistics, little will remain for the requirements of the manager beyond refinements for economic studies.

The formulation of financial and statistical data for publicity purposes, however, should not be entered upon in a haphazard way. It seems to me that it would be quite worth while for the electric railways to organize, at common expense, a permanent advisory bureau to make researches and to study the ways and means by which best to reach the minds of those whom I have enumerated. In order to be most effective, publicity must deal with facts in so simple a way and so directly refute demagogic misrepresentation as to carry conviction to the popular mind. It must be constant and persistent. The field is one for the play of the imagination and constructive genius of the accountant mind, the economic mind, and the advertising mind, all working in harmony to a common end.

As illustration of this method of preparing financial data one measurement might be in the number of dollars each of the several kinds of property and assets (some net) per $1 of long-term debt; another might be in the number of dollars of property and assets, after applying long-term debt against the property immediately securing it, per $1 of preferred capital stock, if any; and another might be per $1 of common capital stock and surplus. By comparison, growth in any and every respect could also be brought out. Measurement of administration in summary form could be worked out per $1 of long-term debt, per $1 of preferred capital stock, and per $1 of common capital stock and surplus. The patron mind might be reached by placarding the public investment, composed of long-term debt and all classes of capital stock and the surplus, and the per cent of return thereon, condensed operating and income data per $1 of such public investment, and also condensed operating and income data per passenger carried.

An advisory bureau might outline advance write-ups, in a manner in which they would be made by an experienced and intelligent financial reporter, to be given out to the press in conjunction with annual reports or at such other times as might be propitious. The bureau might give consideration to revisionary measures to be taken up with federal and state commissions. As one of the revisionary measures that need to be considered, there has been in my mind the excessive refinement in all commission classifications; totally unnecessary for the carrying on of commission functions. You will get my meaning if you will total the smaller items in each main division of operating expenses and divide the totals of such groups by the total operating expenses. If you have not already done this, you will be astounded by the small proportions which these computations will disclose. You may readily conceive that such a bureau should be composed of real experts working co-operatively. Wouldn't it save a lot of haphazardness of effort and be well worth the cost?

It is not possible to force upon any administrator or manager information or data that he thinks he does not want. Often, however, the desire may be created through practical demonstration. Experienced administrators understand the value of indices to uneconomic conditions, indices which point the direction of research for the discovery of the precise facts and the means whereby to stop waste or correct faulty practices. Let me suggest two such indices, based on some practical and agreed condensation of the voluminous detail of operating expenses. One would be a comparison of the percentage ratios of the several items to the total operating expenses, in months and in periods. Another would be to measure such items against like items for some period such as 3 or 5 years previous, according to the conditions. This measurement might be applied to both monthly and periodic expenses. The process would be to divide each amount by the amount of the like item in the basic period. The result would be to produce the amount of expenses incurred in the current period in relation to each dollar of like expense incurred in the basic period.

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* Abstract of a paper before the annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 6-10, 1924.

Now about periods. Have you thought much about, or caused others to consider, the value of constant twelve-month comparisons as in contrast with comparisons for elapsed periods of fiscal years? If not, it is suggested as quite worth while to make the test with open mind. You may think that the constant twelve-month accumulation means a lot of work, but if you lay it out systematically at the beginning of a fiscal year, that thought will disappear after one year's operation. It involves only the subtraction of data for the oldest month of twelve and the addition of data for the new twelfth month. In the first year, the real work involved lies in the establishment of comparative data. It is obvious that at the end of the fiscal year the same data will be accumulated as if proceeding from the beginning of the fiscal year.

The graphic line of monthly revenue is not a tangent; it is afflicted with curvature or with peaks and valleys. You are all familiar with the established custom of distributively disposing of a lot of the more or less fixed or constant expenses for a year on the basis of time elapsed. A question for your serious consideration is whether or not the custom produces fair results.

I want to put into your minds the possibility of giving better service to the administrator and the proprietor. This will involve something like budgeting. Budgeting, as you know, is largely estimating, but it is always possible to progressively adjust toward actuality as the end of a fiscal year approaches, without serious distortion of the results for any month. If, at the beginning of the year, estimates are made of the more or less fixed items or constants which are to be found in maintenance and general expenses, if not elsewhere, and an estimate of the revenue by months also is made, the yearly estimates of the former can be brought into percentage relation to the yearly estimate of the latter. Obviously, the use of these percentages for the monthly charging out of such expenses would be to follow approximately the graphic line of the revenue.

You are all accountants of sufficient experience to understand the use of temporary accounts for actual monthly expenditures, and how the estimates may be revised and adjustments started or made as soon as comparisons may indicate need. You will appreciate, I feel sure, the advantages to the administrator and the proprietor of such a procedure over one involving the utilization of a permissive equalization account as a factor in operating expenses. With a proper clean-up or clearance at the year end it would seem that objection could not well be taken by any federal or state authority.

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Balance Sheets*

By Charles B. Couchman, C.P.A.
New York

When Nature and Purpose of Balance Sheet Are Understood, Its Problems Become Easy—Treatment Explained of Replacements Made at Higher Cost

C. B. Couchman

THE importance of the balance sheet is being recognized more completely year by year. Its place in the business world today is many times more important than it was 10 years ago. The number of business men who look upon financial statements with indifference or even with disdain are rapidly becoming fewer. This change is brought about by an increasing realization of the fact that a balance sheet, instead of being a mere hobby of a group of hobbiests known as accountants, is in reality a document worthy of serious consideration by the business man for his own sake and the sake of his profits and his stability in business.

Without being too technical, it may be stated that a balance sheet as prepared in America today, gives a picture of two things. The right-hand side of it shows the source of all values that have come into, and still remain in, the business picture, and the left-hand side shows the disposition that has been made of these values. The right-hand or liability side may show that a certain amount of value has been received from various classes of creditors, a certain amount from stockholders and a certain amount has been accumulated from the operation of the business. The left-hand side shows that certain of these values are on hand in cash; certain are represented by collectible claims from others; certain other amounts have been paid out for the acquirement of various classes of property both floating and fixed; and still others for services yet to be rendered to the organization, such as prepaid expenses, or for services whose benefit either directly or indirectly is expected to apply to the future, such as organization or development expenses.

It will be noted that the question of whether these properties may have increased in value since their acquirement by the organization does not normally enter into their expression for balance sheet purposes. If circumstances arise justifying the expression among the assets of this increased value attaching to property during present ownership, it must be offset upon the liability side by some item such as "Reserve for Appreciation of fixed properties" so that the liability side may continue to picture the source of the asset values as we have indicated above.

It must not be overlooked that any increase in net worth of a business, as shown by a comparison of the balance sheets as at the beginning and as at the end of a period, must come from additional investment by stockholders, or must be attributed to some sort of gain or profit arising from the activities of the period, over and above amounts distributed to stockholders. Such gain or profit should be available either for distribution as dividends or for acquiring additional facilities for operation. If we allow the assets to be stated in the balance sheet at estimated cost of replacement, and if such estimated value is in excess of their real cost, we automatically add that amount to the surplus of the organization and thereby indicate to the observer of such balance sheet that the organization has this additional amount available for dividends or for expansion. Such treatment would result in a complete misstatement.

The mere fact that the purchase price of fixed assets has increased does not add one real penny to the amount available for distribution as dividends, nor to the amount needed for replacement in case such is a necessity. It is evident by the rules of common sense that the greater the increase in the price of the assets to be purchased, the worse off financially is that organization which must needs purchase them. To try to make such an unfavorable condition appear upon the books as a favorable one is as reprehensible a misstatement of facts as an organization could well make. If the organization is in that happy condition where it is not necessary to replace its fixed assets—all the more reason why a fluctuation in the market price of something which does not concern it should certainly have no place in its balance sheet.

The value of properties to be used as the basis for determination of a fair rate of return is frequently of great interest, not only to the organization owning the property, but also to the public receiving the service. Such value must be determined by careful survey of the relative efficiency of the properties to the purpose which they are to serve. But this value has no place in the balance sheet expression. To give effect to it in a balance sheet would result in a distortion of surplus and a misstatement of the results properly accrued from past operations.

You will note that we consider all investment in properties to be used as being somewhat akin in principle to investment in service prior to the actual receipt of such service. In other words, physical properties for use, such as the normal fixed assets of operating companies, are like prepaid expenses, save that they are represented by tangible properties rather than merely by claims for services. If an insurance policy for one year costs a premium of $600 the result of the transaction is the acquirement of an asset which at that moment may be placed on the book at the full value of the prepayment. Month by month, as the service for which this prepayment has been made is received, a portion of this asset is transferred to expense. The value of the asset, therefore, decreased $50 per month until at the expiration of the year it is reduced to zero.

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*Abstract of a paper before the annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 6-10, 1924.

Similarly, an investment of $600 in a machine is little more than a prepayment for services. The period of service, instead of being exact as in the case of the insurance policy, is estimated. There is a further consideration of a possible salvage value at the expiration of the period of usefulness. If it be assumed that the above machine may be used for 10 years and still have a salvage value of say $50 then the actual amount of service cost or expense prepayment is $550 which must be spread over the years of use. It is not our purpose here to discuss the method of such depreciation or amortization. By the so-called "straight line" method the $550 would be spread equally over the years. The asset of $600 would thereby be reduced $55 per year. Instead of this reduction being applied directly to the asset value on the balance sheet as in the case of prepaid insurance, practical operation has shown the advisability of accumulating this depreciation in a separate account known as "Reserve for Depreciation" or (as is more commonly used in public service) "Accrued Amortization of Capital." This account should be deducted on the balance sheet from the asset to which it applies so that there may be shown the net amount representing the unamortized investment in the fixed asset.

The method of spreading depreciation or even of determining the right amount for periodic spread is difficult and uncertain. Two organizations may buy identical items of equipment to be used for identical purposes. The one through diligence may maintain this item of equipment in efficient condition for twice as many years as may the other, if the latter uses scant engineering judgment in its operations and is negligent of care and of repairs.

ACCOUNTING FOR BETTERMENTS

The principle with regard to the balance sheet valuation of fixed assets which we have been trying to enunciate may perhaps be illustrated by a problem of constant recurrence in organizations of public service character. I refer to the problem of properly recording the replacement and betterment of such assets.

The balance sheet expression of any fixed asset is the difference between two accounts, one of which represents its cost and the other represents the amount of this cost which has been charged to operations. If the asset should be eliminated from use, these two amounts must also be eliminated from their respective accounts. If the difference between them is in excess of the salvage or recoverable value of the asset, this excess must be charged to operation in addition to that which has been accrued in the past.

The question of replacement accompanied by betterment adds but little real difficulty to the problem. The simplest procedure is to consider such a transaction as consisting of two parts; first, the elimination of the old, and second, the acquirement of the new. The elimination of the old is accomplished by clearing the asset account and the reserve for depreciation account of such amounts as have been entered therein because of the asset removed. This journal entry is completed by a proper debit because of salvage value if any, and a balancing item to the operating accounts. Having cleared the old asset from the books, the new asset is recorded at its cost.

May we illustrate this by the assumed replacing of a light weight rail by a rail of say 30 per cent greater weight or efficiency. Assume that the replaced rails cost $100,000 and the new rails because of the higher price of steel cost $200,000. Certain organizations migh assume that since the efficiency is increased only 30 per cent the asset should also be increased by only that amount and should, therefore, appear upon the records as $130,000. The absurdity of such a method is quite evident at a glance. The amount representing the cost of the light weight rails should be eliminated from the asset accounts just as the assets themselves are eliminated from use. The new assets brought into use should correspondingly be brought into the records at cost. This cost becomes immediately the basis for future depreciation.

Like all other rules of accountancy those I have touched upon in this paper must be applied in practice with a due regard for common sense. Accountancy on the whole may be briefly summarized as being nothing more nor less than common sense used in the recording of business transactions, plus a knowledge of the principles which have been found through experience to be the fairest to all parties concerned in the preservation and development of commercial activities.

These principles are general and apply to all organizations regardless of their nature. Each broad class of commercial organizations has its own peculiar problems to which these principles must be applied. It may be broadly laid down as a fact that if any controlling powers such as the public service commissions of the various states or the various income tax departments dictate a policy or method of accounting which is markedly at variance with these principles, such arbitrary rules must sooner or later be amended to conform with general principles or truths. It is therefore more advantageous to study these principles than it is to discuss the particular requirements of any or all public service commissions. Such requirements may be changed at any time by a vote or a decision of the controlling body, but the basic principles of accountancy are the condensed expression of the accumulated experiences of business, and are not subject to change save as increased experience demonstrates the desirability of the change for the purpose of increased accuracy and fairness to the interests of all parties concerned.

W. L. Davis Heads Accountants' Association

W. L. DAVIS, the new president of the American Electric Railway Accountants' Association, is auditor of the Lehigh Valley Transit Company, Allentown, the Lehigh Valley Light & Power Company and affiliated companies. Mr. Davis has had a very broad experience in utility accounting. It dates from the time that he entered the service of the Ohio Electric Railway in 1906 as statistician with that company. Before that Mr. Davis was with Ernst & Ernst, certified public accountants in their Cincinnati office. For obtaining varied experience in accounting work there is perhaps no better place for a man to secure it than the office of the public accountant. The clients of the public accountant are drawn from all walks of business life, and the men who work for him obtain a broad view of accounting practices and details.

For six years Mr. Davis did about all the different accounting jobs that were to be done on the Ohio Electric Railway. Then the chance came for him to change to a field which promised greater opportunities to him and Mr. Davis became associated with the Texas Power & Light Company, Dallas, Tex., as traveling auditor. Soon thereafter he was made secretary-treasurer of the company. From 1914 to 1915 he was auditor of the Southern Traction Company and the Texas Traction Company, both of Dallas.

From this post Mr. Davis went to the position of traveling auditor of the American Power & Light Company. This company is affiliated with the Electric Bond & Share group. It may be presumed that the work of Mr. Davis with this organization was all that the title of his position implied. In that event he certainly saw America first, for the properties are diversified and far flung. The states in which they are located are for the most part on the Pacific Coast with a sprinkling of them in the East. From that position Mr. Davis went to the Lehigh Valley Transit.

As Mr. Davis sees it the primary functions of the accounting department have been the preparation of financial data such as balance sheets and income accounts and the compilation of a financial history of the company. The accountant himself must be prepared to furnish all kinds of cost analyses both for operating and construction purposes, to compile regular reports and special data for regulatory commissions, and to handle numerous other requirements unheard of 25 years ago. To do this adequately Mr. Davis says the man in charge of accounting work should have the necessary technical education both as to accounting and finance, together with a fund of practical knowledge that can come only with experience. In one of the most complete articles on accounting practice which it has been the good fortune of the ELECTRIC RAILWAY JOURNAL to publish in recent years Mr. Davis set forth some of his ideas in "Accounting Practice," included in the series on modernization in the issue of this paper for Sept. 27.

Association News & Discussions

Tax Association Discusses Highway Finance

PAYMENT by the highway user of all maintenance costs and substantial share of the construction costs with interest was the chief conclusion in the report on "Problems of Highway Finance" submitted to the National Tax Association in its annual meeting held at Hotel Chase, St. Louis, Mo., on Sept. 18. Jacob Miner, professor of political economy at the University of Chicago, read the report.

If this program is carried out, it was held, all justification for charges that motor transportation is being subsidized in its competition with other transportation agencies will be removed. The report called attention to the fact that while the special taxes on motor vehicles amounted to only 5 per cent of the total highway expenditures in 1914, such taxes promise to be at least 45 per cent of the 1924 costs.

Because of the different stages of highway development reached by the various states and the many varying factors entering into such situations, the committee found it impossible to recommend any fixed formula for road taxation, saying that in all states except those at the very inception of the road improvement program, the taxation on vehicles should be sufficient to defray a substantial part of the construction and interest costs as well as all of the maintenance costs. The committee recommended a combination registration and gasoline tax as a simple and equitable method of placing the tax burden on vehicles using the highways.

In discussing this relationship between the stage of highway development and the method of financing construction and maintenance, the report said in part:

"During the initial period of construction of an extensive system of improved highways in densely populated and rapidly growing states, and states where the immediate need for the construction of improved highways is urgent, it would be unwise to attempt to finance highway construction wholly or even in large part from current tax revenues.

"If current revenues are relied upon in these circumstances there will result either an intolerable tax burden upon the community or else there will be an unreasonable retardation of highway improvement, entailing on the community the loss of many years of the advantage of improvement of highway communication.

"States and localities which, however, have already made considerable progress in highway construction and have already passed the peak of new annual mileage should move gradually toward the pay-as-you-use plan."

The members of the committee who prepared the report were: Jacob Miner, A. J. Brosseau, W. H. Maltbie, Thornton Alexander, W. G. Query, C. C. Converse and Maurice Groshon.

Safety Depends on Thinking*

By ISAIAH GORDON
Bureau of Safety, Chicago, Ill.

SAFETY advocates should avail themselves of every opportunity to address school children. Of course, admonitions given in such addresses may be quickly forgotten until the child is confronted with a hazard similar to that described in the talk. Then the admonition will come to mind, and it will be remembered that some one was injured or killed by failing to do the right thing.

I have in mind a case where a little boy was waiting for a long freight train to pull by, so that he could cross the tracks. While waiting another boy pushed him. He fell under the cars and his arm was cut off. I have used this in my talks, and said that it would be good judgment always to stand back one's full length from such danger. I dare say many will never think of this admonition until they come to a railroad track where a train is passing, but when they do they will remember and stand back.

Safety is a matter of thinking, thinking about everything we do. The reason why boys in school throw books, cut seats, walk over clothing with muddy shoes, instead of picking it up and hanging it on the hooks in the cloak-room, is because they have not been taught that such acts show lack of thinking. Teachers should appeal to school children to think and point out to them that destructiveness is unnecessary waste.

A plan which I believe will be beneficial to those who would like to start a safety organization in the schools calls for boys and girls to serve on various committees with a view to getting them to see the value of system, of thinking and of planning. For instance, a committee might be appointed to see that books and desks are not abused, a committee to see that coats and hats are properly taken care of, another to see that the stairways and corridors have no physical defects or hazards, one to see that automobiles and other vehicles observe the traffic rules in front of the school, etc. If we can get school children to think before they act in their school work we shall have gone a long way toward getting them to think outside of school, on the playground, in the street, and everywhere.

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*Abstract of a paper presented before the thirteenth annual safety congress, Louisville, Ky., Oct. 2.

National Association of Railroad and Utilities Commissioners

THE annual meeting of the National Association of Railroad and Utilities Commissioners will be held Nov. 11-15 at Phoenix, Ariz. The official call for the convention is signed by Harry G. Taylor of Nebraska, president; William B. D. Ainey of Pennsylvania, a first vice-president, and James B. Walker of New York, secretary. There are now regulating commissions in 47 of the 48 states, Delaware being the only state without one. There are also such commissions in Hawaii, Porto Rico, Alaska and the Philippine Islands.

Traffic Association Proposed

CONNECTING electric railways in eastern Ohio, western Pennsylvania and the northern part of West Virginia have begun the organization of the Tri-State Electric Transportation Association. H. O. Allison, commercial manager Beaver Valley Traction Company, is the temporary chairman of this new organization, whose object is to develop passenger and freight traffic.

American Association News

Special Reports Available

THE following special reports have been prepared and are available to member companies in good standing upon request:

Electric Railway Valuations — Abstracts of recent valuations of electric railway properties officially approved by public utilities commissions or sustained by the courts. For each case there is given a summary of the physical values found together with a discussion of the allowances for overheads, intangibles, development costs, etc.

Anti-Jitney Regulation — Brief accounts of the principal developments in connection with attempts to secure the suppression or regulation of jitney competition with electric railways in the various cities in which the question has ever become an important local issue.

Suggested Remedies for Traffic Congestion — Abstracts of the principal traffic surveys which have been made in American cities with detailed summaries of the recommendations made. In each case a brief description of the traffic problem to be solved is given.

In addition to the above, supplements to the Fare Bulletin, Wage Bulletin and Cost of Living Studies have also been prepared, bringing them down to date.

M.-G. Locomotives for New Haven R.R.

New Type Engine Will Take 11,000-Volt Alternating Current from the Trolley and Convert It to 600-Volt Direct Current for Operating Traction Motors—Five Freight and Two Switching Locomotives Are Included in the Order

SEVEN single-phase locomotives of a new type have been ordered by the New York, New Haven & Hartford Railroad from the General Electric Company and the American Locomotive Company. Five of these units are for freight service and will be used on the main line between the Oak Point yards and New Haven. The other two are switching locomotives and will be used in general yard service. Whenever double heading, these locomotives will function in multiple-unit with the present single-phase locomotives.

The design of this type of locomotive is somewhat unusual in that although it is actuated from a single-phase trolley it does not have alternating-current traction motors. Each locomotive will contain a traveling substation and will be equipped with a synchronous motor-generator set for converting the 11,000-volt, 25-cycle, single-phase supply to direct current. Direct-current railway motors will be used to drive the axles.

Power will be collected from the overhead contact line by the usual slider pantograph trolley and delivered to a main transformer situated in the locomotive cab. This main transformer will step down the trolley potential to 2,300 volts. This 2,300-volt alternating current will drive a single-phase synchronous motor, direct connected to the main direct-current generator which delivers current to the traction motors. This generator is designed with a variable field so that the speed of the locomotive will be regulated by controlling the generator field current. The traction motors will be of the standard series direct-current railway type. They will be geared to the axle through cushion type gears which allow a small movement of the gear ring about the gear hub or center, thus minimizing shocks and stresses in the gears and pinions.

The freight locomotives will have a one-hour rating of 1,350 hp. at a speed of 20.4 m.p.h., while the switchers will have a one-hour rating of 500 hp. at a speed of 8.1 m.p.h.

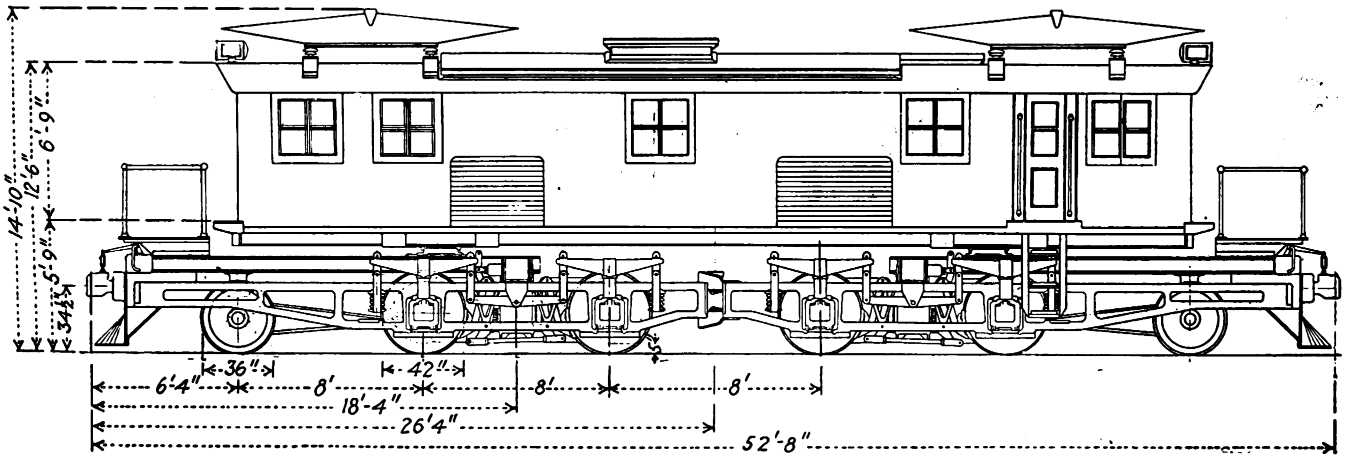
Between the pantograph trolley and the main transformer a time-limit automatic oil circuit breaker is installed. Between the direct-current generator and the traction motors there are a high-speed circuit breaker and line switches. The high-speed circuit breaker will afford protection to both the motors and the generator and will ordinarily prevent the opening of the time-limit switch or of the trolley or feeder sectionalizing switches.

The system of control, in which speed changes are obtained by varying the field strength of the generator, will make the locomotive speed characteristic extremely flexible and adaptable to all operating conditions. It also has the desirable feature of operating at a power factor of unity or of drawing leading current under all ranges of load, the motor-generator being designed with sufficient capacity not only to take care of the rated loads but to furnish an appreciable amount of wattless current, especially at light loads. This tends to improve the trolley voltage for all conditions of load and should be of material benefit in the operation of the entire system.

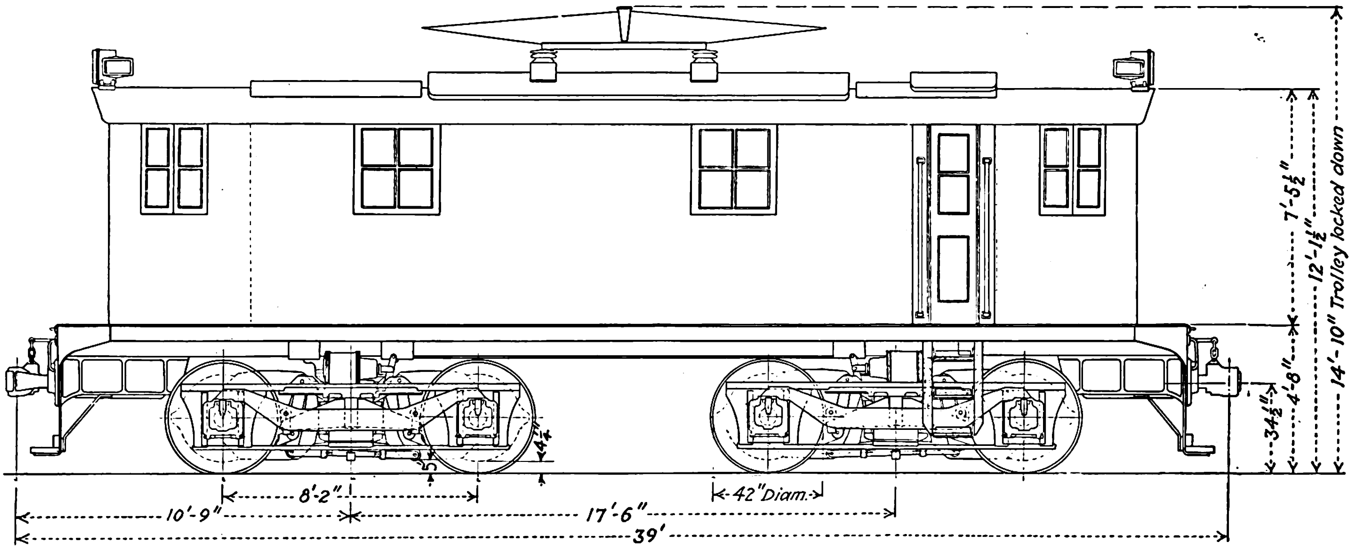
W. S. MURRAY MAKES STATEMENT

W. S. Murray, consulting engineer of New York, who was electrical engineer of the New Haven in the pioneer electrification, has issued a statement with regard to the purchase of this new type of locomotive. He says that he is greatly impressed with the wisdom, both on the part of the New Haven road to purchase, and the General Electric Company to manufacture, the seven electric locomotives of the type described. The history of power distribution shows that wherever power in bulk has had to be transmitted over considerable distances high-tension alternating current rather than the relatively low-pressure direct current has been the preferred agent, not only because less energy loss was involved but because a far greater flexibility of use was provided. It also has become equally well known that no alternating-current motor with variable speed characteristics can be as efficient or as cheap to purchase and maintain as the direct-current motor.

These new locomotives will receive high pressure



The Five Freight Locomotives for the New Haven Will Have Articulated Trucks and Geared Direct-Current Motors



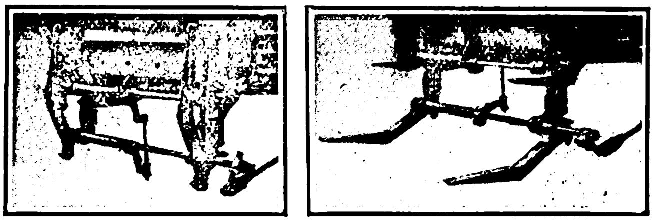
Outline of Switching Type Locomotive for New Haven Railroad

11,000-volt alternating current from the trolley wires which will then be converted by a motor-generator—on board the locomotives—to direct current and fed to motors of that design geared to their driving axles. According to Mr. Murray we thus will see a marriage between economic transmission and distribution of electric power and economic utilization of electric power. The officiating "parson" in this marriage is the motor-generator. His fee is in the form of an annual retainer. Incidentally, what he charges will have everything to do with the economic success of this electrical wedlock. Certainly the General Electric and New Haven companies are both to be congratulated on their mutual confidence and acceptance of locomotives of the design described. In his opinion it will be the harbinger of a far-reaching result.

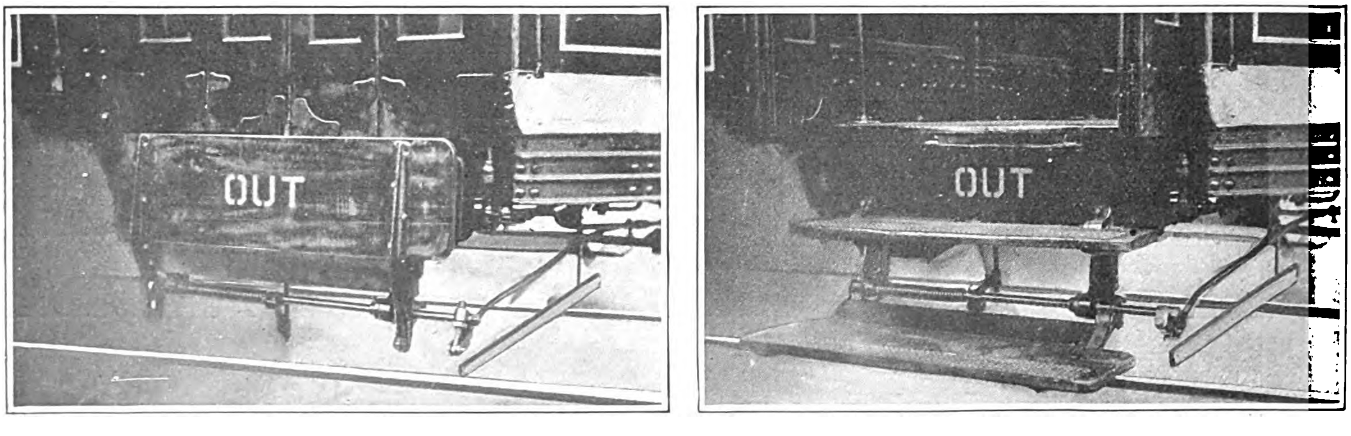
Double Folding Steps for High Platform Cars

A DOUBLE folding step arranged to operate in the same manner as the ordinary single type of folding step is being applied to the cars of the Altoona & Logan Valley Electric Railway. The type of step as shown in the accompanying illustration is the design of Carl E. Keefer, master mechanic. It provides for steps of 13 in. from the rail to the first step, 11 in. from the first to the second step, and 11 in. from the second step to the platform. This type has been installed on eight cars purchased from the Ohio Valley Electric Railway, which originally had a single step with a height of 16 in. from the rail and 19 in. from the step to the platform. The operating mechanism is the same as that used for single folding-step cars except that a connecting rod and two levers are added. The usual type of operating mechanism is attached to the lower step, and the upper step is operated through two bell-crank levers from the lower step.

The double step arrangement has a projection of 20 in. from the rail when opened, which is 3 in. greater than the original single step arrangement. The treads for the bottom step are 12 in. wide and the top step 10 in. When folded, they present an appearance of a single step, as the bottom tread is so arranged as to cover the top one completely.



Step Mechanism in Lowered and Raised Position with Step Treads Removed to Show Mechanism



Double Folding Step in Closed and Open Position

Detroit & Ironton Locomotives to Use M.-G. Control

The New Type Will Operate on a Single-Phase Trolley at 22,000 Volts and 25 Cycles—Design Has Been Made to Secure Great Flexibility of Speed Control in Heavy Freight Service—Complete Locomotive Will Develop 225,000 Lb. Starting Effort and 3,600 Continuous Horsepower

By Fred Allison H. L. Maher* and L. J. Hibbard†*

AN IMPORTANT development in the electrification of steam railroads is that recently announced for Henry Ford's Detroit & Ironton Railroad. While news of the electrification was published in ELECTRIC RAILWAY JOURNAL for Dec. 8, 1923, details of the electrification have not been available. As was to be expected, Mr. Ford has not been restricted by past practice or tendencies in the choice of electrical system and of type of motive power units for his road. The result has been the adoption of an overhead trolley line fed with alternating current at 22,000 volts, 25 cycles—a trolley voltage twice as high as any previously used in this country. The type of motive power unit adopted is not only novel in electrical design, but embodies many new and important ideas in the mechanical design. The locomotive shows possibility not only of containing but also of improving on all the desirable features of the most successful locomotives in use on present electrifications.

The mechanical parts for the new locomotives are being designed and built by the Ford Motor Company, while the electrical equipment is being designed and built to this company's specifications by the Westinghouse Electric & Manufacturing Company.

LOCOMOTIVES WILL WEIGH 340 TONS AND DEVELOP 5,000 HP.

The initial order calls for a locomotive comprising two motive-power units operated in multiple. It will develop a maximum of 5,000 hp. at 17 m.p.h. and will exert a maximum starting tractive effort of 225,000 lb. on the basis of a 42,500-lb. axle loading with 33⅓ per cent adhesion. The nominal rating of the locomotive will be 4,200 hp. It will also deliver 3,600 hp. continuously at all speeds between 17 m.p.h. and 25 m.p.h. and will exert 54,000 lb. tractive effort continuously when operating at 25 m.p.h. Each motive-power unit will be arranged for double-end operation so that an operating locomotive may consist of one, two or more units as desired. It is estimated that each unit will weigh 170 tons. All weight will be carried on the driving wheels.

MOTOR-GENERATOR CONTROL ADOPTED

The motive-power unit is of the motor-generator type. The principal reasons which have led to the adoption of this type can be summarized as follows:

While the use of alternating-current power supply for the trolley results in economy in distribution, direct-current traction motors of the most rugged type could be used. This gave the opportunity to design the motor for its own best condition, regardless of voltages, line surges, etc. In other words, the motors have the most rugged electrical characteristics and maximum efficiency. There also were possibilities for the simplification of the mechanical parts due to the high space and weight efficiency obtained in the traction motors. The direct-current motors permit simplicity and flexibility of control, as well as simplicity of the regenerative system and ability to regenerate at any speed from the maximum practically down to standstill.

Voltage control is used, with consequent freedom from rheostatic losses. This gives low accelerating peak loads, and ability to operate continuously at any desired speed. The speed characteristics obtained permit the locomotive to adapt itself to all changes in the profile, and the constant horsepower characteristic enables the locomotive to develop its full capacity under a variety of speed and tractive effort conditions.

The driving wheels have little tendency to start or continue slipping during accelerating periods, because the voltage impressed across each traction motor is low while the maximum starting tractive effort is being exerted, and does not increase if slipping starts.

There is inherent voltage regulating effect of the synchronous driving motor of the motor-generator set, with an attendant favorable effect on the distribution system. This makes it possible to maintain the a.c. power drawn by the locomotive at unity power factor and consequently tends to give low transmission losses.

The flexible control gives the locomotive the ability to operate at full load in the same train with any other type of alternating-current locomotive. It is able to operate as a constant-speed type of locomotive on all applications where this feature is desirable by separately exciting the traction motors. With this connection a large number of constant running speeds are obtainable when motoring.

LOCOMOTIVE EQUIPMENT

Each motive-power unit will be equipped with a transformer, a direct-current generator driven by a single-phase motor, eight axle-hung direct-current, series-type traction motors, and suitable control and auxiliary apparatus.

The single-phase alternating-current at 22,000 volts will be collected by means of a pantograph and conducted through an oil circuit-breaker to the primary side of the transformer, where it will be stepped down to a suitable voltage for driving the motor-generator set.

Direct current, which can be regulated from zero to 600 volts, will be delivered by the motor-generator set to the traction motors. These will be connected permanently in parallel. The locomotive is designed for regenerative braking.

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*Ford Motor Company.
†Westinghouse Electric & Manufacturing Company.

The locomotive transformer will be 2,000-kva., two-circuit, oil-insulated, air-cooled railway type unit. The primary winding may be connected to receive either 22,000 or 11,000-volt power, while the secondary will deliver current at 1,250 volts. This will be accomplished by having the high-tension side connected between the circuit breaker and ground in series with two single-pole, double-throw knife switches. This feature has been included so that these locomotives can be operated over connecting 11,000-volt lines if desired at some future date.

The motor-generator set will consist of a 2,100-hp., 25-cycle, four-pole, single-phase motor, driving a 1,500-kw., 600-volt, 2,500-amp. generator at 750 r.p.m. on the same shaft. It will be self-contained, will be supported at three points and will have two bearings. A 75-kw., 125-volt direct-current main exciter will be mounted upon a shaft extension at the motor end of the set, while a 25-kw. direct-current "regenerative exciter" will be mounted upon a shaft extension at the other end.

The generator will have a series-excited differential field, an interpole field and a compensating field, as well as a separately excited main field.

The 75-kw. main exciter will supply excitation to the motor field, the generator field, the regenerative exciter field, and will supply power for the control circuits and for all auxiliary motors.

The 25-kw. regenerative exciter will be used to separately excite the traction motor fields during regeneration and during high-speed motoring periods.

GEARED D.C. TRACTION MOTORS EMPLOYED

The locomotive traction motors will be 225-hp., 600-volt, direct-current series, axle-hung machines. Each motor will be flexibly connected to the driving axle by a gear at each side. A 22-tooth, 3½-in. face, 3-diametral pitch pinion, suitable for meshing with a corresponding 98-tooth gear, will be mounted on a shaft extension at each end of the motor. The motors will be of a special mechanical construction for application to the mechanical parts being designed and built by Mr. Ford.

Each motive-power unit will be equipped with double-end control. Forty-five normal running speeds will be available between standstill and maximum speed during both the motoring and regenerating periods. When motoring the traction motors will be connected as series excited machines from standstill to 17 m.p.h., and as separately excited motors from 17 m.p.h. to maximum speed.

The traction motor fields are separately excited throughout the entire regenerative period. Regeneration may be obtained at any time while the traction motors are separately excited by regulating the generator voltage and traction motor field strength so that the motor voltage overbalances the generator voltage and causes the armature current to reverse. This will cause the traction motors to act as generators, driving the main generator as a motor, which in turn drives the a.c. motor, causing it to become a generator and return power to the line.

A closed-circuit type of transition will be utilized in going from the series excited to the separately excited connections of the traction motors and vice versa. Thus the separately-excited connections may be completed while the traction motors are energized and working at full load as series motors, without interrupting or appreciably changing the value of motoring tractive effort either during the changeover period or after the separately excited connections have been completed. This method of transition can be utilized advantageously when it is desired to increase the speed of the locomotive or to permit regeneration automatically.

Since the single-phase driving motor of the main motor-generator set, like the phase-converter of the single-phase three-phase locomotive, is not self-starting, the motor-generator set will be started and accelerated to approximately 50 per cent speed by means of the main generator and from 50 per cent speed to full speed by means of the a.c. motor. A 60-cell, 125-volt storage battery will be provided on each unit for this purpose. This battery also will be used for energizing the control circuits and supplying power to the compressor motor whenever the motor-generator set is shut down.

TYPICAL CYCLE OF OPERATION

Starting from rest with a full-tonnage train the traction motors will be energized as series-excited motors and the train may be accelerated with continuous full tractive effort up to a running speed of approximately 17 m.p.h. by manually regulating the main generator voltage through the external field resistor and a set of 50-amp., 125-volt switches. If load and grade conditions permit the use of a higher running speed than is obtainable with the series connection, the transition will be made from series to the separately excited connection of the traction motors. The speed may then be increased by weakening the field strength of the traction motors. This will be accomplished by manually regulating the regenerative excited voltage through an external field resistor and a set of 5-amp., 125-volt switches. Then when the train passes over the crest of a hill regeneration will take place automatically. The traction motors will act as generators, and if it is desired to maintain some constant speed while descending the grade, this can be done by strengthening and properly regulating their fields.

When the train is to be stopped heavier regenerative braking may be utilized if desired and a very low speed reached before applying the air brake.

The speed may be decreased to approximately 17 m.p.h. by properly regulating the traction motor field strength, and below 17 m.p.h. by regulating the generator voltage.

Statistics of Electric Interstate Carriers

THE bureau of statistics of the Interstate Commerce Commission has just published a report based on the returns of the electric railways reporting to that commission for the year ended Dec. 31, 1923. Altogether there are 271 companies, of which 186 are in the Eastern district, 7 in the Southern district and 78 in the Western district. The summarized statistics follow:

	Eastern District	Southern District	Western District	Total
Miles of road operated...	8,249 34	344.84	5,571.10	14,165.18
Freight revenue.........	$14,492,278	$2,018,094	$19,822,905	$36,783,277
Total operating revenues.	128,632,097	4,638,520	103,159,320	236,429,937
Total operating expenses.	101,983,442	3,183,868	81,436,497	186,603,807
Operating income...	29,191,469	4,378,851	21,687,710	55.258,030
Net income.............	4,335,111	2,208,826	7,041,958	13,585,895
Dividends declared.. ..	8,984,492	4,036	7,114,039	16,102,567

The News of the Industry

Service Started Over Dallas-Denton Line

The Dallas-Denton line of the Texas Interurban Railway, the electrified line of the Missouri-Kansas-Texas Railway of Texas, has been completed and regular service was started Oct. 1. Richard Meriwether, vice-president and general manager of this line as well as of the Dallas-Terrell line and of the Dallas Railway, reports traffic has come up to expectations and that operation of the line is in every way satisfactory.

The Dallas-Denton line of the Texas Interurban Railway is the second unit of the system of electric lines now being established in Texas by this company. The first was the Dallas-Terrell line. It is admitted by officials of the company that electrification of other steam lines radiating out of Dallas is being considered, and it is learned that the Missouri-Kansas-Texas line from Dallas to Greenville is one and the Gulf, Colorado & Santa Fe from Dallas to Cleburne is another.

Like the Dallas-Terrell line, which was the first line in the Southwest to use automatic electric substations and one-man cars, the Dallas-Denton line is operating one-man cars and depends on automatic substations for power. The same general plan of construction has been followed in the Dallas-Denton line as was followed on the Dallas-Terrell line, the only material difference being that a roadbed had to be constructed to Terrell and steel laid thereon, whereas from Dallas to Denton a steam line was electrified.

Although the tracks of the M-K-T were already built from Dallas to Denton, much new construction was necessary to make possible the operation of electric interurban cars. The electrification was carried out at a cost of $1,000,000.

Actual construction work on the Denton line was started March 15, 1924, and the line completed just six months and fifteen days later. For this construction work, the company organized to build the Dallas-Terrell line, known as the Texas Construction Company, was kept in existence. B. R. Brown was chief engineer, Sam R. Fowler, assistant engineer in charge of construction; M. B. Parsons, superintendent, and B. F. Cooke, electrical engineer in charge of electrical installations.

Some additional details of the project were published in the ELECTRIC RAILWAY JOURNAL of Jan. 12 and Jan. 26, 1924.

Plans for Detroit-Port Huron Bus Service

That hourly bus service will be started between Detroit and Port Huron, including towns on the river along the way, has been announced by the Detroit United Railway to begin late in October. The buses, it is stated, will be operated by the Wolverine Transit Company, a subsidiary of the D. U. R. At first the local buses will be operated in conjunction with the local interurban service, but it is believed that in a short time local electric service will be discontinued and entirely supplanted by buses on local schedules.

The local buses of the company will operate over Jefferson Avenue or a parallel street out of Detroit, and will follow the shore road into Mount Clemens. From Mount Clemens they will follow a route including New Baltimore, Fair Haven, Algonac, Roberts Landing, Marine City, St. Clair and Marvsville, with Port Huron as the northern terminal of the route.

The interurban tracks will not be abandoned, but will be kept in repair so that they can be used on the through runs and for handling freight and express.

Mayor Has Subway Measures

Chicago Officials Looking Into Proposals Made by Mr. Insull for Transit Construction with Private Funds—Surface Lines Say Rapid Transit Proposals Must Provide for Street Cars

SAMUEL INSULL, head of the elevated railroads, gas and electric utilities in Chicago, has offered to provide the city with increased rapid transit facilities to be financed entirely with funds raised privately. This is the first proposal of its kind, all similar offers made previously having contemplated the use to some degree of the borrowing capacity of the city. His proposal in this connection, however, had to do more particularly with the subway to be constructed through the down-town district, preferably under State Street and extending from Eighteenth Street on the south to North Avenue on the north with necessary connections with the present elevated lines at either end.

Mr. Insull says that this subway should have four tracks through the heart of the business district and double tracks at each end. His estimate of the cost of construction is between $25,000,000 and $30,000,000. Its construction would more than double the present rapid transit facilities through the loop by affording capacity for 2,400 cars an hour instead of 1,100 as at present. Mr. Insull believes, however, this subway should be owned by the city, but that it should be laid out so as to be capable of extension to the west, northwest and southwest sides.

WORK TO START IMMEDIATELY

Mr. Insull's proposal was made in a letter addressed to the Mayor and City Council on Sept. 27. It provides for starting work immediately on a comprehensive extension and improvement of rapid transit facilities in the city, including the subway through the congested downtown section to which reference has just been made. With the letter was submitted the draft of an ordinance outlining in detail the various extensions of facilities that are proposed. Acceptance of this ordinance would pave the way for an early start on the actual construction of extensions that have been under discussion for a number of years, and which would fit into the several schemes proposed from time to time for the development of a comprehensive transportation plan for the city.

The definite proposal contained in this letter, and the provisions of the ordinance which accompanied it, mark the culmination of the stand taken by Mr. Insull on the Chicago transportation situation in his address before the Cook County Bankers' Association on Feb. 21 of this year, reported in detail in the isssue of the ELECTRIC RAILWAY JOURNAL for March 1.

PROBLEM UP TO THE CITY

Coming as it does after a request for authority to make certain immediate improvements of the elevated structure including the extension of platforms for the accommodation of eight-car trains, for which funds are now available, this comprehensive plan for extending rapid transit service to make it available to the people of 45 out of the 50 wards in the city—this, together with acceptance of the task of financing such a plan—puts the responsibility for further delay squarely up to the Mayor and the City Council.

Up to this time the Mayor has consistently held to the principle that any action in the extension of transportation facilities in the city should fit into a comprehensive plan for the solution of the entire transportation situation in the city. He has also held that the difficulty of financing such a plan under private ownership made municipal ownership necessary.

With the submission of Mr. Insull's ordinance, the subway problem again became linked up with that of surface lines and the elevated. Mr. Insull's first offer to build a subway brought the statement from the surface lines officials that whatever plan was adopted taking into consideration the elevated lines also must make a provision for the street cars.

It was said that the purpose of the many ordinances was to find one that would fit the financial abilities of the city or of any private company which might undertake to build the subways. One of the suggestions is for an open-cut subway in the outlying section and tunnels downtown. Another is for a system of tubes connecting with surface, elevated and bus lines several blocks beyond the congested areas to the north and south. Still another ordinance provides a general system of short tubes radiating three ways from the heart of the city.

The engineering phases of subway construction will be dealt with in a report which the city's transportation engineer, Major R. F. Kelker, Jr., is drawing. He declares subway construction to be feasible and describes the engineering conditions in some parts of the city as ideal for the work.

Corporation Counsel Busch holds that construction outside the commercial districts could not legally be financed by any special assessment based on benefits. Financial experts declare that in no other way, either as a private or public undertaking, could funds be got.

Mr. Insull departed for Europe before Mayor Dever and his associates had progressed very far in their consideration of the proposals.

Wages Increased Two and a Half Cents in Boston

An increase of 2½ cents an hour was awarded to the trainmen and miscellaneous employees of the Boston Elevated Railway on Oct. 16 by the board of arbitration which had been considering counter proposals of employees and the company.

The award was signed by Judge John D. McLaughlin of the Superior Court, chairman and neutral member of the board, and James H. Vahey, counsel for the union men. Charles W. Mulcahy, company representative, dissented, submitting a minority report.

The employees had sought an increase of 25 cents an hour and the company had asked that the employees accept a reduction of 5 cents an hour. In commenting upon the proposal to decrease wages the majority ruled that disparity between income and expenditure is not a reason for reducing wages.

The decision of the board is final and binding to both company and union. It will continue in force to June 30, 1925, and is retroactive to July 1, last.

Experts for the company estimate that the award will add $500,000 yearly to the payroll, of which $175,000 will be in back wages.

By the terms of the decision the blue uniformed men, who comprise a majority of the employees, will receive a maximum of 72½ cents an hour. Operators of one-man cars and bus drivers were increased to 80½ cents an hour. This is the same differential that has been in effect for the last three years.

The company's representative declared that the increase was not justified, in view of current rates for wages, and asserted that the road had faced a substantial deficit in operation in the current year.

Indianapolis Freight Terminal Formally Opened

The new joint freight terminal constructed by the Interstate Public Service Company, Indianapolis & Cincinnati Traction Company, Terre Haute, Indianapolis & Eastern Traction Company and the Union Traction Company of Indiana was formally opened on Oct. 2. The terminal represents an investment of approximately $1,000,000. It was described in detail in the ELECTRIC RAILWAY JOURNAL of Aug. 2, 1924.

The occasion of the opening was celebrated by a dinner at which 400 guests were present. These included the traffic managers of practically every important industrial concern in Indianapolis, representatives of steam and electric railways located in the city and in the territory served by the four interested lines, and about 100 city and state officials. Neat souvenirs in the form of small scale maps of the electric lines in the C.E.R.A. territory, bound convenient for carrying in the pocket, were distributed. Frederick A. Doebler, president of the Traffic Club, presided. Harry Reid, president of the Interstate Public Service Company, was toastmaster. Among the speakers was John W. Colton, editor of *Aera* representing the American Electric Railway Association.

Another significant step was taken in connection with the completion and opening of this new terminal. Although the Central Electric Railway Traffic Association has been unable to agree on the establishment of a consolidated joint freight tariff, the four lines entering the new terminal have gone ahead with the preparation of such a tariff to apply between all stations on these lines and such other lines as may participate with them as issuing carriers. A committee consisting of Chairman F. D. Norveil, general freight and passenger agent of the Union Traction Company of Indiana; H. R. Biery, assistant to the president Indianapolis & Cincinnati Traction Company; J. H. Crall, general freight and passenger agent of the Terre Haute, Indianapolis & Eastern Traction Company and Bert Weedon, traffic manager of the Interstate Public Service Company, is carrying on this work.

All lines in the Central Association that desire to be shown as issuing carriers under this new consolidated tariff have been invited to participate, but in any event, the compilation of the tariff will be completed by the present committee, and rates to points on lines in the Central Association territory which do not care to participate, will be shown as a combination of the rates now in effect and those being compiled for the participating lines. In the preparation of this new consolidated tariff, it is the plan to use short-line steam railroad rates, wherever possible. It is being issued primarily as a "business getter," but is also expected to eliminate inequalities and discriminations.

North Shore Acts to Protect Its Operating Rights

A temporary injunction has been obtained by the North Shore Line restraining the city of Chicago from barring the trains of the Chicago, North Shore & Milwaukee Railroad from the tracks of the Chicago Rapid Transit Company (elevated railroads) within the city limits.

The court action was taken in answer to an order issued by the local transportation committee of the Chicago City Council, to the chief of police, to bar the North Shore Line trains, by force if necessary, on Oct. 13.

The hearing on the motion to make the injunction permanent will be held at a time fixed by the court following the answer to the action by the city.

The city contends that in order to operate its trains into the loop district the North Shore Line must obtain a franchise, as was outlined in a recent issue of the ELECTRIC RAILWAY JOURNAL.

The company contends that as long as it pays the Rapid Transit Company trackage rental for its trains together with a fee to the city for each car operated it does not need a franchise.

The drastic action on the part of the transportation committee was taken after a refusal on the part of its members to accept an offer of double the present fee paid by the company for each car, a total of $100 license fee per year.

The case is an interesting one from the standpoint of the questions involved. If necessary the company will carry the matter into a high court in order to settle the issue for all time.

Court Rejects Cleveland Arbitration Award

Judge Close in Common Pleas Court, late on Oct. 15, rendered a decision declaring illegal the arbitration proceeding of last June under which the Cleveland Railway platform employees were awarded a wage increase of 12 cents an hour. The court sustained the charge of fraud made in connection with the conduct of the arbitration.

In the same decision the court upheld the validity of the closed shop agreement that now exists between the railway and the local union. It directed that a new arbitration be held on the men's demand for higher pay.

The Cleveland Railway withdrew from the arbitration proceedings last June, on the ground that James W. Holcomb, the fifth and deciding member of the arbitration board, was biased and prejudiced in favor of the men.

Despite the withdrawal of the two representatives of the company from the arbitration proceeding Mr. Holcomb and the two arbitrators representing the union announced a decision giving the men a wage increase of 12 cents an hour.

The decision of the court denies the increase to the men. It is a victory for the company.

Unless the union attempts to carry the case to the higher courts, it is likely that members of a new arbitration board will be picked and hearings begun within the next few weeks.

Appeals Heard

Arguments For and Against Temporary Increase to P. R. T. Before Superior Court

Hearings on the appeal of the city of Philadelphia, Pa., and of other protesters against the recent order of the Public Service Commission granting a temporary increase in fares to the Philadelphia Rapid Transit Company were started on Oct. 9 and concluded Oct. 10, in the Superior Court. The seven judges who heard the case then took the matter under advisement.

At the opening session City Solicitor Gaffney said the commission's order was not justified, proof of which was that officials of the company had not adopted any definite plan relative to the time of buying more cars, and for building more crosstown lines. He said that the increase meant the collection from the car riders of an additional $300,000 a month. On the company's argument that a requirement to issue rebate slips would have caused too much trouble, and that rebate slips might fall into the hands of persons not entitled to collect them, Mr. Gaffney asked about expecting each of the 2,000,000 car riders to file his own complaint and bring his own suit to recover amounts overpaid as fares.

Frank M. Hunter, counsel for the Public Service Commission, was the last attorney to be heard by the court before adjournment for the day. He resented the implication that the commission had rendered its decision before the records of the fare hearings had been transcribed.

Frederick L. Ballard presented the argument for the Philadelphia Rapid Transit Company, at the hearing on Oct. 10, declaring that the old rates were confiscatory of the company's property. Under the former rates, this year there would have been a deficit of $2,500,000, Mr. Ballard said. He said that the company might have asserted a right earlier to charge rates high enough to prevent such deficit, but that it "did not like to change rates unnecessarily and had some reason to think that in time the old rates might yield what we are entitled to."

The Philadelphia Rapid Transit Company's report furnished as required by the order of the Public Service Commission shows for six days Sept. 25 to Sept. 30, at the new rate of fare $743,381 revenue against $740,387 a year ago, an increase of $2,994. The number of passengers carried was 13,633,349, against 15,477,540, a decrease of 1,844,191.

Milwaukee's Socialist Mayor Sees Bus as an Auxiliary

Mayor Hoan, Milwaukee, a socialist and former proponent of the use of the bus as a panacea for the city's alleged transportation ills, is convinced now that buses will never supplant street cars for mass transportation in large American cities. In an interview in the Milwaukee *Journal* for Oct. 7 the Mayor explained that he was convinced of this fact after studying the report of the local public utilities acquisition committee, to which reference has been made before in the ELECTRIC RAILWAY JOURNAL. In connection with that report the Mayor said that he had come to no conclusion regarding the advisability of the city entering into the proposed contract with the Milwaukee Electric Railway & Light Company. He said he had made only a cursory study of the commission's report, and wished to reserve judgment on it until after he had heard debates on both sides. On the subject of buses the Mayor was quoted as follows:

> I have come definitely to the conclusion that buses will never replace our traction lines.
>
> Prior to the time that the commission presented its report on the whole problem, I had leaned toward the belief that buses might possibly be an important factor in future transportation problems.
>
> The report goes thoroughly into this matter, however, and has convinced me that buses will be only supplementary to traction lines. Buses cannot be operated profitably for less than a 10-cent fare. The public demands a fare of from 5 to 7 cents. Transportion of this kind can be given, evidently, only by electric street cars.

Wage Increase in Dallas

The Dallas Railway, Dallas, Tex., has increased wages of trainmen in its employ 4 cents an hour effective from Oct. 1, 1924. The new wage scale in cents per hour will be as follows: First year, 45; second year, 48; third year and thereafter, 50. Wages of one-man car operators were increased 4 cents an hour.

In announcing the wage increase Richard Meriwether, vice-president and general manager, made public a resolution adopted by the board of directors. In part the resolution said:

> When wages were reduced on Aug. 1, 1921, the cost of living had materially declined since the peak of 1920, so that the management felt that, in view of the financial condition of the company and the reduced cost of living, a reduction in wages was justified. Since that time, however, there has been a material increase in the cost of living; and while the financial condition of the company is not by any means satisfactory, we feel that through effecting the greatest economy in operation and with the hearty co-operation and assistance of the trainmen's body, we will be able to bring about a reduction in operating costs which will permit of the increase.

Seeks Permit to Operate Bus Lines in New York City

The People's Electrobus Corporation, 44 Wall Street, New York, N. Y., headed by George W. Loft, wealthy candy manufacturer, has petitioned the Board of Estimate of New York City to operate 22 bus lines on 140 miles of streets at a 5-cent fare. A hearing will be held by the Board of Estimate on Oct. 22.

The offer is the fourth big petition that the city has received since the original plan was launched by the Omnibus Company of America. This concern, with John Hertz as chairman of the board, achieved a merger with the Fifth Avenue Coach Company.

In addition to the proposed Park Avenue route the company proposes to run five north and south lines and sixteen cross-town lines. The application states that the city would retain the right at any time upon six months' written notice after the first five years of operation to purchase the entire plant at a price fixed by three arbitrators.

Court Prohibits Truck from Competing with Interurban

The power of the Corporation Commission to regulate motor vehicles and to prevent them from operating in direct competition with Oklahoma interurbans was upheld Oct. 2 in the District Court of Pittsburg County. A permanent injunction was granted the Pittsburgh County Railway against C. E. Golden and W. L. Colvert, enjoining them from operating trucks along the highway paralleling the interurban line between McAlester and Hartshorne, Okla. Judge H. L. Melton ruled that the defendants were operating trucks contrary to the provisions of the state motor transportation law. The contention of the railway that the defendants failed to obtain permission to operate their trucks along the highway was upheld by the court. The State Supreme Court recently upheld the validity of the motor transportation act and ruled that the Corporation Commission had power to deny certificates of convenience and necessity to any bus owner, or company, where the public's interests seem to demand such action.

Providence Men Seek Wage Increase

Employees of the United Electric Railways, Providence, R. I., members of the Amalgamated Association, recently submitted the draft of a new wage and working agreement which calls for a general increase in wages amounting to 14 cents an hour. The draft contains 105 sections, most of them dealing with minor working conditions, many of them the same as are now in operation. The new wage demand for motormen and conductors on two-man cars is 70 cents for the first three months, 73 cents during the next nine months and 75 cents after one full year of service. The present wage is 56, 59, and 61 cents for the corresponding terms.

Operators of one-man cars who now receive 5 cents an hour in excess of the amount paid on two-man cars ask that the 5 cents be increased to 15 cents, or 90 cents an hour for men of more than a year's service. The same advance is asked for crews of snow plows and an additional 5 cents, or 20 cents an hour extra for the motorman. Bus drivers are rated as crews of two-man cars. The rate asked for motormen and conductors in the trolley freight department is 2 cents an hour more than is paid in the passenger service.

The agreement provides that no run shall be for less than seven hours nor more than eight. It provides that the company shall not prevent or discourage any employee from becoming a member of the union. In the matter of reducing or increasing the number of employees, the agreement stipulates that in case of reduction, the last man who was hired in the division to be reduced shall be the first to be laid off, and in the case of increasing the force, the last man laid off shall be the first to be given the chance to return.

The present agreement expires on Oct. 31.

Bus in Operation on East Side of Connecticut River

The Hartford & Springfield Street Railway has started a bus service on the east side of the Connecticut River between Hartford and Springfield, operating two buses regularly, leaving each city every two hours from 8 o'clock in the morning until 10 o'clock at night. A terminal has been established in Springfield, where a building is being remodeled for offices and waiting room.

The company has been operating a bus line on the west side of the river, between Springfield and Windsor Locks since last year. Recently it sought from the Springfield transportation board a license to run an east side service, on the ground that a faster service was necessary to enable the company to attract business and operate without loss. Springfield officials denied the application after informal hearings at which objections to the service were entered by President Clark V. Wood and General Manager H. M. Flanders of the Springfield Street Railway on the ground that such service was likely to cut into that company's receipts.

The interurban decided to start the service, however, on the ground that no permit from the Springfield authorities was needed as the buses would run express with no local stops in Massachusetts. In common with independent bus lines now doing an interstate business in that territory, the Hartford & Springfield Street Railway evidently rests its right to run on the assumption that such a service is under the jurisdiction of the federal authorities only.

Kansas City, Kan., Refuses Bus Permit

Judge Kimbrough Stone, of the federal court, under whom the receivers for the Kansas City Railway, Kansas City, Mo., are operating the property, and Col. F. W. Fleming, one of the receivers, have announced that they have invited experts to make a survey of the conditions in Kansas City to guide the court and the receivers so as to install bus service in co-ordination with car service. Announcement to this effect was made following the return of officers of the company who were in attendance at the American Electric Railway Association convention in Atlantic City. Judge Stone will announce his orders in the matter in November.

Meanwhile the City Commissioners of Kansas City, Kan., on Oct. 13, refused a franchise to the H. H. Moore Company, Cleveland, which had organized the Kansas Cities Motor Coach Company, buying the bus line already operated by P. H. Kennedy. The new company is operating four or more Fageol buses in intercity service, and six or more street car type buses in cross-town service, one route, within Kansas City, Kan., 10 cent fare, giving transfers. The routes will be increased; but none will go over street car streets. The Moore company recently sold its Cleveland-Akron bus line, operating 40 buses, to the Northern Ohio Traction & Light Company. The Moore company, the holding company, and Mr. Moore, are large operators of passenger and freight interurban and touring service.

East St. Louis Company Wants Bus Line for Connection

The East St. Louis Railway, East St. Louis, Ill., applied to the St. Louis Board of Public Service Oct. 7 for a permit to operate buses over the St. Louis Municipal Bridge in East St. Louis and to loop around certain streets in St. Louis. The Board of Public Service will set a date for a public hearing on the application. Recently the Community Motorbus Company of Belleville, Ill., applied for a similar permit, but failed to appear when a public hearing was held. That permit has not been granted.

The East St. Louis Railway is now operating buses in conjunction with its railway in East St. Louis. Connected up with its present bus line on Twenty-fifth Street between Missouri Avenue and Lincoln Avenue, in Lansdowne, the proposed bus line over the free bridge would give East St. Louis a short and direct connection between its outlying residential districts and downtown St. Louis and take much traffic from the congested Collinsville Avenue district in East St. Louis.

Sixty-Day Bus Permit for New York

Mayor John F. Hylan and other members of the Board of Estimate of New York agreed on Oct. 10 to grant a sixty days' revocable franchise to the Fifth Avenue Coach Company to operate buses in the Bronx at 10 cents.

Operation was begun the following morning on a four-minute headway. The buses run from 138th Street and Mott Avenue to the Grand Concourse, and through the Grand Concourse to Mosholu Parkway with a spur to the Hub, which is at 149th Street and Third Avenue.

Henry Bruckner, Borough President of the Bronx, forced the issue by calling the attention of the Mayor and other members of the board to the fact that conditions on the Grand Concourse had reached a pass that demanded immediate relief. Oct. 22 is the date set for a general hearing and discussion of the bus question, but Mr. Bruckner demanded immediate action for the Bronx.

Frederick C. Wood, president of the Fifth Avenue Coach Company, said his company could start its lines operating in the Bronx at once if he were given a temporary sixty days' permit.

The same question was asked Edward A. Maher, Jr., counsel for the Third Avenue Railway System, which has had a Bronx bus application pending for three years. Mr. Maher said he could start buses in two weeks, but would have to acquire them.

It was pointed out, however, that this grant by the board in no way binds it or the Mayor in acting upon future applications for franchises and that the permit granted is revocable, without prejudice to the Mayor and his maximum 5-cent fare principle, at the end of sixty days.

Wages Reduced Under Three-Year Canadian Agreement

Trainmen in Vancouver and Victoria, B. C., have signed a new agreement for three years with the British Columbia Electric Railway.

No change takes place in the wages of motormen and conductors. They now receive 62 cents an hour on two-man cars in city service and 68 cents an hour for one-man cars. Wages of trackmen and car cleaners will be reduced 3 cents an hour to 53 cents for city trackmen, 48½ cents for interurban trackmen and 51 cents for car cleaners.

In Victoria the system is operated entirely with one-man cars. There the wages of operators will be reduced 4 cents an hour from 68 cents to 64 cents, due to the lower rents, reduced cost of living and the condition of the railway.

The new agreement was made with the street railway union. It dates from Sept. 1. Brief mention of the wage changes was made in the issue of this paper for Oct. 11, page 667.

New Jersey Fare Suit Dismissed

The United States Supreme Court on Oct. 6 dismissed the suit of the Board of Public Utility Commissioners of New Jersey to compel the Public Service Railway to reduce its fares to 7 cents, with a 2-cent transfer charge. The court was advised that the parties to the suit had reached an agreement.

This action by the commission in bringing suit was one of the moves made in connection with the rate and valuation controversies which culminated in the suspension of service by the company in the summer of 1923 for a period of more than a month. Growing out of the negotiations conducted at that time the company put in for a trial period of four months beginning Oct. 1 a rate schedule which provided a 5-cent fare within the limits of the larger cities, with an additional 5-cent fare in the suburbs, but no transfers. The rate of 8 cents, with four tokens for 30 cents, and 1 cent for a transfer, was continued in all other parts of the territory. This is the general arrangement now in effect.

Steam and Electric Properties Contend Over Business

A hearing was held recently before Examiner A. C. Wilkins of the Interstate Commerce Commission on the question of cancelling the right of the Salt Lake & Utah Railroad, Salt Lake City, Utah, known as the Orem Electric, to participate as a carrier in westbound transcontinental traffic. Thirty days were granted to each side to file its brief, the Salt Lake & Utah Railroad appearing as complainant against the cancellation and the Union Pacific as the respondent.

It was the contention of the electric line that to cancel its right to this business would be discrimination against it. It set forth that it had enjoyed this tariff for five years and that the tariff had increased its revenue materially. The Union Pacific alleged that the shorter line acted as a "bridge" carrier, hindered prompt movement and was unnecessary.

Fourteenth Street Subway Plans Advanced

The Board of Estimate of New York City on Oct. 10 adopted unanimously the plan of the Board of Transportation for the completion of the Fourteenth Street-Eastern District subway line by the use of a 700-ft. elevated structure connecting the tube with the elevated lines of the Brooklyn-Manhattan Corporation at East New York. This apparently removes the last official obstacle to the completion of a long delayed part of the city's rapid transit system.

At the same time the Board of Transportation opened bids for the construction of that part of the new subway extending along McKibben Street and Harrison Place from Boerum Street to Varick Avenue, Brooklyn, a distance of 3,600 ft. Of the six bids, the lowest was that of the Marcus Contracting Company for $2,561,000.

The section of the subway on which the contractors bid on Oct. 10 is one of three subdivisions of that section of the Fourteenth Street-Eastern line. The construction of the two other sections will be bid for on Oct. 17.

The completed part of the Fourteenth Street-Eastern District route, extending under the river from Sixth Avenue, New York, to Bushwick Avenue at McKibben Street, is now in operation is a shuttle line.

Seven Cents Allowed.—The Public Service Commission has approved a rate for the new line of the Syracuse Railway Co-ordinated Bus Line, Inc., known as Strathmore Bus Line, operated in the city of Syracuse, N. Y., of 7 cents per capita, or a valid transfer issued by the New York State Railways (Syracuse Lines). Children under six years of age, when accompanied by parent or guardian, will be carried free. Fare for children between the ages of six and ten years will be 4 cents.

Honor for Railway Official — H. Hobart Porter, president of the American Waterworks & Electric Company and of the Brooklyn City Railroad, has been elected to the board of trustees of Columbia University. Mr. Porter is a member of the firm of Sanderson & Porter. He has been connected with the Brooklyn City Railroad since 1919, when upon the separation of the Brooklyn City lines from the old Brooklyn Rapid Transit Company he became general manager.

Transfer Restrictions Lifted. — A more liberal use of car transfers was recently announced by the Des Moines City Railway, Des Moines, Ia., in connection with the concession to grant the company an 8-cent fare. Permission has now been given for transferring from one line to another even though the lines run along parallel streets. In the future transfers will be accepted at other than the transfer points provided they are used within the time limit. Restrictions on various lines have been lifted.

Chair Car Service Made Permanent.—Effective on Oct. 16, the Detroit, Monroe & Toledo Short Line Railway, Detroit, Mich., began operating a new and improved limited service between Toledo and Detroit. Limited trains are scheduled hourly now and express cars are canceled. Alternate trains will be de luxe chair cars. L. M. Swartz, district passenger agent, says the plan will give much faster service for the through traffic which is rapidly becoming the most important part of the passenger business. Service with the chair cars proved very popular after a short trial of them.

New Transfer System in Effect.—The Springfield Street Railway, Springfield, Mass., has put in force a transfer system similar to that already in use in Worcester. The transfers are of different colors, representing different lines, and the system hinges on the principle that the transfers, instead of being punched to indicate the lines the passenger can take, are marked in advance to show the lines he cannot take. This affords passengers considerable leeway as to cars, but it saves time on the part of conductors and operators. The time limit for which a transfer is good has been extended 10 minutes under the new plan.

Restores Free Transfers.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., recently announced the restoration of free transfers at Seventeenth, Eighteenth, Nineteenth and Twentieth Streets, to and from Market Street. It was explained that the motive in the abolition of the transfers at the points where they have been restored was a desire to try to avoid congestion in the central delivery district by keeping riders from boarding Market Street cars to go only a block or so. It has now been decided that the congestion does not extend west of Sixteenth Street. In consequence it was decided to restore the free transfers.

Electric Railway, Trunk Lines and Tube in Terminal Project.—Plans have been submitted to Director of Public Works Raymond at Newark, N. J., for a combined terminus for the Pennsylvania Railroad, the Hudson & Manhattan Railroad and lines of the Public Service Railway on the site of the present Market Street station. The new structure will cost $15,000,000 and will eliminate Manhattan Transfer. Passengers to and from lower New York City now change from Hudson & Manhattan Railroad trains to Pennsylvania trains and vice versa at Manhattan Transfer. Upon its completion, it is said that all except the purely local cars of the Public Service Railway will be diverted from the present Public Service Terminal to the new building.

Argues Against Bus Substitution.—Abandonment of the suburban line between Absecon and Somers Point, N. J., and the substitution of buses would mean the scrapping of the Atlantic City & Suburban Railway, Atlantic City, N. J. So the superintendent told the Board of Public Utility Commissioners at a recent hearing on the application for increased rates. The suggestion that buses be substituted was made by Colonel Philander Betts, chief engineer of the Public Utility Commission, who declared the operation of the rival tracks was neither economical nor useful and that there was no justification for a fare increase. The hearing will be continued.

One-Man Cars with Two Men.—The Key System Transit Company, Oakland, Cal., has been granted permission by the Berkeley City Council to operate one-man cars on the Ashby Avenue and Dwight Way lines in the college city by using two-man crews. The one-man cars for these two lines were given a tryout in the spring. The City Council at that time expressed the opinion that, due to the many crossing over rapid transit lines, one man could not safely operate the cars and ordered the cars taken off. The new cars were replaced by others with two-man crews, but residents of the district requested a better type of car. The company then offered to place the one-man cars back in service, using two men on each car. After investigating the subject, the Council consented to this offer.

Ordinance to Continue Line Passed.—The plan whereby the Toledo, Fostoria & Findlay Railroad, Fostoria, Ohio, will operate the Tiffin & Fostoria line is expected to pass the Council at Fostoria on third reading set for Oct. 21. The franchise has been drawn up to settle difficulties encountered by the Tiffin & Fostoria line in Fostoria. The city demanded pavement of streets and removal of freight sheds. The company threatened to junk the property. In the new franchise sale of the property except to former owners is provided, tentative paving specifications are approved by the city, and a clause is included for removal of freight sheds by July 1, 1925.

Through Service Re-established. — Through car service between Springfield and Northampton, Mass., has been reestablished after an interruption of several years. This action followed a successful week's experiment during the Eastern States Exposition. A regular schedule for the through cars, operated as a joint service of the Springfield, Holyoke and Northampton systems, became effective on Sept. 22. This service is in addition to the limited service between Springfield and Holyoke. The fare from Springfield to Northampton is 64 cents.

Fare Dodgers Punished.—Members of the secret service staff of the International Railway, Buffalo, have brought about the arrest of passengers alleged to be exchanging transfers at line intersections to avoid the payment of cash fares. Several passengers have been found guilty and nominal fines of $5 each imposed.

Belt Line Contract Signed.—Contracts for the operation of the Tacoma Municipal Street Railway, Tacoma, Wash., as a tideflat belt line have been signed by three of the four transcontinental railroads serving Tacoma. It is expected the city line will begin operating as a belt line by Nov. 1. The operation as a belt line will save Tacoma industries of the tideflats a switching charge they now pay on noncompetitive line business, and will also give a lower intraterminal switching charge.

Financial and Corporate

Protective Committee Reports Progress

Letter to Bondholders of the Hamilton Property Reviews Conditions Since Receivership

A protective committee recently sent a letter to the holders of the first consolidated mortgage 5 per cent bonds of the Southern Ohio Traction Company, Hamilton, Ohio, sketching the progress which has been made since George P. Sohngen took possession of the property as receiver on Nov. 6, 1920. The road then was in very poor physical condition, struggling to give service with inadequate facilities.

As a result of the progressive improvements made at the suggestion of the committee's experts, the physical condition of the property has been materially improved; the deficiency in tie renewals has been largely made up and a large amount of work has been done in reconstructing and rehabilitating track in paved streets. Extensive repairs were made to ten passenger cars, two freight cars and four work cars used in interurban service and two cars used in the local city service in Dayton. Despite these repairs, the present interurban equipment is uneconomical and unsatisfactory in service and should be replaced, the statement says, by more modern and attractive rolling stock.

BUS COMPETITION OVERCOME

On the matter of bus competition, the committee reports that beginning in November, 1920, competition developed in Hamilton, Ohio, and as a result traffic on the Hamilton city lines was reduced more than 30 per cent within a period of six months. Heavy operating deficits made imperative either the abandonment of these lines or their modernization. Accordingly receiver's certificates and car trust certificates were issued to finance the purchase of 22 one-man safety cars to be used on the Hamilton city lines. Introduction of safety cars in April, 1922, coupled with the provision of more frequent service and the rehabilitation of the local city traffic, has radically changed the financial results of operation of this section of the property. The introduction of this equipment, together with track rehabilitation, marked the beginning of the end of bus competition, which shortly thereafter was stamped out on all except one line.

In February, 1922, competitive bus routes paralleling the interurban lines between Cincinnati and Hamilton were started. This competition has since continued and in consequence the revenues and traffic on this section of the interurban line have been greatly reduced. Bus competition developed along the interurban line between Hamilton and Dayton in June, 1922, but before June 11, 1924, all of the bus competitors were forced to discontinue service.

The report refers to the value of the Freeman-Collister act regulating buses, to the rejection of the application of the Royal Green Coach Company, and the value of the decision of the Supreme Court to the property covered by the holders' mortgage.

In concluding, the report states that although it is impossible in advance of the final accounting of the receiver, ordered by the Ohio Supreme Court to determine the net earnings accruing to the trustees under each of the several mortgages now in default, yet it seemed clear from the receiver's reports that during recent months the entire net earnings of the property, over and above operating expenses, resulted from the operation of the interurban line between Hamilton and Dayton and from the operation of the Hamilton city lines. According to the current reports of the receiver during the first five months of 1924, the net earnings after operating expenses, maintenance and taxes of the interurban line between Hamilton and Dayton and the local city line in Dayton aggregated $69,523. Assuming that the receiver sets up for those months the same depreciation accrued by him during a like period in 1923, the depreciation accrual applicable to that section of the property would aggregate $25,665, leaving a balance available for rentals, interest, etc., during the five months of $43,858.

The committee is confident that the advantages in a reorganization of the property as a unified system are so self-evident that all parties in interest will work to effect that result. The committee believes that depositors will be well advised not to sell their holdings of Southern Ohio bonds at a great sacrifice. Further, the committee points out that while there has been a marked improvement in the physical condition of the property, a large amount of rehabilitation work is required on the section of the interurban line between Cincinnati and Hamilton. In the judgment of the committee's experts the carrying out of this work should result in a substantial increase in the volume of through business between Cincinnati and Dayton and should cripple, if not destroy, the existing bus competition. Further, that substantial expenditures should also be made upon the interurban line between Dayton and Hamilton in order to permit of a speeding up of schedules, which should result in a further increase in business. New passenger equipment should be provided for the interurban line, while substantial additions should be made to the present freight equipment.

All this work, in the opinion of the committee, makes necessary the provision of a substantial amount of new capital, a large part of which must be provided in connection with the reorganization of the property.

Middle West Utilities Company Completes Financing

The Middle West Utilities Company, Chicago, has deposited with the Illinois Merchants Trust Company of Chicago, Ill., $6,246,500 to pay off at par and accrued interest all of its ten-year 6 per cent bonds maturing Jan. 1, 1925. Payment of these bonds leaves the company with no maturing obligations before Sept. 1, 1935. Series "A" notes, of which $2,340,000 were issued, mature at that time. These notes are redeemable at the company's option subsequent to Sept. 1, 1925. Series "B" notes, of which $2,195,500 were issued, mature Dec. 1, 1940, and are redeemable subsequent to Dec. 1, 1925. Series "C" notes, of which $1,309,000 were issued, mature July 1, 1941, and are redeemable subsequent to July 1, 1926. After the payment of the ten-year 6 per cent bonds on Jan. 1, these notes, totaling $5,844,500, will be the only outstanding senior obligations of the company.

Following almost immediately upon this announcement a syndicate composed of Pynchon & Company, West & Company and the Middle West Utilities Corporation offered an issue of 20,000 shares of Middle West Utilities Company 7 per cent prior lien stock at $98 and accrued dividend to yield about 7.14 per cent. The prior lien stock is participating in that it is entitled to an additional 1 per cent dividend in any calendar year in which the total cash dividends paid on the common stock exceed $5 a share.

Among the many subsidiaries of the company is the Interstate Public Service Company, which operates 90 miles of electric railway. This is, perhaps, the most important of the company's railway holdings.

Columbus Stockholders Who Sold Are Paid

The control of the Columbus Railway, Power & Light Company, Columbus, Ohio, formally passed into the hands of Cyrus S. Eaton, Cleveland, on Oct. 14 when stockholders residing in Columbus and vicinity received approximately $3,000,000 for shares they had turned over to Mr. Eaton. Mr. Eaton originally offered to buy 46,000 shares, which he finally obtained. Checks in payment of the entire transaction amounted to more than $5,000,000. Payment was made at the rate of $115 per share, plus accumulated dividends from Sept. 1, minus 2 cents per share for transfer tax.

Immediately after gaining control, Mr. Eaton announced the merging of the Columbus Railway, Light & Power Company with four other utility organizations in a super-power company under the name of the United-Continental Gas & Electric Company, which covers territory in the Middle West and Northwest.

Work is now to be pushed as fast as possible on the new 150,000-kw. station of the Columbus Railway, Power & Light Company located about 10 miles south of Columbus. The completion of the plant will make Columbus a power center in the merger.

Seven Per Cent Issue Replaced by Lower Coupon at Minneapolis

Dillon, Read & Company, New York, announced on Oct. 16 by public advertisement that they had sold an issue of $5,000,000 of first mortgage collateral 5½ per cent gold notes of the Minneapolis Street Railway, Minneapolis, Minn., dated Nov. 1, 1924, and due Aug. 15, 1928. The offering price was 100 and interest. Principal and interest on the loan are unconditionally guaranteed by the Twin City Rapid Transit Company. The transaction is purely a refunding one, carried out in accordance with the tendency under present conditions of easy money to replace high coupon issues with ones bearing lower interest wherever the transaction can be carried out to advantage. In the present case it is explained that "as these notes bear 5½ per cent interest and replace a 7 per cent issue for a like face amount, their issue will result in a material saving of interest to the company.

Stock Rights Accrue to New Jersey Holders

The Public Service Corporation of New Jersey is offering to holders of common and preferred stock of record Oct. 17, additional common stock in the ratio of one share of no-par value common for every ten shares of both common and preferred. The price is $60 a share, plus accrued dividends. Subscription will be due Dec. 1, and accrued dividends up to that date will amount to 66⅔ cents a share. Subscribers will have the option of paying $30 a share cash on Dec. 1, $15 on Jan. 2, 1925, and $15 additional on April 1, 1925. It is estimated that the amount of the new issue will be between 100,000 and 120,000 shares.

Motion Made to Consolidate St. Louis Foreclosure Suits

A motion to consolidate the receivership and foreclosure suits pending in the United States District Court against the United Railways, St. Louis, and some of its subsidiaries, was filed by counsel for the Mercantile Trust Company, trustee under the indenture securing the general mortgage bonds of the St. Louis Transit Company. The Transit bondholders have filed foreclosure proceedings as a step toward complete reorganization of the company. A hearing on the new motion will be held by the court on Oct. 25.

Holders of the bonds of the St. Louis & Suburban Railway to date have declined to accept the plans for reorganization in so far as they affect the Suburban general bonds, but it is believed in financial circles in St. Louis that this difficulty will be surmounted and that the reorganization plans will be carried through probably unchanged.

Suspension Time Extended.—The petition of the Virginia Railway & Power Company for permission to discontinue service over the Pinner's Point line and the Park View and Cemetery line in Portsmouth, Va., is before the State Corporation Commission. The case was heard on June 19 and the commission entered an order granting suspension of service as of Sept. 15, but on Sept. 12 another order was entered extending the suspension indefinitely so as to permit the taking of further evidence.

Manhattan Rental Payment Declared.—The directors of the Interborough Rapid Transit Company, New York, have declared a regular quarterly rent instalment of $1.25 a share on the stock of the Manhattan Railway, payable on Nov. 1 to holders of record of Oct. 20. This is in accordance with the readjusted rental plan which provides dividends at the rate of 5 per cent per annum beginning with the fiscal year starting July 1, 1924.

Hearing on Abandonment Deferred.—At the request of the corporation counsel of Auburn, N. Y., and attorneys for the Auburn & Syracuse Electric Railroad hearing by the Public Service Commission in the matter of the abandonment of the Clark Street and Aurelius Avenue portion of the railroad's line in Auburn will be postponed to a later date. The hearing has been advertised for Oct. 17 at Auburn. The case will be called at that time and then adjourned to a date to be fixed later.

Loss for Fiscal Year.—The Sault Ste. Marie Traction Company, Sault Ste. Marie, Mich., lost $1,030 in the year ended June 30, 1924. After deducting $16 for interest received on bank account and adding $4,057 for depreciation on buildings and equipment, the company lost $5,070 which was added to the debit balance of $28,466 brought forward from the previous year. This left a total debit balance carried forward of $33,436.

Will Dismantle Line.—The Menominee & Marinette Light & Traction Company, operating in Marinette, Wis., and Menominee, Mich., has decided to dismantle its Quimby Avenue line in Menominee. The company claimed that the line cost $11,000 annually to operate and that the revenue was only $5,000. Admission was made by the franchise committee of the Menominee Council that it was powerless to prevent this action because the company operates without a franchise.

Time for Deposit Extended.—The reorganization committee of the New York Railways, under the plan and agreement of July 18, 1924, has extended the time for the deposit of bonds and stocks listed in prior notices published by the committee until the close of business Oct. 20. Penalties may be imposed after that date. The plan and agreement for the reorganization of the road have been approved, the sale at foreclosure has been conducted and only a few minor details now remain to be arranged. The company operates about 70 miles of surface lines, mostly in the Borough of Manhattan. Extended references were made to the terms of the reorganization proposal in the ELECTRIC RAILWAY JOURNAL for July 12, page 67, and Aug. 2, page 183.

Bonds Called for Redemption.—All of the outstanding general and refunding mortgage 7½ per cent gold bonds, series A, of the Puget Sound Power & Light Company, Seattle, Wash., dated May 2, 1921, and due May 1, 1944, have been called for redemption Nov. 1 at 105 and interest. Bondholders may present their bonds at any time prior to Nov. 1, 1924, and receive for each $1,000 bond $1,087.50, less a discount at the rate of 3½ per cent for the period from the date of their presentation to Nov. 1, 1924.

Trains Will Replace Trolleys.—The Public Utilities Commission has granted the petition of the Connecticut Company requesting permission to discontinue operation of trolleys over the tracks of the New York, New Haven & Hartford Railroad, between East Hartford and Rockville. Public convenience and necessity do not warrant the further continuance of the service, and the service is now being operated at a loss, the commission finds. The New Haven road has offered to increase the frequency of its steam railroad service between Hartford and Rockville to six trains each day on the discontinuance of the electric service over its tracks. The commission's order and the road's new service will affect the towns of East Hartford, Manchester, Vernon and Rockville.

Hears Petition to Buy Common Stock.—A hearing on the petition of the Interstate Public Service Company, Indianapolis, Ind., for authority to buy the common stock of the Indiana Power Company and of the Knox & Sullivan County Light & Power Company from the Utilities Power & Light Company was held before the Indiana Public Service Commission recently. The petitions were not contested. The Interstate Public Service Company is on Insull operating company and the Utilities Power & Light Company is an independent corporation, of which H. L. Clarke of Chicago is president. It is owned by Clarke and his associates. The two subsidiary companies involved in the transaction serve about thirty towns and communities in southwestern Indiana.

Short Line Suspended.—The Berwick & Nescopeck Railway, Berwick, Pa., after operating for twelve years, discontinued trolley service at midnight, Oct. 5. The company has replaced the cars with buses and service is to be continued on the usual schedule. The line is 1.6 miles long.

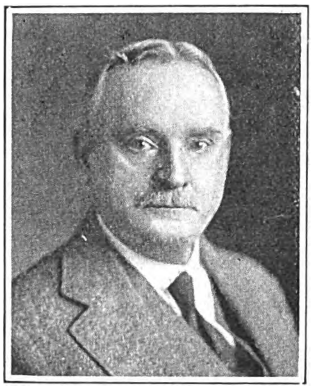
Second Mortgage Issue Sought by D. U. R.—Attorneys for the Detroit United Railway appeared before the State Public Utilities Commission at Lansing, Mich., on Oct. 14, to request that the company be authorized to sell $2,000,000, par value, of second mortgage bonds at 75 cents on the dollar. They said the company wished to improve its electric lines and purchase several bus lines.

Deficit of Interborough in August Larger.—The Interborough Rapid Transit Company, New York, reports for August a net operating revenue of $1,011,110, an increase of $240,098 over the similar month last year, but a deficit after revenues and rentals of $519,282, an increase of $174,283 over that reported a year ago.

Personal Items

Edwin W. Robertson Leaves Columbia Utilities

With the idea of curtailing his labors, Edwin Wales Robertson, formerly chairman of the board of directors and treasurer of the Columbia Railway, Gas & Electric Company, Columbia, S. C., and the Parr Shoals Power Company and president of the Columbia Gas Light Company, has severed his connection with the public utility business in that community. Having arrived at the age of 61 years, Mr. Robertson wants to be relieved of some of his efforts, and has therefore disposed of his controlling interest in these several properties. The sale was satisfactorily and amicably carried into effect with the General Gas & Electric Company, under the leadership of W. S. Barstow of New York.



Edwin W. Robertson

It was in 1903 that Mr. Robertson obtained control of the Columbia Electric Street Railway, Light & Power Company, and the name was subsequently changed to the Columbia Railway, Gas & Electric Company. In 1905 he purchased the entire assets of the Columbia Water Power Company and the Columbia Gas Light Company. In 1912 he financed and arranged to build the Parr Shoals Power Company hydro-electric plant.

Mr. Robertson was born in Columbia on Sept. 3, 1863. In 1885 he was graduated from Yale University and from the law department of the University of South Carolina in 1887. Mr. Robertson has been very conspicuous in the banking field, establishing the Canal Dime Savings Bank of Columbia, and in 1897 acquiring control of the Loan & Exchange Bank of Columbia. Later he merged the two banks. In 1905 he was elected director in the Equitable Life Assurance Society of the United States. He has been a member of the Executive Council of the American Bankers' Association and president of the State Bankers' Association, and is a member of the Graduate Advisory Board of Yale University.

At the outbreak of the war he took an active part in the various Liberty loans, being chairman of the loan committee for the state of South Carolina in the first four war loans.

J. W. Spencer, for the past two years district superintendent of the Anniston operations of the Alabama Power Company, has been transferred to the records department of the company, with headquarters in Birmingham. C. J. Perryman, superintendent of the Gadsden operations of the company for many years, will succeed Mr. Spencer at Anniston.

C. B. King, manager of the London Street Railway, London, Ont., since 1905, has resigned. It is stated that L. Tait, secretary-treasurer, has been appointed acting manager.

L. F. Pearce has been retained by W. S. Barstow & Company, the new owners of the Columbia Railway, Gas & Electric Company, Columbia, S. C., in the office of secretary and treasurer. Under the former ownership at Columbia Mr. Pearce was secretary.

T. S. Nicholson, an employee of the Arkansas Central Power Company, has been made assistant to Harry U. Wallace, assistant general manager of the Knoxville Power & Light Company, Knoxville, Tenn.

N. D. Wilson, who has been associated with the Toronto Transportation Commission as head of the traffic study department, has left Toronto for Mexico City, where he will conduct studies and report on routing and traffic for the Mexico Tramways. His work with the Transportation Commission centered about the economic and engineering aspects of traffic matters. When he returns from Mexico at the end of the year Mr. Wilson will resume his duties with the Toronto Transportation Commission as head of the traffic study department.

Obituary

In Memory of John M. Roach*

Calmly and unafraid, as ever, John M. Roach became one with the eternal on the eighth day of March last. But in the memory of his countless friends he will never die, for his were the qualities upon which true friendships are builded.

A strong man, he accomplished greatly; his achievements (like those of so many of his kind) rebuking and refuting the oft-uttered weakling assertions that the age of opportunity has passed. The story of his struggles and his successes is inspiring. From the foot of the transportation ladder he climbed to executive eminence. By labor intense and probity unquestioned he became one of the commanding figures of our industry. For more than half a century he exemplified that genius for unremitting toil which is the basis of our national prosperity. Twenty-four years ago he was president of this association, and as such contributed to our early growth and influence. We owe him much.

Combative when combat was his duty, he was withal a kindly man—sympathetic, generous, delighting in good works. His ears were never closed to appealing voice or circumstance. Mercifully he considered the poor, the fatherless and the afflicted. He walked uprightly and spoke the truth.

The suggestion that life could be burdensome came to him but little more than a twelvemonth since and took him—a veteran of threescore and eleven—from his Chicago home to the sunshine and sofe breezes of Florida. For a while there was hope, but before spring came north again this year his undaunted spirit, fearing no evil, strode through the valley of the shadow to the mysterious realm where the earth-wearied conquerors are forever re-energized.

To those who are of his kin—the near and dear ones—our association tenders this wholly inadequate expression of high regard for its departed leader and of its heartfelt sympathy with those who were of his household.

Randall Montgomery, vice-president of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, died recently at the age of 73 years. It was in 1889 that he became identified with public utility work, becoming general manager of the Youngstown Electric Company. He later became vice-president and continued in this work until the time of his death. Mr. Montgomery was born in Youngstown and he spent his entire life there. He was educated in the local schools and began his career as clerk in a grocery store. He was active in politics. In 1888 he was elected on the Republican ticket as Mayor of the city and was re-elected two years later. In 1897 he was appointed to the city commission, serving thereon for three years.

Major William A. Garrett, transportation manager of the Baldwin Locomotive Works, died recently at his home in Moylan, Delaware County, Pa., at the age of sixty-three years. Mr. Garrett, in 1917, was appointed by President Wilson a member of the United States Railroad Commission. He was a leading railroad executive, and was an expert on transportation matters in general. He was a member of the transportation committee of the Chamber of Commerce of Philadelphia, and chairman of the transportation committee of the Middle States and Atlantic Advisory Board.

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*Prepared by Gen. George H. Harries, chairman of a committee appointed for the purpose, and presented before the American Electric Railway Association at its session at Atlantic City, N. J., on Friday, Oct. 10, 1924.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Changing Trend in Pole and Tie Timber

The total number of cross ties purchased by electric and steam railroads in the United States was considerably less during 1923 than it was twelve years ago. Similarly the number of wood poles bought was less, although in this case the decrease was not so marked. From figures published by the Department of Commerce it appears that the purchase of ties goes in cycles, 1907, 1911 and 1923 being comparatively big years, while 1909 and 1915 were rather lean years.

Important changes have taken place during this period in the kinds of timber used for cross ties. Southern pine, chestnut, cedar, and Western yellow pine have declined noticeably in popularity. That is to say, their use has been much curtailed, although in many cases this is due to difficulty in obtaining this wood rather than preference for other varieties. The use of maple, gum and beech has increased to a marked extent. Oak, always the most popular wood for ties; Douglas fir, cypress, larch, hemlock and redwood were used in approximately the same quantities in 1923 as in 1907. Approximate figures showing the purchases of different varieties are given in an accompanying table.

Less change is noticeable in the number of poles purchased by the electric and steam railroads and by power, telephone and telegraph companies, all of whose purchases are lumped together in the figures announced by the government. Moreover, there appears to be little change in the relative popularity of the different woods used for this purpose. Detailed figures are given in the accompanying table.

SUMMARY OF WOOD TIE PURCHASES IN FIVE TYPICAL YEARS

Kind of Wood	1923	1915*	1911	1909	1907
Oak	62,915,237	49,333,881	59,508,000	57,132,000	61,757,000
Southern pine	22,048,967	14,115,681	24,265,000	21,385,000	34,215,000
Douglas fir	15,316,571	6,950,910	11,253,000	9,067,000	14,525,000
Cypress	5,243,835	4,478,612	5,857,000	4,589,000	6,780,000
Chestnut	4,419,782	4,548,352	7,542,000	6,629,000	7,851,000
Tamarack or larch	4,220,194	3,858,098	4,138,000	3,311,000	4,562,000
Cedar	3,676,228	5,122,103	8,015,000	6,777,000	8,954,000
Hemlock	3,477,740	859,662	3,686,000	2,642,000	2,367,000
Gum	3,050,798	485,466	1,293,000	378,000	15,000
Maple	3,035,007	1,069,547	1,189,000	158,000	....
Redwood	2,492,445	563,685	1,820,000	2,088,000	2,032,000
Beech	2,279,221	1,173,490	1,109,000	195,000	52,000
Western yellow pine	1,340,007	1,402,836	2,696,000	6,797,000	5,019,000
Lodgepole pine	949,451	1,316,819	....	....	....
Birch	369,154	465,815	....	....	....
All other	1,141,480	1,361,694	2,682,000	2,603,000	5,574,000
Total	135,976,117	97,106,651	135,053,000	123,751,000	153,703,000

* Based on reports from railroads representing 78.46 per cent of total mileage. Estimated total for all railroads, 123,766,000.

RELATIVE POPULARITY OF THE DIFFERENT WOODS USED FOR POLE TIMBER

Kind of Wood	1923	1915	1911	1909	1907
Cedar	1,702,247	2,521,769	2,100,144	2,439,825	2,109,477
Chestnut and oak	817,259	851,085	893,079	844,908	706,732
Pine	402,393	546,233	161,690	179,586	155,960
Cypress	73,403	67,644	72,995	77,677	100,368
All other	65,492	91,233	190,112	196,744	210,731
Total	3,060,794	4,077,964	3,418,020	3,738,740	3,283,268

United States Steel Corporation Purchases Cyclone Properties

The properties of the Cyclone Fence Company have been purchased by the United States Steel Corporation. The transfer includes the Cyclone factories at Waukegan, Illinois and Cleveland, Ohio, also plants at Fort Worth, Texas and Newark, N. J.

No change in policy is contemplated, the business to continue under the name of the Cyclone Fence Company, carrying on, with the exception of its principal officers, under its present organization as a subsidiary of the corporation.

Petition in Bankruptcy Against Standard Equipment & Machinery Company

An involuntary petition in bankruptcy has been filed in the United States District Court at St. Louis against George H. Tontrup, doing business as the Standard Equipment & Machinery Company, St. Louis, Mo. The National Safety Car Company, in which Mr. Tontrup is interested, is also in the bankruptcy court. The petitioning creditors of the Standard Equipment & Machinery Company were the Liberty Foundry Company, with a claim of $435; Beck & Corbitt Company, $104, and St. Louis Machinery Supply Company, $174.

Large Orders for Steel Wheels

The fundamentally sound condition of the electric railway industry at this time is well indicated by the continued large purchases of steel wheels. The Standard Steel Works, Philadelphia, reports that in spite of the business depression prevailing somewhat generally at the present time orders received from electric railways since June 1 for steel wheels have been in as large volume as for a similar period last year.

G. E. Orders Decrease

Orders received by the General Electric Company, Schenectady, N. Y., for the three months ended Sept. 30 totaled $58,389,832 as compared with $65,483,549 for the similar quarter in 1923, or a decrease of 11 per cent. For the first nine months of the present year orders totaled $203,097,719, compared with $229,747,304 for the similar period in 1923, a decrease of 12 per cent.

Metal, Coal and Material Prices

Metals—New York	Oct. 14, 1924
Copper, electrolytic, cents per lb.	13.125
Copper wire base, cents per lb.	15.125
Lead, cents per lb.	8.05
Zinc, cents per lb.	6.65
Tin, Straits, cents per lb.	49.875
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.30
Somerset mine run, Boston, net tons	2.075
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.375
Central, Ill., screenings, Chicago, net tons	1.175
Kansas screenings, Kansas City, net tons.	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N. Y., cents per lb.	17.75
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	1.08
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.12
Turpentine (bbl. lots), N. Y., per gal.	0.87

Rolling Stock

Wisconsin Power & Light Company, Fond du Lac, Wis., lost two new Mack buses and a Faegeol bus in a fire which swept the garage, in Madison, where the buses were stored.

United Railways, St. Louis, Mo., through its subsidiary, the St. Louis Motorbus Company, has placed orders for four buses with the White Company, Cleveland. The buses will seat 29 passengers and cost approximately $35,000. Delivery will be made about Nov. 1.

Lake Charles Electric Company, Lake Charles, La., recently purchased from the Houston Electric Company six standard single-truck Birney cars, which have entirely replaced the two-man cars formerly operated.

Toronto Transportation Commission, Toronto, Canada, has ordered 3 White bus chassis and is building bodies for them at the Hillcrest shops. The seating capacity will be 29.

Tampa Electric Company, Tampa, Fla., recently purchased seven of the latest type cars from the American Car Company. The new cars will have a seating capacity of 52 persons. The cars will be placed in service on the Sulphur Springs line.

Track and Line

Trenton & Mercer County Traction Company, Trenton, N. J., has decided to use a 90-lb. rail in the laying of new rails in Pennington in place of the 75-lb. rail at first decided upon. It is also said the line to Pennington will be extended to the far end of the town instead of ending near the center of the borough.

Cincinnati Traction Company, Cincinnati, Ohio, is laying approximately 2 miles of new rails on Gilbert Avenue between Sinton Avenue and the Eden Park entrance. The work is expected to be completed by Nov. 15.

Grand Rapids Railway, Grand Rapids, Mich., has laid 858 ft. of new track between Madison and Russell Avenues and 1,413 ft. between Russell and Eastern Avenues or nearly ½ mile of new roadbed and rails.

Pacific Electric Railway, Los Angeles, Cal., has been granted permission by the Railroad Commission to extend its Daisy Avenue line from its present terminus in the city of Long Beach at grade across several streets in the county of Los Angeles. The proposed line will be constructed under the tracks of the Los Angeles & Salt Lake Railroad 100 ft. north of Daisy Avenue. The cost is apportioned between the two companies on the basis that the Pacific Electric Railway shall pay one-half of the cost of the 22-ft. clearance in excess of the cost of a standard 14-ft. clearance.

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., plans to build an electric freight line from its Lakeside power plant to connect with the Chicago & Northwestern Railway system.

New Brunswick Power Company, St. John, Canada, has completed relaying about 2,000 ft. of single track in Fairville. In conjunction with the permanent paving work of St. John City, it is proposed to relay with high T-rails, concrete base and steel ties about 2,000 ft. of single track on St. James Street.

Erie Railway, Erie Pa., lately reorganized in conjunction with the General Electric Company, has plans under way for moving the tracks in the East Lake Road from the center of the road to the side of the street. The work is estimated to cost $85,000.

Power Houses, Shops and Buildings

Philadelphia Rapid Transit Company, Philadelphia, Pa., has purchased 12 acres of land in the section of Fifth Street and Olney Avenue, which will be used as a loop terminal for the extension of the Fifth Street trolley line, north from Olney Avenue. Purchase of the tract was made by the Motor Real Estate Company, a subsidiary organization of the Philadelphia Rapid Transit, from the Hilltop Land Company for $147,500, subject to mortgages of $112,000.

Lake Shore Power Company, Toledo, Ohio, has asked authority to issue $271,500 of 7 per cent preferred stock to finance improvements and purchase property jointly owned by the Toledo & Indiana Railroad and itself. The power company will install a new generator, coal crusher and conveyor, stokers, superheaters and other equipment for its power house.

Los Angeles, Cal.—Definite steps are being taken by a group of capitalists for the financing and erection of a new downtown subway terminal and office building to be built on the site of the Hill Street station of the Pacific Electric Railway. The cost will be between $3,000,000 and $4,000,000.

Baton Rouge Electric Company, Baton Rouge, La., will complete its new carhouse this month. The material for the carhouse has been ordered and the preliminary work is now being done. The building will be located on the site recently purchased from the State University.

Trade Notes

Roller-Smith Company, New York, N. Y., announces the appointment of the Thrall Electric Company, Presidente Zayas No. 27 and Esquina A Habana, Havana, Cuba, as its exclusive representative for the Island of Cuba. The Thrall Electric Company is primarily a sales and engineering organization carrying complete stocks of electrical machinery, instruments and supplies and operates over the entire island. The company also maintains the largest electrical installation department in Cuba. It will carry a comprehensive stock of Roller-Smith instruments and circuit breakers.

Globe Ticket Company, Philadelphia, Pa., has received an order from the Philadelphia Rapid Transit Company for approximately 60,000,000 transfers. This railway ordinarily prints its own transfers, but on account of the recent fare change it was desired to secure an unusually large number for use on short notice and this order was given to the Globe Ticket Company.

Conveyors Corporation of America, Chicago, Ill., has appointed W. P. MacKenzie Company, Philadelphia, as its sales representative in southeastern Pennsylvania and southern New Jersey. This organization will handle the sale of American steam jet ash conveyors, American cast-iron storage tanks, American airtight doors for ash pits and boiler settings, and other specialties.

Gibb Instrument Company, Bay City, Mich., manufacturer of electric welding machines and electric heating machines, has broken ground for a new modern plant.

White Manufacturing Company, Elkhart, Ind., maker of case-hardened brake pins and bushings for railway trucks, and other railway car parts, has completed a new factory at Elkhart, into which it moved on Oct. 1 from its previous location at Goshen, Ind. With it is associated the Chausse Oil Burner Company, maker of kerosene torches, railway switch heaters and asphalt street repairing machinery.

New Incorporation

East St. Louis, Caseyville & Eastern Railroad, East St. Louis, Ill., has been incorporated at Belleville, Ill., with a capital stock of $5,000. Among the incorporators were M. L. Munie, Finis P. Ernest, Jr., and Mrs. Marie Dacray, all of East St. Louis. They propose to establish an interurban line between East St. Louis and Caseyville via Washington Park. The line will handle both passengers and freight.

New Advertising Literature

Ajax Metal Company, Philadelphia, Pa., has issued a new Babbitt booklet entitled "Babbitt Facts." The booklet contains interesting information to users of babbitt and tells how to pick the best babbitt for every purpose and why the best babbitt should be picked.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is distributing insulation guides for 500 to 600-volt railway equipments These guides are designed to be hung on the walls of railway repair shops where they may be referred to when equipment is being repaired. The different grades and forms of materials used for insulating various railway equipments and parts are tabulated in convenient form. The data card is known as H. C. 234.

Fageol Motors Company, Oakland, Cal., has issued a pamphlet, "It's Always Fare Weather." It is replete with illustrations of the Fageol Safety Coach in operation during severe snowstorms. Some complimentary letters to the Fageol company on what its motors are doing through the country are reproduced.

Buffalo Forge Company, Buffalo, N. Y., has given out some data for the factory management and small shop owner regarding the use and advantages of unit heaters in a bulletin describing Breezo-Fin heaters, manufactured by this Buffalo company. The text is amply illustrated, including tables of capacities and dimensions.

J. G. Brill Company, Philadelphia, Pa., has published "Brill Cars," a 60-page catalog designated as No. 277. In it are included exterior and interior illustrations, seating diagrams of various types of cars built at the Brill plants, and records of weights and general details. Tipped in the back there is a tabulation of dimensions and weights of all the cars illustrated in the catalog. Special equipment, including gasoline and gas-electric cars, Brill rail-less cars and Kuhlman steel coach and type "G" bus bodies are also illustrated.

Champion Switch Company, Buffalo, N. Y., has issued a 70-page booklet entitled "Indoor Bus Supports." The interchangeability of the Champion line of bus supports is described with illustrations. Besides general information on the Champion bus supports, the pamphlet shows the interchangeable parts, gives insulator detail and includes a numerical index.

New York, Saturday, October 25, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

Henry W. Blake and Harry L. Brown, *Editors*

Volume 64
Number 17

Correct Bearing Maintenance May Save the Industry $3,000,000

MAINTAINING car bearings in operating condition, while one of the most essential jobs on a railway, is given little thought by any one outside the mechanical department. There are four or eight journal bearings on each car, and eight to sixteen motor bearings. With more than 100,000 electric railway cars this gives a total of more than 1,500,000 bearings in service. These are all expected to function perfectly at all times and under all conditions of load and weather. That they usually do so is a tribute to the skill of the designers and the men who maintain the cars.

Of course, bearings wear out in service and their periodical replacement is one of the routine jobs of car maintenance. Failures occur occasionally, and when they do the service is disrupted. Too much importance cannot be given to the inspection and maintenance of this humble device, so that repairs can be facilitated and road failures prevented.

The importance of the subject can be seen from the recent estimate of an engineer who states that the cost chargeable to motor bearings alone is annually some $6,000,000, and that half of this amount can be saved to the industry by better motor lubrication.

The survey on bearing practice, the first article of which appeared in the Aug. 16 issue of this paper, and the second appearing this week, points out some of the difficulties to be looked for and how they may be overcome. The present article shows the importance of correct methods of machining the bearings so as to obtain proper lubrication and so that they will fit properly. Both of these are essentials in keeping the car on the road instead of its being held in the shop.

Careful Fitting of Bearings Is Needed to Lengthen Their Life

AS SOON as a motor goes into service, wear starts between the armature shaft and the bearing lining, of which, incidentally, some 90 per cent is caused by foreign matter and dirt getting into the bearing. Apart from this normal wear, which can be determined with a certain degree of accuracy, the bolts which clamp the bearing in the motor shell frequently loosen, and wear then takes place on the outside of the bearing and on the inside of the frame fit. When loosening starts, it increases rapidly, due to the pounding action when the car operates over rough track, until the bearings get so loose that they become dangerous to operate. It is this looseness that is responsible for the greatest majority of bearing troubles and the short life obtained.

Trouble of this sort is most pronounced on the old split-frame motors of which there are still many in service, because railway managements feel that the expense of purchasing new ones is not justified. Although these motors are heavy they will operate satisfactorily and will stand heavy overloads under extremely trying conditions of service, provided they are maintained properly.

The problem of keeping the bearings of such motors in condition is difficult. A solution for much of the trouble, as disclosed in the survey of bearing practice, has been found by some roads where precautions are taken to insure a tight fit of the bearings in the motor shells and where careful attention is given to fitting each bearing to the shaft on which it operates.

Good results have been obtained on some railway properties by welding these bearing fits and reboring the motor frames. Where shops are properly equipped to handle this work, the cost of welding and boring does not exceed the cost of a new set of bearings. An additional advantage is obtained where the motors originally had cast-iron babbitted bearings, as the bearing fits can be filled in and rebored to a smaller diameter so that a standard type of bronze bearing can be used. By this method some roads have obtained reduction in bearing weights of from 50 to 60 per cent.

This class of work can be carried out on small railway properties quite as well as on larger systems and will produce surprisingly good results. The argument sometimes used that while a practice is all right for the big roads the little ones cannot follow it does not apply here. With such possibilities, the practice is well worth giving a thorough trial.

Car Brakes Can Be Improved

MUCH thought is being given these days to the improvement of car equipment for electric railway service. Efforts which at first were directed almost entirely toward reductions in weight and operating cost have subsequently included serious consideration of the merchandising aspects of the design. In the attempt to make electric railway cars more attractive to the rider, noise reduction, ease of riding, seat comfort, appearance, smooth starting and stopping, have all been given increased attention, and progress has been made in improving cars along these lines.

One important part of the car equipment which has apparently received little general consideration is the brake system. There seems to be excellent possibility for improvements in the present type of brakes that would reduce weight and maintenance cost and would at the same time improve the design from a ride merchandising standpoint.

On most cars, at present, the braking force is transmitted from a single brake cylinder to the brakeshoes through an expensive, noisy and heavy system of levers and rods. Developments in hydraulic and pneumatic automotive brakes have pointed the way toward simplification of this design.

Some simple adaptation of the diaphragm or cylinder constructions which have been developed for automotive air brakes might be applied to an axle-mounted drum on electric railway cars. Such a construction would substitute air piping direct to the brake diaphragms for the present cumbersome mechanical transmission system represented by the foundation brake rigging. It has even been suggested that the brake diaphragms might be mounted directly on the motor case and the drum be carried on an extension of the armature shaft so as to take advantage of the increased leverage obtainable through the motor gearing. For single-end equipment, this would give more uniform wear on both sides of pinion and gear teeth.

Of course space limitations will be encountered on some of the larger and heavier types of cars. Again there will be the necessity for some form of flexible connection at the trucks in the brake piping on double-truck cars. However, these difficulties do not appear insurmountable. Flexible brake pipe connections between cars are successfully used in train operation. Limitations of space might make it necessary on certain cars to apply the brakeshoes to the treads of the wheels as at present. If there is sufficient advantage in taking the brakeshoes off the wheel treads to justify it, the possibilities of specially designed wheel hubs to take the shoes have by no means been exhausted.

There are many more reasons for considering this subject of brake improvement than can be given in a brief discussion. Reduction in noise and rattle, better equalization of pressure, elimination of weight and expensive maintenance of levers and pins are only a few of the advantages to be derived. The advantages of low car floors from a merchandising and safety standpoint have been generally accepted. The problem of getting sufficient clearance for the present type of brake pull rod presents a serious limitation in reducing these floor heights. On some center-door cars it has been necessary to use two brake cylinders to get clearance for pull rods. This difficulty would be all eliminated by piping the air directly to brake cylinders or diaphragms mounted at the point of application of the shoes.

Undoubtedly the advantages to be derived from elimination of the foundation rigging more than justify careful study and experiment. This will require co-operation between the manufacturers and some of the larger operating companies.

Why Not Give Private Companies the Same Advantages?

WHEN explaining how the city of New York could operate rapid transit lines at a profit on a 5-cent fare, provided it had some of its own to operate, Commissioner Delaney, head of the City Transportation Bureau created as a part of the home rule law passed at the last session of the State Legislature, is reported to have said that the city would have a decided advantage because no income nor franchise taxes would have to be paid, and money could be borrowed at 4½ per cent instead of 6 per cent. Is this admission a sign that the municipal authorities have seen a great light? One would have supposed from the past remarks of Mayor Hylan and his supporters on the subject of transit that inefficient management and the desire for exorbitant profits were the only reasons that the private companies could not operate satisfactorily on a 5-cent fare. Now it appears that the city authorities realize how heavy the tax burden of the railways really is.

If the Mayor of New York is genuinely anxious to give the people good transportation for a nickel fare, he might begin by advocating the abolition of the franchise and other taxes now collected from the private companies. They would then share with the proposed municipal system the advantages of which Mr. Delaney speaks. Of course, there would not be any true economy in such a scheme. Still more of the present cost of operation would be shifted from the car rider to the taxpayer, for it is a well-known fact that the interest on the city's subway investment is not being earned in full by the operating companies, but the deficit is being made up by general taxation. But Mr. Delaney admits that that is what the city would do if it had its own lines. Why not do it now without waiting for the completion of proposed routes whose construction has not yet been begun?

Boston Wage Award Forces Fare Increase

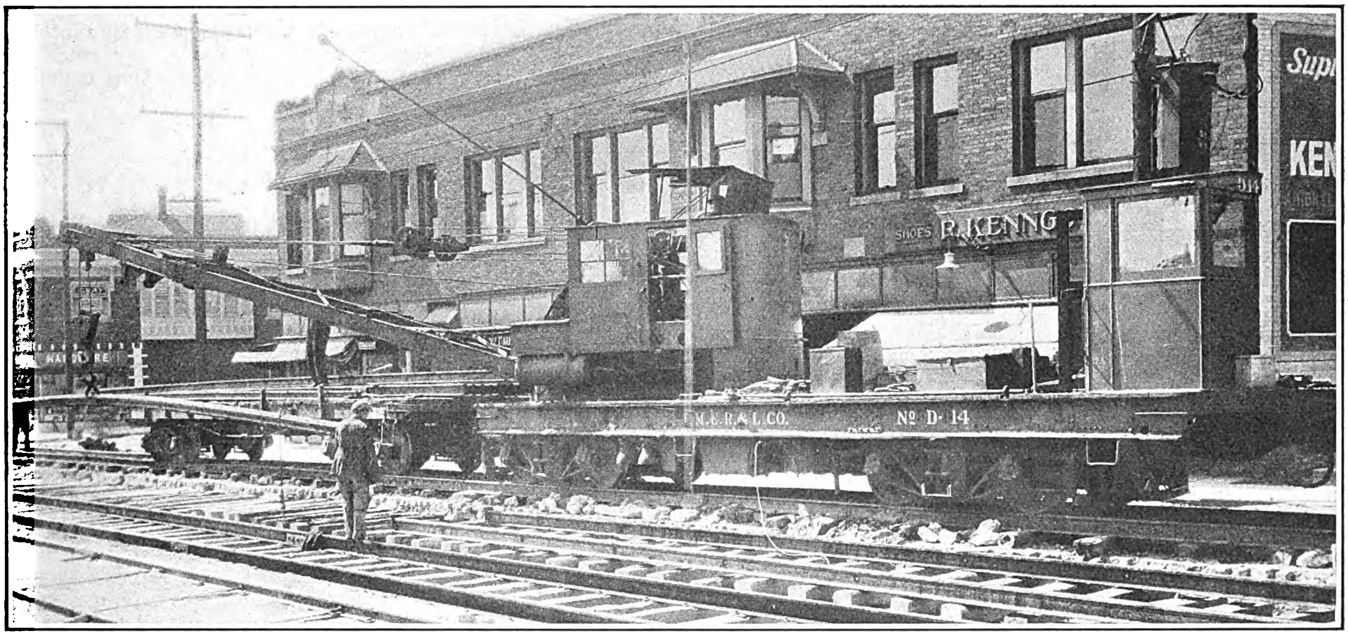
FARES on the so-called community lines of the Boston Elevated Railway, patronized by a million people last year, will go to from 5 cents to 6 cents on Nov. 1. This is the first and immediate effect of the arbitration award under which the men have just been granted an increase in wages of 2½ cents an hour at a cost to the company estimated at $500,000 for this year. Moreover, there may be a curtailment in the number of 6-cent routes. There most certainly will be more one-man cars.

In the face of the facts it is impossible to agree with the finding of the majority of the board. Again the plea is advanced that the wages to be paid to the employees in Boston should be entirely independent of the prosperity of the enterprise. In discussing the influence of public control on the rate of wages, Mr. Mulcahy, arbitrator for the company, has aptly said that the public should not be permitted to assert its interest against a particular group to deprive that group of a minimum fair living wage, but that after this minimum had been exceeded it was in the interest of every one concerned, not the least of all the employees themselves, that the wage award might not cripple the industry or unduly restrict it in the performance of its service.

As the Boston *Post* sees it, "there can be no serious complaint on the part of the public to the increase," but this expression of opinion was rendered before it had been established as a fact that fares would have to be raised. It would seem that the car riders, many of whom are not nearly so well paid as the trainmen, would be much more likely to agree with the opinion expressed by the Boston *Transcript* and sympathize with the argument of the minority report rather than that of the majority, particularly as the men were granted a 15 per cent increase only last year. In this particular case both the user and the non-user of the system pay, because under the public control act the deficits are made up by proportional assessments against the local communities and these advances are returned only if the earnings of the company permit. Fear was expressed in an editorial in the ELECTRIC RAILWAY JOURNAL for Sept. 13 that this fact might again be used to increase the wages of a favored group of employees. In the present instance this is just what has been done.

Work Train Employees Share in Profits

Utility Division of Way and Structures Department of the Milwaukee Electric Railway & Light Company Provides a Bonus Each Month for Workmen's Efficiency—Work Done for All Departments Is Credited at Predetermined Rates, and Cost of Operation Is Then Deducted to Determine Net Return



Service Trains of the Milwaukee Electric Railway & Light Company Do Work for the Way and Structures Department at Predetermined Rates

AS AN incentive to increase the number of ton-miles of materials hauled per hour of active duty for each piece of equipment and to improve the efficiency of the workmen the utility division of the way and structures department of the Milwaukee Electric Railway & Light Company has inaugurated a profit-sharing plan whereby all employees of this division receive a bonus each month that the division shows a "profit" on its operation. The bonus to employees represents 40 per cent of the net return after deducting the total expenses of the division from the total output credited at predetermined rates for utility service rendered to all departments of the railway.

Before a fair bonus plan could be put in operation it was necessary to place the work of the utility division upon a business basis. The first step in this direction was the classification of work. Utility service is the transportation of material for the construction, operation and maintenance work of the entire company. The operation of sand, salt, sprinkler and money cars, locomotives and snow-fighting equipment, line cars, etc., which is controlled by other departments than the way and structures, does not enter into the bonus plan. Work train equipment operated by the way and structures department under the "Utility Special Account" consists of motor and derrick cars, Differential side dump motor cars, Koppel center dump trailers, Differential side dump trailers, double-truck flat cars and single-truck flat cars.

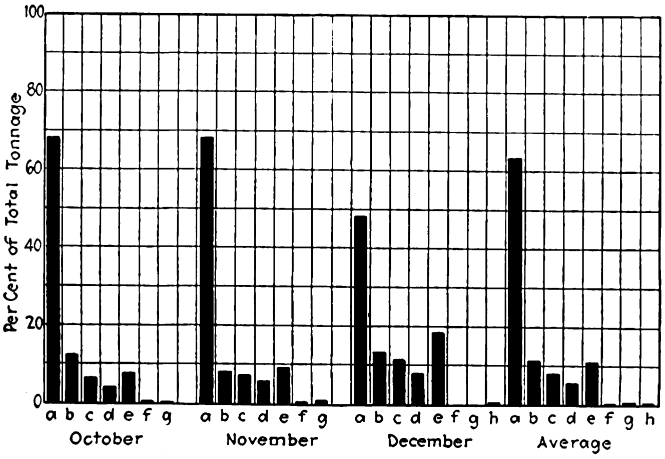
This utility service is available to all the departments of the railway, but as it was found that the way and structures department made more use of the service than did any other department it was deemed advisable to make the utility division a part of it. Chart 1 shows the distribution of work performed by the utility division for the various departments.

HOW THE PLAN WORKS

Orders for the transportation of material are received at the office of the utility division located in the way and structures department material yard. They are then classified and the trains dispatched. Ordinary shipments require one day's notice, but in special cases arrangements can be made on shorter notice. After a motorman receives his orders and leaves for his trip, he keeps in touch with the utility office, calling in for orders over the company's telephone system. A utility service delivery order and freight bill is filled out in quadruplicate by the motorman operating each train assigned to this work. It contains spaces for all necessary information relative to the shipment. The motorman fills out only the names of the sending and receiving points, date, weight, description of material and department for which the work was done. One copy goes to the foreman on the job and two copies—the original and a carbon—to the way and structures department office. The remaining copy is retained in the motorman's order book.

The two copies sent to the way and structures department are forwarded to the accounting department, where the remaining blank spaces are filled in with the rates and price of the job. The job order or work order to which the job is to be charged are also noted on this form.

In addition to routing the utility trains, the office of the division also keeps a daily record of the hours



Way and Structures Department Makes Greatest Use of the Utility Service

a. Way and structures.	*e.* Power plant.
b. Transportation.	*f.* Purchasing.
c. Rolling stock.	*g.* Lakeside.
d. Electric distribution.	*h.* Miscellaneous

each piece of utility equipment is in use. The information is obtained from the motormen's order books, in which are the copies of all delivery orders filled by them each day. This sheet is arranged so that every detail on the order sheets may be tabulated. As will be seen in the accompanying illustration the headings across the top of the sheet are such as to facilitate the work of the clerk as much as possible. The motor car numbers are listed vertically and the information filled in opposite the number of the car which was used for the particular job. A monthly summary of the daily reports is compiled by the utility division, showing the complete figures on the motor and trailer equipment.

For the purpose of simplifying the accounting work and to determine the rates, materials which are handled have been divided into three general classes:

Class "A" Materials.

All materials (except Class "C" materials) which can be handled in bulk in dump cars, such as:

Cinders (power plant)	Rejection gravel
Coal	Sand (in bulk)
Gravel	Asphalt
Crushed stone	Paving blocks
Screenings	Etc.

Class "B" Materials.

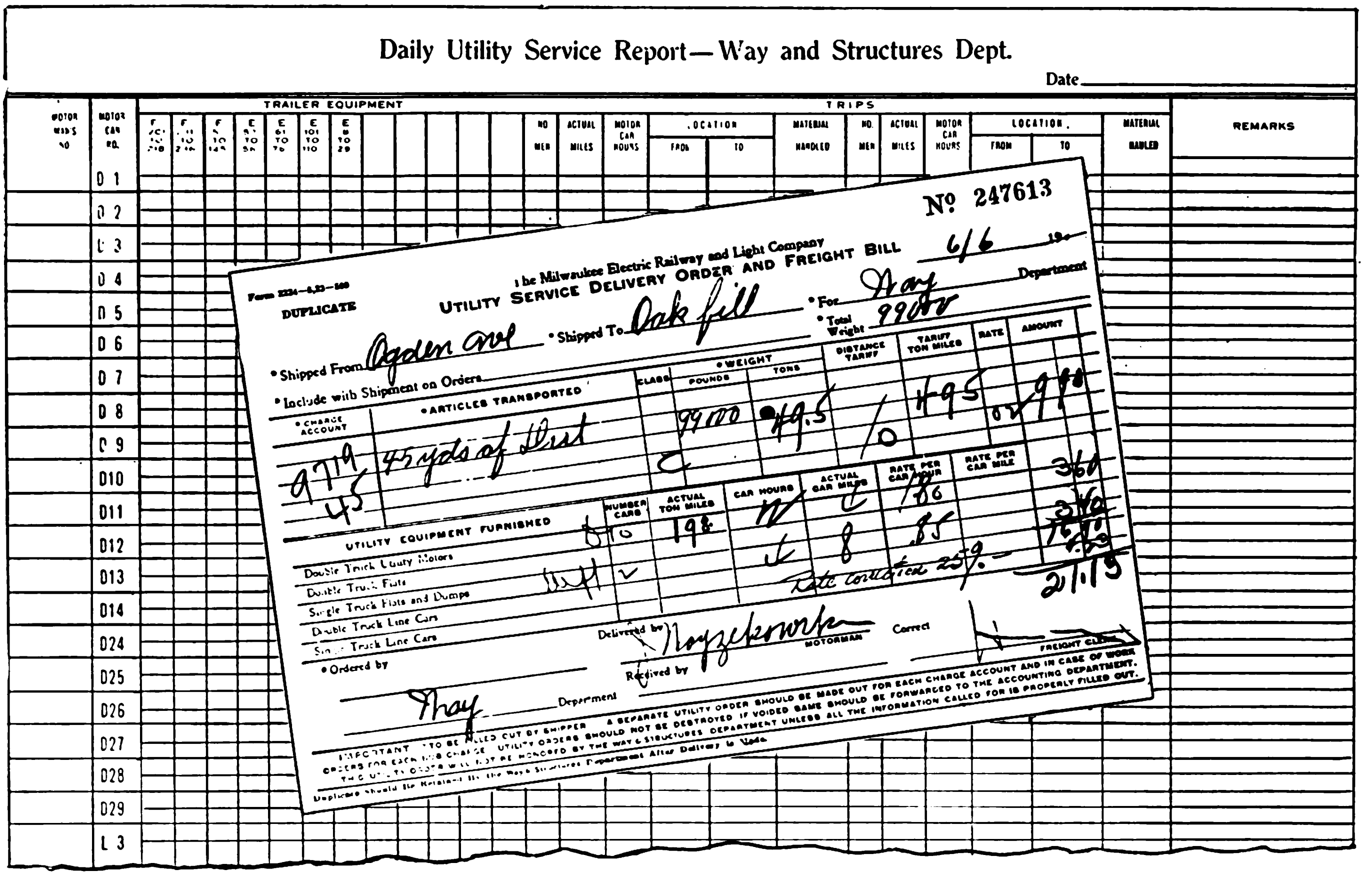
All materials and shipments not specifically included in Class "A" or Class "C" materials. Including ties, tie plates, sewer pipe, cement, poles, track tools, cable, car wheels, axles, conduit, stone dust and package freight that cannot be dumped.

Class "C" Materials (Special).

Coke.
Ashes from car stations.
Dirt from construction work.

After classifying the material hauled, it was necessary to determine the proper rates for each classification. This was first accomplished by determining the number of hours the equipment is used per year and the number of ton-miles hauled and dividing the special accounts covering the expenses of the utility service by these figures.

In this manner two sets of rates were established, one based on a ton-mile haul and the other on an hourly basis for equipment with or without crew. The ton-mile rates for the above classification of material hauled vary from 2½ cents to 31¼ cents, depending upon the character and volume of the material. In the case of ashes hauled from car stations and dirt from construction work, which are carried at a rate of 2½ cents per ton-mile, an allowance of only 1½ hours per round trip is included in this rate for loading and unloading. Any additional time required per trip is charged for at the regular car-hour rate.



Daily Utility Service Report—Way and Structures Dept.

Date

MOTOR CAR NO.
TRAILER EQUIPMENT
TRIPS
NO. MEN
ACTUAL MILES
MOTOR CAR HOURS
LOCATION FROM TO
MATERIAL HANDLED
REMARKS

D 1
D 2
D 3
D 4
D 5
D 6
D 7
D 8
D 9
D10
D11
D12
D13
D14
D24
D25
D26
D27
D28
D29
L 3

Nº 247613

The Milwaukee Electric Railway and Light Company
UTILITY SERVICE DELIVERY ORDER AND FREIGHT BILL 6/6 19

DUPLICATE

Form 2224—5,23—500

*For Way Department

*Shipped From Ogden ave *Shipped To Oak fill *Total Weight 99000

*Include with Shipment on Orders

*CHARGE ACCOUNT	*ARTICLES TRANSPORTED	CLASS	*WEIGHT POUNDS	TONS	DISTANCE TARIFF	TARIFF TON MILES	RATE	AMOUNT
979 45	45 yds of Dirt	C	99000	49.5	10	495	.02	9.90

UTILITY EQUIPMENT FURNISHED		NUMBER CARS	ACTUAL TON MILES	CAR HOURS	ACTUAL CAR MILES	RATE PER CAR HOUR	RATE PER CAR MILE	AMOUNT
Double Truck Utility Motors			198			1.86		3.60
Double Truck Flats		✓			8	.85		3.40 16.20
Single Truck Flats and Dumps								
Double Truck Line Cars								
Single Truck Line Cars								

Rate corrected 25%— 21.15

Delivered by Noyzekowski MOTORMAN Correct FREIGHT CLERK

*Ordered by Way Department

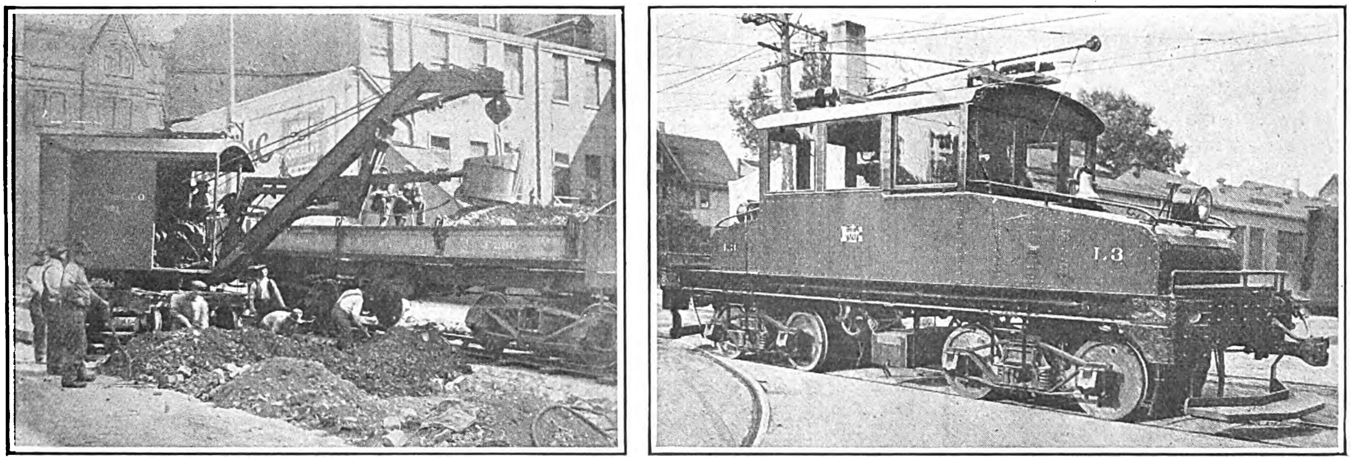
Received by

IMPORTANT *TO BE FILLED OUT BY SHIPPER A SEPARATE UTILITY ORDER SHOULD BE MADE OUT FOR EACH CHARGE ACCOUNT AND IN CASE OF WORK ORDERS FOR EACH [illegible] CHARGE UTILITY ORDERS SHOULD NOT BE DESTROYED IF VOIDED SAME SHOULD BE FORWARDED TO THE ACCOUNTING DEPARTMENT. THE UTILITY ORDER WILL NOT BE HONORED BY THE WAY & STRUCTURES DEPARTMENT UNLESS ALL THE INFORMATION CALLED FOR IS PROPERLY FILLED OUT.

Duplicate Should Be Retained By the Way & Structures Department After Delivery Is Made.

Forms Used by the Utility Division Show Details of Work Done by Each Piece of Equipment

These car-hour rates have been computed from the various expenses itemized in the special accounts with the exception of labor. The latter item has been computed separately so that it is possible to establish rates for the use of equipment with or without crews. Having the total of all charges on a piece of equipment, a "use factor" is introduced by which it is possible to figure the hourly rate. This factor represents the percentage of use per day, for the previous year, using 24 hours as the length of a day. Utility equipment is charged for on an hourly basis only under the following conditions: (1) When it is necessary to make emergency partial trainload shipments; (2) when equipment is required for diversified use, such as moving work gangs, moving tools and cleaning up débris; (3) when equipment is used for special purposes such as switching freight, etc.


Left—A Single-Truck Electric Shovel Is Part of the Utility Division Equipment.
Right—Freight Switching Is Done by Electric Locomotives of This Type

The expenses for utility service are divided into two classes—operating expenses and fixed charges. Under the first are included superintendence, operating labor, miscellaneous supplies and expenses, power, light and heat, maintenance of equipment, maintenance of buildings, fixtures and grounds. The second classification represents the fixed charges, which are divided as follows: Injuries and damage, insurance, depreciation and taxes.

The rates have been fixed on such a basis that ample return may be obtained from the present operation of the equipment, and with the existing possibilities of reducing the expenses an opportunity is presented to increase the bonus. Certain expenses exist over which the operating employees of the utility division have no direct control, such as the unit maintenance cost. These are corrected periodically to allow for changing costs. The bonus paid to employees amounts to 40 per cent of the gross profits earned by the operation of the utility division. This sum is distributed according to the participating wages of the various employees. In this plan, as in other bonus plans of this company, participating wages are limited to $200 per month. This limitation, however, applies only to supervisory employees. The bonus is paid for each month that the division shows a profit. On the other hand, the employees' wages are not reduced if there is a loss resulting from the operation, but they receive no bonus.

Fixed charges are included in the bonus computations because they are necessary to arrive at the true profit. These charges are taken as 6.5 per cent of the valuation and consist of 3.5 per cent for depreciation, 2 per cent for taxes and 1 per cent for insurance. Inclusion of these items discourages securing unnecessary equipment, because such equipment increases the valuation without producing a corresponding increase in the revenues. The actual valuation of the utility equipment is $390,854. The percentage for depreciation has been made so as to correspond closely to the actual life of the equipment. Figures approved by the Wisconsin Railroad Commission gave the life of the car bodies and trucks as 25 years and that of motors from 15 to 20 years. Based on these figures the rate of 3.5 per cent has been adopted.

In ordinary calculations of this nature the fixed charges do not vary from month to month, except as the value of the equipment changes. If a flat monthly rate were followed in this plan it would create a heavy expense in the winter, in proportion to the amount of work done, and would almost prohibit the earning of a bonus during this season. For this reason, the annual fixed charges have been so distributed that they follow the trend of the revenue. Thus they are higher in the summer than during the winter because a greater amount of work is done by the division during the summer. This varying fixed charge aids the employees in earning a profit in slack seasons. The variable percentages which are applied to the fixed charges in order to determine the charge for each month of the year are calculated in Table I. They are arranged so as to vary in the same ratio as the revenues.

An example showing the operation of the bonus system for a six months period is given in Table II. From the table it will be seen that during the six months period the revenues exceeded the expenses for each month. Therefore each month the employees received a bonus amounting to 40 per cent of the profit made the preceding month. In computing the profits for a month, the bonus which is paid during that month for the efficient operation in the previous month is included in the expenses. Every month an analysis is made of the special accounts showing the amount of expense chargeable to each item and the amount of output or credit received. As a part of this report a comparison is made between the figures for the current month and those for the same month a year ago. Another interesting feature of this report is the statement of profit or loss for the month and also a year ago and in addition the cumulated profit or loss for the present year to date compared with a similar period a year ago. This analysis for June, 1924, is shown in Table III.

TABLE I—DETERMINATION OF VARIOUS PER CENTS FOR THE FIXED CHARGES FOR MILWAUKEE UTILITY SERVICE

Month	1918	1919	1920	1921	1922	Total	Per Cent of Total	Apportionment of Fixed Charges, per Cent Actual	Apportionment of Fixed Charges, per Cent Adjusted to Smooth Curve
January	$5,214	$4,698	$7,154	$5,226	$4,655	$26,947	3.82	0.25	0.33
February	17,912	3,566	4,790	8,048	5,848	40,164	5.69	0.37	0.29
March	4,850	4,484	8,115	7,595	5,581	30,625	4.34	0.28	0.29
April	5,390	6,993	10,561	8,429	6,238	37,611	5.33	0.34	0.37
May	6,129	13,044	11,000	16,226	14,882	61,281	8.69	0.56	0.52
June	7,112	15,455	9,478	18,236	13,825	64,106	9.09	0.59	0.61
July	7,260	11,991	19,284	21,511	16,691	76,737	10.88	0.71	0.67
August	12,197	13,261	15,835	13,464	22,089	76,846	10.90	0.71	0.72
September	5,972	15,761	15,092	15,081	24,143	76,049	10.78	0.70	0.74
October	12,570	15,481	19,057	14,863	20,102	82,073	11.64	0.76	0.74
November	6,350	24,327	15,848	12,221	18,038	76,784	10.89	0.71	0.69
December	5,207	19,457	12,783	6,301	12,335	56,083	7.95	0.52	0.53
Total	$96,163	$148,518	$148,997	$147,201	$164,427	$705,306	100.00	6.50	6.50

NOTE.—All output figures used above have been computed to the same basis of rates.

Possibilities of effecting savings in the total wages in the miscellaneous supplies and expenses and in the maintenance expenses are obvious. Means of reducing the power costs and the fixed charges are as follows: The power costs, while now obtained through the use of meters on the motor cars, were formerly determined from the car mileage. Separate standards of power consumption per motor car-mile, per double-truck trailer car-mile and per single-truck trailer car-mile were established. These were used in determining the power consumption. The employees may reduce this consumption per day by increasing loads and eliminating empty operation. With the installation of meters on motor cars, further savings can also be made by the economical use of power.

One item of the fixed charges which offers a chance for savings is that of injuries and damages. These include accidents and damages to persons or property. For the year 1923 these have been taken as 10 per cent of the revenue in place of the actual expenditures. This is done in order to avoid excessive fluctuations in the profits whenever large settlements are made. The ratio of 10 per cent represents approximately the amount of these expenses during 1922 and is revised at the close of each year to represent the amount actually expended during the year. For the year 1924 the figure is 8.62 per cent, this being lower than that used during 1923, mainly because of the greater output of the division during the past year. It is the object of every employee to reduce accidents in order to secure a low rate for each ensuing year.

Because of the utilization of the utility rates for bonus purposes, careful correction is made for changes in the actual costs due to conditions not under the control of the employees. The most important of these are changes in the wage rates of the direct labor and in the unit maintenance costs. The percentage increase in utility rates is computed by multiplying the increase in the wage rate by the percentage the total wages, exclusive of the bonus, is of the total expenses. The unit maintenance costs depend largely upon the wage rates in effect in the rolling stock department and upon the material costs. As the entire cost of the maintenance of equipment is but 13.33 per cent of the total expenses, it is not advisable to construct a complicated index for correcting material costs. It is sufficiently accurate to assume that the material costs vary in the same ratio as wage rates of that department. The utility rate correction for changes in the unit maintenance costs is computed in the same manner as is the correction for changes in direct labor wages.

This plan to decrease unit costs, besides exerting a very strong influence to curb the expenditures, aids the employee to see operating conditions from the standpoint of his employer and enables him to grasp the fundamental law of profit sharing, namely, that profits can be shared only after they have been earned.

Even with correction of rates and adjustment of costs the bonus earnings under this plan have continued to rise. One reason for this is that in the past no urgent incentive has been offered to increase the output per hour of active duty for each piece of equipment or to decrease the time of empty travel. Employees as a rule are not interested in the number of pieces of equipment owned or in how many of them stand idle on the storage tracks. They do not realize that every hour of labor which does not produce causes the expenses to rise without a corresponding return.

TABLE III—ANALYSIS OF SPECIAL ACCOUNTS, JUNE, 1924, COMPARED WITH JUNE, 1923, MILWAUKEE UTILITY SERVICE, WAY AND STRUCTURES DEPARTMENT

Accounts	June, 1924 Amount	June, 1924 Per Cent of Cost	June, 1923 Amount	June, 1923 Per Cent of Cost
Superintendence	$431	3.19	$438	2.94
Operating labor	6,949	51.45	7,121	47.82
Miscellaneous supplies and expenses	16	0.12	115	.77
Power, light and heat	1,046	7.74	933	6.27
Maintenance of equipment	1,778	13.16	2,618	17.58
Maintenance of buildings, fixtures and grounds	....	....	....	....
Fixed charges*	3,287	24.34	3,667	24.62
	$13,507	100.00	$14,892	100.00
Profit for month of June	3,286	24.33	1,599	9.69
Profit for year to end of June	$16,793	4.87	$16,491	3.28
Credit for Work Performed:				
Charged to company	$16,774		$16,350	
Charged to outsiders	19		141	
	$16,793		$16,491	

* Injuries and damages, 10 per cent of output; insurance, 1 per cent; depreciation, 3.5 per cent; taxes, 2 per cent; total, 6.5 per cent on valuation.

TABLE II—OPERATION OF THE UTILITY DIVISION PROFIT-SHARING PLAN, YEAR 1923

	April	May	June	July	August	September	Total
Total wages, exclusive of bonus	$5,754	$6,988	$6,893	$6,132	$6,093	$6,154	$38,014
Bonus paid during month	......	816	666	412	587	635	3,115
Miscellaneous supplies and expenses	74	102	115	109	105	102	607
Power, light and heat	979	2,112	2,224	1,974	1,863	1,922	11,074
Maintenance of equipment	3,171	3,357	2,618	2,389	1,749	1,408	14,692
Maintenance of buildings, fixtures and grounds	......	......	......	......	......	......	......
Injuries and damages (10 per cent of output)	1,674	1,912	1,457	1,999	1,653	1,235	9,931
Fixed charges (6.5 per cent of valuation per year)	1,436	2,018	2,368	2,601	2,795	2,872	14,090
Total expenses	$13,088	$17,305	$16,341	$15,616	$14,845	$14,328	$91,523
Utility output	15,231	19,120	17,452	17,113	16,532	15,019	100,467
Profit	2,143	1,815	1,111	1,497	1,687	691	8,944
Bonus (40 per cent of profit)	857	726	444	599	675	276	3,577
Bonus in per cent of wages	14.90	10.39	6.44	9.76	11.07	4.49	9.41

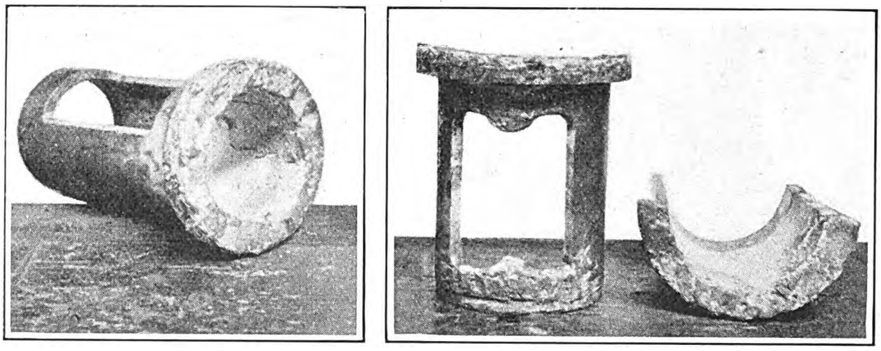
Survey of Armature, Axle and Journal Bearing Practice

Second Article

Machining, Cutting Oil Grooves and Finishing Railway Car and Motor Bearings —Clearances and Methods of Fitting Discussed—Building Up Worn Housings and Bearing Flanges — Proper Thickness of Babbitt in Finished Bearings — Recommended Allowances for Pressing and Precautions to Insure Tight Fits

THIS article, the second on the subject of bearing maintenance, deals with methods employed for machining the bearings, cutting oil grooves, and other work necessary to produce a finished bearing, together with the precautions which are used by electric railways when reinstalling the bearings in cars to insure that proper fits are obtained so that adequate service will result. Information for this analysis was obtained from a survey of the armature axle and journal bearing practice, as found by personal visits by the editors to 20 electric railways.

The first article on this subject, published in the Aug. 16, 1924, issue of ELECTRIC RAILWAY JOURNAL, contained an analysis of practices used by the same 20 railways. Information was given as to the types of bearings favored, the methods used to determine wear, practice in taking the bearings from the cars, the removal of old babbitt metal from the bearings, equipment and methods used in cleaning and tinning the shells and otherwise preparing them for rebabbitting, the compositions of babbitt metal used, and the precautions that are necessary while pouring the babbitt and preparing the mandrels for use.


Left—Armature Bearing Flange Built Up by Means of Oxyacetylene Welding Adds Approximately 50 per Cent to Its Life. Right—Axle Bearing Built Up by Means of Acetylene Welding on the Thrust Flanges and Other Parts Badly Worn

The bearing most commonly used on electric railway rolling stock consists of a shell of bronze or malleable iron lined with babbitt. There is, however, a decided tendency away from the babbitt lining for armature bearings. Motor manufacturers are now furnishing a bronze type of bearing with thin tin lining almost entirely with their new motors.

In the fitting of new bearings, it is necessary to machine both the outside and the inside, since the bearing itself must fit into a motor shell or housing, as well as provide an accurate inside fit with the shaft or journal. The ideal with regard to the inside fit is to provide enough clearance to allow a thin film of oil to form between the stationary and rotating parts so that the supported part actually will float on it. Running friction will then be reduced to a minimum, and while the film exists no wear of the metal surfaces can take place. In addition to giving the correct clearance it is necessary to provide oil grooves in order to keep the film of oil constantly in the bearings during rotation. Dirt and water must also be kept out or excessive wear will result.

The average finished thicknesses of babbitt required in babbitted bearings was found to vary from 1/16 in. up to ½ in. on 18 of the roads from which information was obtained. The thicknesses most frequently used are given in Table I.

FITTING BEARINGS TO WORN SHAFTS

Axles and armature shafts wear with use, normal factors of safety permitting a variation in diameter of perhaps ¼ in. between the size new and the size where the part must be scrapped, built up or re-turned to smaller size. Hence bearings must be provided with a variety of bores in order to give proper clearance for correct lubrication. In some cases this variation is taken care of with different thicknesses of the babbitt lining, and in others shells of different inside diameters are used with the babbitt of approximately uniform thickness. The practice on several roads is given in the following paragraphs:

At the Decatur shops of the Illinois Traction System, shafts scored or worn tapered are turned to true them up. Standard practice is to provide a layer of babbitt approximately 1/16 in. thick in bronze shells. Where measurements show that the bearing previously used will require a greater thickness of babbitt another bronze shell is used. This may be either a second-hand shell of proper size or a new bronze shell bored out, so as to allow 1/16 in. of babbitt in the finished bearing. Every time a bearing is installed on an armature shaft a number is stenciled on the flange. When it is used a second time, the old armature number is removed and the new one replaces it.

In the design of bearings used by the Milwaukee Electric Railway & Light Company, the amount of babbitt to be left in a finished bearing is determined by the air gaps in the various motors, so that if all the babbitt were burned out, it would not allow the arma-

TABLE I—AVERAGE THICKNESS OF BABBITT, RUNNING CLEARANCE AND END PLAY IN INCHES ALLOWED WITH BEARINGS

Railway	Average Finished Thickness of Babbitt	Running Clearance in Bearings Armature	Axle	End Play
Brooklyn-Manhattan Transit Corporation	1/8	0.012	0.012	1/16
Chicago Surface Lines	1/16	0.015	0.031	1/32
Denver Tramway	3/32 to 1/4	0.010	.....	1/16
Eighth Avenue Railway, New York	1/4 to 3/8	0.005	.....	1/4
Georgia Railway & Power Company	1/16 to 5/16	0.015	0.031	1/16
Illinois Traction, Inc.	1/16	0.004	.....	1/4 Max.
Long Island Railroad	1/8 to 1/2	0.006 to 0.012	0.012	1/32
Memphis Street Railway	1/8 to 5/16	0.015	.....	1/32
Milwaukee Electric Railway & Light Company	1/16 to 3/32	0.020	.....	..
New York Central Railroad	3/8 to 1/2	.....	.....	..
New York & Harlem Railroad	1/8 to 1/4	0.020	0.018	1/32
New York & Queens County Railroad	1/4 to 1/2	0.015 to 0.018	0.018	3/16
New York, Westchester & Boston Railroad	1/4	0.010	.....	1/16
Niagara, St. Catharines & Toronto Railway	5/16	0.007	0.015	1/64
Omaha & Council Bluffs Street Railway	3/16 to 1/4	0.001 per in. of Dia.	.....	1/16
Third Avenue Railway, New York	1/4 to 3/8	0.008 to 0.012	0.015	1/32
Toronto Transportation Commission	1/4	0.005	.....	1/16
Youngstown Municipal Railway	1/8 to 1/2	0.006 to 0.008	.....	1/32

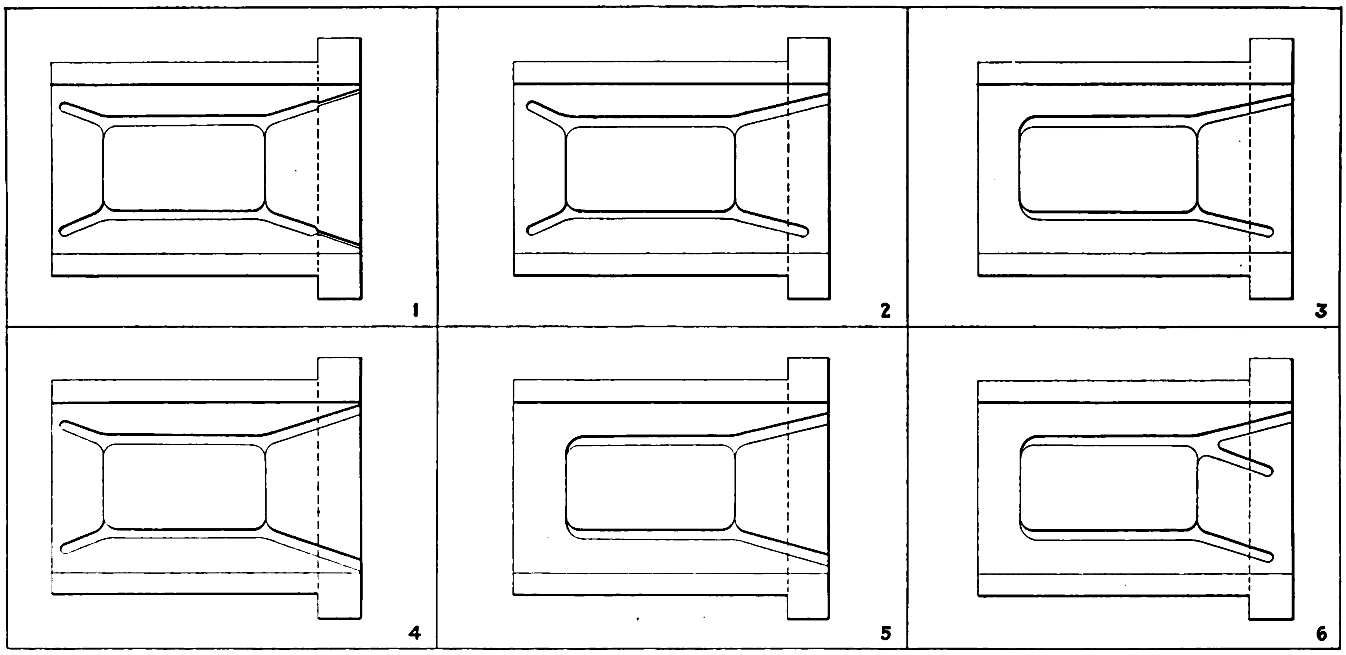
ture to drop upon the pole faces. For a GE-216 motor, 3/32 in. thickness is left; for a GE-80 motor 1/16 in., and for a Westinghouse 508 motor 1/16 in. It is seldom found necessary to turn down an armature shaft. Axle bearings are finish turned and are then kept in the storeroom until issued. One of the interesting features of the machining process is the method used to finish the joining surfaces of split bearings. This work is done on a Gardner power-driven horizontal abrasive grinding stone. Formerly this work was done on a milling machine or shaper, which took approximately five times as long as the present process. The grinding is done after the castings have been cleaned, but before they are turned in a lathe.

For its axle bearings the Omaha & Council Bluffs Street Railway uses cast-steel shells lined with babbitt almost entirely, except where the diameter of the axle is so close to that of the bearing housing that there is not room for a babbitt-lined shell. The minimum difference in diameter between the axle and the bore of the housing considered sufficient for the babbitt lining is 1 in., or a thickness on each side of the axle of ½ in. The practice is to use 3/16 in. to ¼ in. of babbitt. Thus the minimum amount of babbitt allows 5/16 in. thickness for the cast-steel shell. If the clearance between the axle diameter and the bearing housing bore is less than this the solid bronze bearing is used, as on some types of motors where it has been necessary to increase the diameter of the axles. Axle bearings are babbitted to predetermined standard sizes, and are not bored when put on the axle. To provide for axle wear it is necessary to mold bearings to several sizes, which vary in steps of about 1/16 in. When an axle wears so as to give excessive clearance it is turned down to the next size, and the nearest standard oversize bearing is used thereafter until it is again necessary to repeat the performance.

Armature bearings in Omaha are bored to individual fit for each particular armature shaft at the time that they are installed. The practice after babbitting these bearings is to broach them to certain standard sizes, in which they are carried in stock. When a call comes from the armature room for a set of bearings, the babbitt is then bored out to fit the individual armature shaft.

Steel shells are favored for armature bearings as well as for axle bearings. Although no cost figures were available it is considered that the cast-steel shells and babbitt lining produce a saving in cost over bronze shells.

The practice of the Third Avenue Railway, New York, is to provide an average thickness of babbitt of from ¼ in. to ⅜ in., and in fitting bearings three sizes are used. For example, for a 4½-in. shaft new bearings are bored out to 4½ in. plus clearance. When the bearings are romoved at an overhauling the shaft is gaged. If the shaft allows a snap gage of 4.44 in. to pass over it, it is turned down to 4.4 in. diameter, and a bearing of 4.4 in. plus clearance is used. The next time the shaft comes in, if a gage of 4.34 in. passes over it, it is turned down to 4.3 in. diameter, and a bearing of 4.3 in. plus clearance is used. Whenever a



Arrangement of Oil Grooves as Used by Various Railways

1. Used in Brooklyn. 2. Used in Youngstown. 3. Used by Third Avenue Railways, New York City. 4. Used by Georgia Railway & Power Company, Memphis Street Railway, New York, Westchester & Boston Railroad and Niagara, St. Catharines & Toronto Railway. 5. Used by Chicago Surface Lines, Denver Tramway and New York & Queens County Railroad. 6. Used in Toronto.

shaft comes in which allows a gage of 4.24 in. to pass over it the shaft is scrapped. Standard bearings are thus 4½ in., 4.4 in., and 4.3 in. plus clearance.

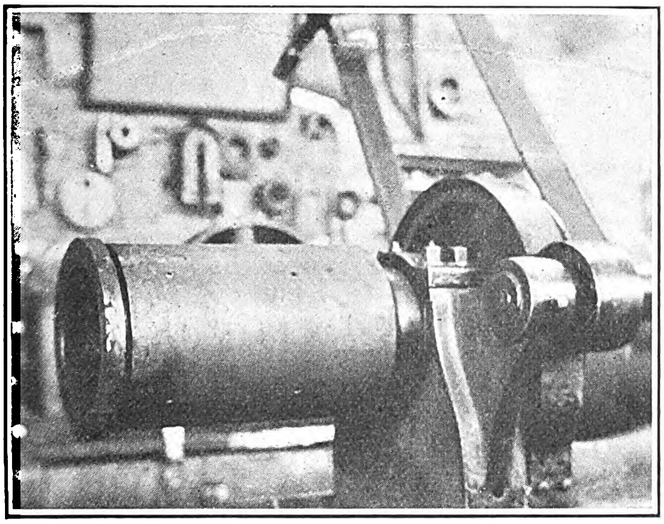
RUNNING CLEARANCES ALLOWED

The running clearances allowed for both armature and axle bearings was found to vary considerably on different properties. These are shown in Table I. As a guide to what is considered good practice by motor manufacturers the following is given:

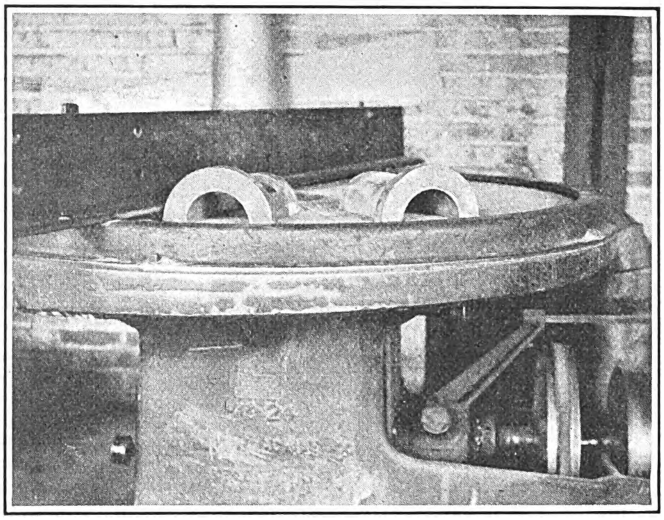
RECOMMENDED CLEARANCES FOR ARMATURE BEARINGS USING OIL AND WASTE LUBRICATION

Sizes	Clearance
2 in. up to 3 in.	0.006 in. to 0.008 in.
3 in. up to 4 in.	0.008 in. to 0.010 in.
4 in. up to 5 in.	0.010 in. to 0.014 in.
5 in. up to 6 in.	0.014 in. to 0.016 in.
6 in. up to 7 in.	0.016 in. to 0.018 in.

On the Illinois Traction System babbitted bearings are bored out 0.004 in. larger than the armature shaft fitted. Bronze shells are turned approximately 0.002 in. larger than the bore of the motor housing. When the bearings are pressed in, the interior bore is reduced in size to approximately 0.0025 in. larger than the shaft diameter.



Cylindrical Chuck for Holding Split-Axle Bearings While Being Bored and Machined in the Wheaton Shop of the Chicago, Aurora & Elgin Railroad



The Connecting Surfaces of Axle Bearings Are Finished on a Horizontal Grinder in the Shops of the Milwaukee Electric Railway & Light Company

The Youngstown Municipal Railway is now using a special form of nickel-bronze bearing. This was described in the Aug. 16 issue referred to at the beginning of this article, and clearances used were given.

Each of the two methods of fitting described above has its advantages and disadvantages. Where armature bearings are fitted directly to the shaft on which they are to be installed, the work must be done where the cars are inspected, except where a railway shop has only one operating carhouse, and this method requires the fitting of bearings by carhouse men who are usually not skilled machinists. This method also necessitates proper equipment at each carhouse to do this class of work. Longer service will be obtained if the bearings are fitted exactly to the shaft, but this work ordinarily can be done properly only in a machine shop with the correct tools and expert machinists.

The method of turning armature shafts to standard sizes and carrying the corresponding bearings in the storeroom to accommodate these diameters has the advantage that the machine work can be done efficiently, so as to obtain an accurate fit. Its disadvantage is that where the correct size of bearing is short or missing there is a tendency on the part of the carhouse men to use the next larger size, rather than to withhold the motor from service. One point brought out in this survey is that the man in the pit at the inspection shop is the one responsible person for the character of work done. Master mechanics and foremen issue instructions as to the methods to be followed, but pressure of work and the insistence that cars be returned to service promptly often lead the workmen to use their own judgment.

FITTING BEARINGS TO HOUSINGS

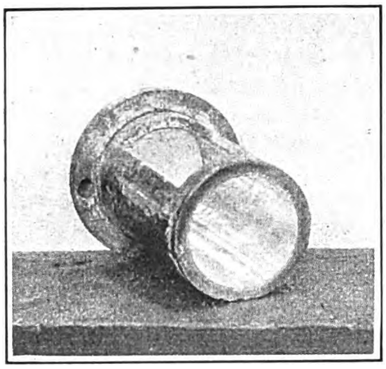
The finishing of the outside of armature and axle bearings is just as important as boring them out. Wear is sure to occur on the outside of the bearings and also in the housing fits or motor frames in case there is any looseness in the bolts which hold the bearings in place. Such looseness causes pounding, which not only shortens the life obtained from the bearing but allows the outer surface to rub against the housing and causes excessive wear between dowel pins and dowel holes or keys and keyways.

On most railways, while particular care is taken in the installation of armature bearings, axle bearings do not receive equally close attention. There is no air gap of which to take measurements, and there is no danger of excessive damage such as would result should an armature rub the pole faces. The wear on axle bearings, however, is really greater and the service is harder than on armature bearings. The hammer blows to the bearings are more severe since there are no springs between the axle and the track. These bearings are allowed to remain in service much longer than the motor designer would recommend, as information obtained clearly indicates. Just as much damage is done from excessive wear on axle bearings as on armature bearings when the lives of gears, pinions and armature windings are taken into consideration. Excessive clearance or loose fit in bearings causes the distance between centers to change so that the gear and pinion do not mesh properly and excessive tooth pressures result.

A number of different methods are used by various companies for machining the outsides of bearings. The precautions taken to insure tightness also vary. Some practices are given in the following paragraphs:

At the Wheaton shop of the Chicago, Aurora & Elgin Railroad the thrust flanges of both axle and armature bearings are built up by means of acetylene welding, ofttimes as much as ½ in. being added, after which the bearings are machined to exact size. The company states that this practice has been found satisfactory.

For machining split axle bearings, a sleeve chuck is used in an 18-in. engine lathe, with an interior bore that will accommodate the axle bearing. The chuck is of sufficient length so that the thrust flange will fit against its end. The bearing is held in position with eight pointed setscrews. The inside bore is finished and the thrust flange machined to smooth off the welded surface at one setting.



At the Decatur Shops of the Illinois Traction System Bronze Armature Bearings Are Finished on the Outside 0.002 In. Larger Than the Hole in the Housing.

Approximately 1/16 in. of babbitt is used on the inside and this is finished 0.004 in. larger than the diameter of the armature shaft. The shrinking of the bearing into its housing contracts the bore to approximately 0.0025 in.

SHIMS ARE NOT FAVORED

Several methods are used for obtaining a tight fit of the bearing in its housing or in the motor frame. The majority of the railways included in the survey do not favor shims or liners, although others are using them. The materials used for shims include canvas, cardboard, fiber and tin. A practice considered better by several of the railways is welding and boring out the housing or bearing fit. Metal is also frequently welded to the outsides of the bearings themselves. Reasons given for unsatisfactory results where shims are used are that the wear on the shells and bearings is uneven, and it is virtually impossible to shim a bearing so that the pressure between the two motor shells will be evenly distributed. With uneven wear on the bearing or its housing, the shims are always tight or pinching at the high spots, with a loose fit at low spots. Many railways do not spin their armatures with power or rotate them by hand after the motor is assembled, so that a tight fit on the shaft is not detected and hot bearings result.

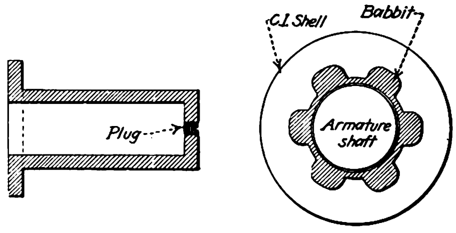
In Denver, shims are not used to hold bearings tight when the housing bores become worn. Due to a former practice of using unfinished bearing castings which were pressed into the housings, some of the housings have become excessively worn. These are now being welded and rebored. In the past, when metal shims were used to hold the armature bearings tight in the end housing, these would work loose and in some cases shift over the bearing windows and so restrict the flow of oil to the bearings. The present practice of welding and reboring has resulted in longer life of bearings.

In the shops of the Omaha & Council Bluffs Street Railway it is the practice to plane off the faces of the axle caps until the bearing is clamped tightly with the bolts drawn down. In order to determine the amount of metal which it is necessary to face off the practice is to drive a thin wedge under the bearing until it is tight in the housing and then to measure the thickness of wedge inserted. The amount of metal taken off the axle caps is 1/64 in. greater than this measurement, so that the bearing will be tight when the cap is drawn down.

When the armature bearing housings become worn, it is the practice to use over-sized castings for the bearing shells so that they will be tight. Under no circumstances are shims of any kind permitted.

Results obtained by railways which are welding and reboring their motor frames indicate that this practice merits careful consideration. The cost of welding and reboring runs from $18 to $25 per set of two armature and two axle bearing fits. Of course, the cost will vary, depending upon how well shops are equipped to handle this class of work. Several railways have motors which were originally designed for babbitt-lined cast-iron bearings, but in which bronze shells have been substituted. This requires an excessively thick bronze shell. With the practice of welding and reboring the diameter of the opening in the housing can be reduced so that a bronze bearing of standard thickness can be used. This reduces the cost for bearings considerably. In some cases the cost of welding and reboring is nearly compensated for by the decreased price of a set of bearings. On some railways the weight of the bearings has been reduced 50 to 60 per cent by the reduction of the fits in motor housings.

The practice of using heads to hold the bearings in the frame, as employed in the latest types of motors, overcomes part of the difficulty experienced with the split frame without heads. The same degree of care, however, should be exercised to keep these heads tight in the motor frames and also to keep the bearings tight in the heads, or else the same trouble in bearing fits will result as with the old type split-frame motors. In welding and boring a split-frame head, it is possible in many cases to use steel plates and weld these in place so that the amount of welding metal is reduced.



Two Types of Bearings Used in Denver

Armature bearing shells for GE-58 motors are cast solid at the end and finished with a screw plug to keep dirt and water from getting into the bearing. This is necessary because the narrow gage used subjects the motor to considerable wheel wash.

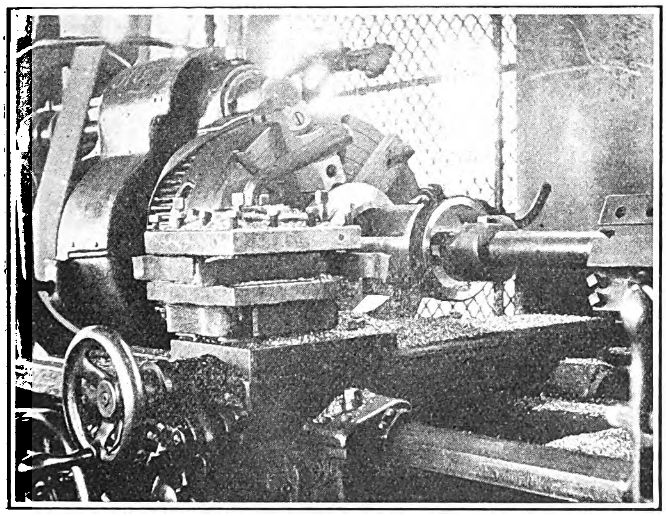
Cast-iron armature bearings are cored out so as to provide six lugs. These are bored out 1/16 in. over the armature shaft diameter. The thickness of babbitt over the lug is small enough so that there is no danger of the armature getting down on the pole faces.

A method of welding on steel rings to build up worn housings which has proved satisfactory consists of drilling out the worn tap-bolt holes and driving cast-iron plugs tightly into them. The worn housings are then turned down and a steel ring about ⅜ in. thick is shrunk on and welded. If the housing has a double flange, one of these must be cut off and a new flange made on the ring. The ring is then turned to insure a good tight clamping action of the two halves of the motor frame when bolted together. New holes are drilled and tapped in the housing through the shrunk-on ring into the cast-iron plugs to receive the bolts.

Some precautions recommended by motor manufacturers to keep housings on motors of the split-frame type from wearing are as follows: (1) Keep frame bolts and housing bolts drawn up tight; (2) see that lock washers are applied to all bolts; (3) use a good grade of heat-treated steel bolts; (4) remove all dirt at the split when assembling motors; (5) keep armature bearings in good condition; (6) inspect bolts regularly and systematically and keep them drawn up tight.

To keep the various parts of motors tight and with good clamping fits, the Westinghouse Electric & Manufacturing Company has given the following allowances:

On malleable-iron housings of box-frame motors an allowance for tight driving fits of 0.001 to 0.003 in. made on the housing is recommended. The bore of the frame at the fit should be from exact size to 0.002 in. under size. Keys are not used.



Split Bearings Are Clamped Together and Finished as One Unit on a Semi-Automatic High-Speed Lathe in the Shops of the Milwaukee Electric Railway & Light Company

Convenient Storage of Bearings After They Are Finished Assists Materially in Taking Care of Requirements in the Milwaukee Electric Railway & Light Company's Shops

With malleable-iron housings of split-frame motors an allowance for a clamp fit is provided in the housing seat on the motor frame. It is recommended that the housing seat be machined to exact size with single liners 0.017 in. thick placed at the split of the two halves of the frame.

For armature bearing shells of malleable iron or bronze in box and split-frame motors with housings, an allowance for a press fit is recommended of 0.002 to 0.004 in. made on the bearing shell. The average pressure for pressing in should be from 3 to 5 tons at the commutator end and from 5 to 8 tons at the pinion end.

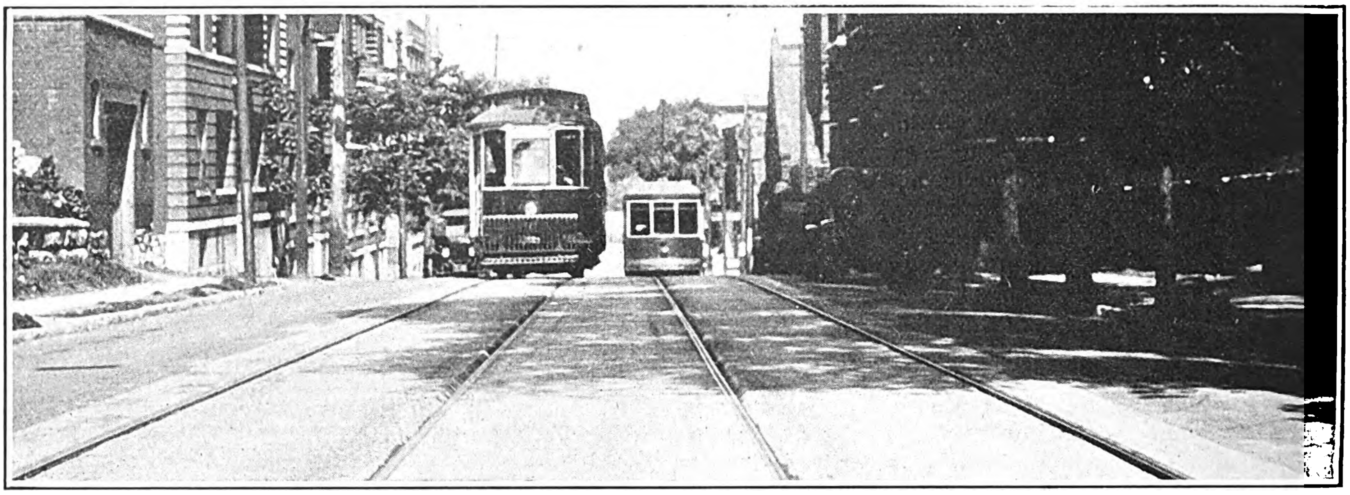
Malleable-iron and bronze armature bearings in split-frame motors without housings should have an allowance for a clamp fit provided in the bearing seat on the frame of the motor. As already stated, this should be provided by the insertion of 0.017-in. liners while the seat is being machined. This same method should be followed for axle bearings of malleable iron or bronze.

In connection with any of the preceding work it is important to have the surfaces that are fitted together machined and gaged accurately. The fitted surfaces should be given a smooth finish, since a rough surface provides a poor contact. When keys or dowels are used they should be held tightly in one of the pieces and be given the minimum practical clearance in the other part. In pressing two pieces together it is advisable to use a lubricant, such as white lead mixed with lard oil or machine oil, on the surface of the fit, and to get a true alignment at the start.

Axles with enlarged wheel and gear seats have fillets at the changes in diameter. The ends of axle bearings should be rounded off accordingly. The practice on the majority of railways is to make the radius of the rounded portion on the axle bearing larger than the radius of the fillet on the axle itself. This insures that the bearing can go into place properly, without danger of binding on the fillet. Several railways obtain the same result by cutting a chamfer off the inside edge at the flange end. This is easier to machine.

Other points which are given attention in the machining of bearings by a majority of electric railways consist of chamfering the inside edges of waste openings or windows and the edges of oil grooves. Of the 20 railways covered in this survey all but three were using oil grooves in their bearings. In most cases these are either machined or are cut with a chisel. A few, however, are molded into the lining. Six different arrangements of oil grooves were found on the railway properties visited, as given in the accompanying illustrations. All of these have at least one oil groove leading to the flanged end of the bearing. This is the hardest point to keep lubricated, and probably most hot bearings start from heating there. An important point in the location of oil grooves is to make certain that the inside ends of the groove start from the chamfered portion of the window. With this arrangement the chamfered portion forms a trough in which oil accumulates and thus feeds to the groove. On the railways which do not use oil grooves to the outer end of the bearing, reasons given for the omission of grooves at this end are that the window is so close to the outer end that grooves are unnecessary.

The amount of end-play allowed for armatures when bearings are fitted was found to vary from $\frac{1}{32}$ in. to $\frac{1}{4}$ in. The practice used by the various railways is given in Table I.



A Typical Example of Solid Concrete Track Construction with Concrete Paving in Kansas City

Rigid Track Experience in Kansas City

Approximately 46 Miles of Track Has Been Built in Solid Concrete with Various Types of Paving—Both Wood Ties and Steel Ties Have Been Used—Thermit Joints Have Stood Up Well

By A. E. Harvey

Superintendent Way and Structures, Kansas City Railways

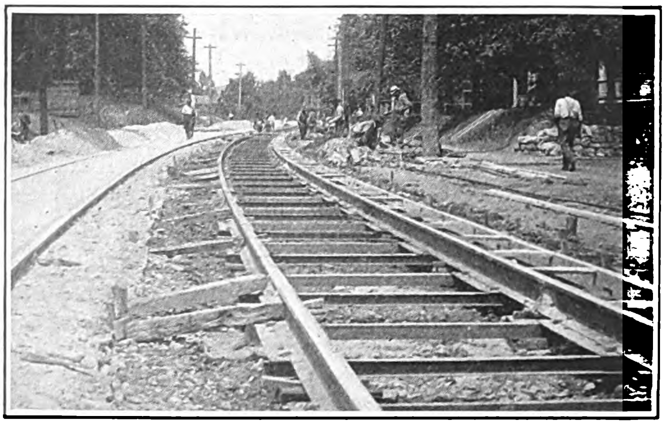
DURING the past twelve years there has been constructed in Kansas City 242,230 ft., or approximately 46 miles, of track in solid concrete. This work has been done with various kinds of paving, and at the present time the greater part of the track is in first-class condition. Trouble has been experienced with certain types of welded joints and some wood block paving has proved to be unsatisfactory. The track structure in general, however, has stood up well and no serious rail corrugation has developed. The experience of this company indicates that the noise produced by the passage of cars is due more to the condition of equipment than to the nature of the track structure.

Disintegration of the pavement along the rail led the Kansas City Railways some time ago to undertake rather extensive experiments with various methods of building track. The independent movement of the parts of a flexible structure was believed to create openings into which water entered, so that it destroyed the track foundation. In an attempt to eliminate this action track was built on a concrete base in such a way that the completed structure was practically rigid.

At first the track was built with a solid concrete base and a cushion of sand under the ties. Although this design remedied all the defects occurring in the subgrade, it was sufficiently flexible to permit independent movement of the rail and pavement. Another design was tried, therefore, in which the ties and base of the rail were entirely inclosed in concrete up to the base of the paving material. This type of track structure gave good results, but it was necessary to excavate to a considerable depth under the wood ties in order to give the concrete slab sufficient strength.

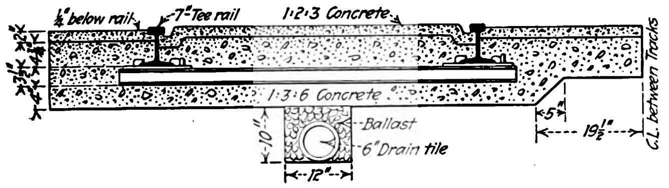
It was thought on this account that there might be advantages in a type of construction wherein substitute ties of shallow depth were used. This would permit a minimum amount of excavation and the ties and the rails would act as reinforcing bars for the concrete. It was hoped that this design would largely eliminate the independent movement of the rail and pavement. Several kinds of substitute ties have been tried and in general they have produced good results.

Tamping Concrete Under the Ties as It Takes Its Initial Set



Type of Track Structure Used in Kansas City with Substitute Ties

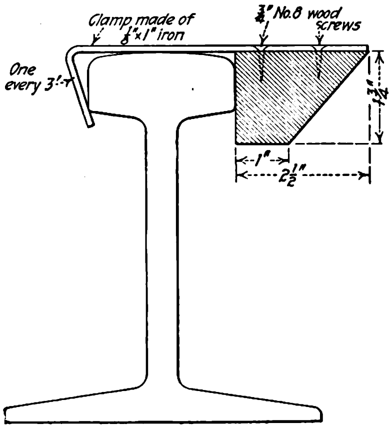
Solid concrete construction was first used in 1913, when about 36,900 ft. of track was built, using white oak ties, 7-in. T-rail, with thermit joints and granite block paving. At the present time, this track is in almost perfect condition and practically no money has been spent on it for repairs. The following year 4,260 ft. of track was constructed, using 100-lb. A.S.C.E. rail, Carnegie steel ties, bolted joints and various types of paving. Today the base, ties and general track structure are still in good condition, but some repairs to the bolted joints have been necessary, and the wood block paving deteriorated badly in places.



Where Concrete Paving Is Used the Concrete Is Poured in Two Courses

During several following years wood ties were again used. This construction has stood up as well as the track built in 1913. In 1918 5,690 ft. of single track was constructed in solid concrete, with Carnegie steel ties, concrete paving and 80-lb. A.S.C.E. rail. No repairs have been made up to the present time on this track. In 1920 the use of International steel twin ties was begun, and since that time 35,100 ft. of single track has been constructed in this way. The results that have been obtained both in the matter of cost and in the quality of the work have been satisfactory. In general, the cost of the material is greater for the steel tie structure and the cost of labor somewhat less. This is due to the fact that steel ties are considerably easier to handle and the track can be brought to gage with less effort.

Where concrete paving is used the concrete is placed in two courses. The base course is placed first and the concrete thoroughly tamped under the rail and ties as it takes its initial set. Immediately thereafter a second or finish course containing a richer mixture is placed by a second gang of workmen and a second concrete mixer. This is done at once, in order that the concrete may set in a single mass without a seam. When T-rail is used flangeways are provided by the use of wood forms. These are of pine or cypress and are made in 12-ft. lengths. The design is shown above.



A Wooden Form of This Shape Is Used to Make the Flangeways

Experience with monolithic concrete construction in Kansas City shows that little damage occurs through expansion of the rail and very few cracks occur in the concrete surface. Paving of other types has been found, in fact, to be more subject to this trouble than is concrete paving. The absence of trouble from this source may be due to the fact that the concrete and steel have very nearly the same coefficient of expansion.

Keeping Cars Clean in the Twin Cities

Regular Reports, Systematic Routine and Continual Vigilance Found to Be the Secret of Obtaining Uniformly Good Results

THAT clean, well-painted, fresh-looking cars are an important element in keeping car riders pleased with the service rendered by the street railway company has come to be accepted by most progressive operators. It has also been demonstrated that money invested in paint and scrub brushes is at most a very small part of the total cost of maintenance of equipment, but represents one of the most effective methods of obtaining favorable publicity.

In the Twin Cities, systematic effort and continual vigilance have been found by the mechanical department to be the two most effective factors in keeping cars in this desirable condition. This kind of work requires supervision by a comparatively rare type of man—one who has the ability to organize his work for efficiency and who, at the same time, has sufficient imagination to maintain an enthusiastic attitude toward a type of work which is performed with common labor and which is sometimes looked on by mechanical men as being a necessary nuisance. It is needless to say that it also requires interest, enthusiasm and continual vigilance on the part of general executives to keep such a man pitched up to a key of interest that will produce consistently good results.

Careful analysis of various methods of carrying out the work of car cleaning and washing have led to the subdivision of this work, so that each car is kept at all times in the best possible condition consistent with reasonable cost. This subdivision of cleaning activity includes the following operations: Sweeping, dusting, scrubbing, washing and general car cleaning.

A total of 850 cars are in service on the lines of this company. During the month of June, 28,806 cars were swept. This includes sprinkling sweeping compound over the floor, sweeping this out thoroughly, and spraying the interior of the car with disinfectant. Eighteen men are engaged in this work, and the average time per car is approximately 8.66 minutes. It is evident that the total number of cars gone over per month is equivalent to sweeping each of the 850 cars practically 34 times per month, or a little more than once per day.

Dusting consists of thoroughly wiping seats, shades, windows and the other interior parts of the car, to remove interior dust. Twenty-two men are engaged in this work, and the average time per car is 31 minutes. During the month of June, 7,749 cars were gone over in this way, which is equivalent to dusting each car on the system nine times during the month, or a little better than twice per week.

Five men are engaged in the work of scrubbing floors. Thorough cleanliness is considered the best form of sanitation, and is superior to the use of large quantities of disinfectants. The practice in scrubbing cars, therefore, is to give the oak floors a thorough old-fashioned hand and knee scrubbing, as a housewife would scrub the floors of her home. During the month of June, 1,073 cars were so scrubbed, in an average time of 59 minutes per car. This is equivalent to going over each car about 1¼ times per month.

When a car is washed, the outside is gone over thoroughly with lukewarm water and long-handled brushes. If the car is unusually dirty, as is sometimes the case after protracted periods of bad weather, a weak soap solution is applied first, and is then rinsed off with clean water. Pails and brushes are used for car washing in preference to spraying methods, due first to the flexibility and simplicity of this method which eliminates an excessive amount of car shifting, and also to the economy in the use of water. During the month of June, 8,104 cars were washed by 16 men, in an average time of 22½ minutes per car. The total number of cars gone over is equivalent to washing each car 9½ times per month.

When a car is given a general car cleaning, it is gone over both inside and out. Ceilings, curtains, windows, floors and exterior are thoroughly washed and scrubbed when necessary. Oxalic acid is used to remove tenacious dirt on painted surfaces. The time spent on a car is 12.07 hours, and when it is completed all dirt has been removed from corners as well as from those parts that show more conspicuously. During the month of June, 261 cars were cleaned in this way. This is equivalent to putting each car through this process approximately once every three months. There are thirteen men engaged in this work.

Systematic reports by the man in charge of car cleaning to the head of the mechanical department form the basis of following up this work. These reports are made up in detail, so that the head of the department can tell at a glance whether any part of the work is being allowed to lag, or whether the efficiency of the men doing the work is being allowed to fall off. It is only by virtue of continual interest on the part of the department head that this work can be kept from lagging either in thoroughness or volume. Total labor costs for car cleaning in the Twin Cities average approximately $2.75 per thousand car-miles. It is part of the price of keeping patrons pleased with the car service, and reductions in expenditures for this purpose represent poor economy from the standpoint of the company's relations with its patrons.

Corrosive Effect of Slag

Detroit Investigation Shows 54 per Cent of Base of Rails Eaten Away in 21 Years

By W. R. Dunham
Executive Engineer Department of Street Railways, City of Detroit

The effect of slag on a rail section is brought out very clearly in the illustration accompanying this article. Not only is the corrosion shown but some light is thrown on the difference between wear on the head of the rail due to traffic and what has actually occurred, or the apparent wear which would be indicated from an inspection of the head surface only.

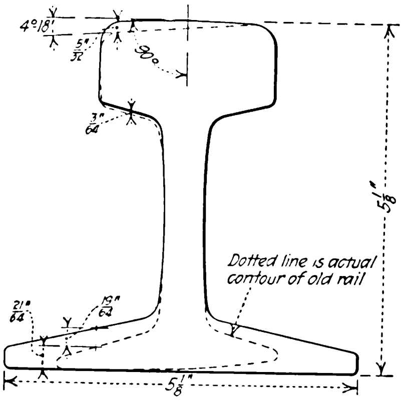
The sketches are from an actual section cut from the rail after its removal from the track. The rail, an 85-lb. A.S.C.E., was laid in 1903 and removed early in 1924. The track area from the top of the ties was back-filled to the head of the rail with furnace slag.

The accompanying table gives under "New Section" the areas in square inches and per cent of metal in the head, web and base and is taken from a steel company handbook. The areas and percentages given under "Worn Section" are for the section as shown by dotted lines, the areas being derived by planimeter. The last column in the table gives the losses in per cent of the different rail parts from corrosion. It will be noted that there has been an apparent gain in the web area. This is due to the increased length of the fishing section on account of the corrosion on the base.

DISTRIBUTION OF METAL OF RAIL SECTIONS NEW AND AFTER 21 YEARS IN THE TRACK

	New Section		Worn Section		Worn Section
Rail Part	Area in Square Inches	Area in Per Cent of Total	Area in Square Inches	Area in Per Cent of Total	Per Cent Change in Area
Head	3.50	42	3.25	50	7.1—
Web	1.75	21	1.85	28	5.7+
Base	3.05	37	1.40	22	54.0—
Total	8.30	100	6.50	100	21.7—

It is interesting to note that, under traffic, the head and web on the gage side have bent down and in toward the center line of the track respectively. Had the wear of this rail been measured from the surface, it would have indicated a total wear of 5/32 in., or 0.0372 in. wear per 5-year period. It will be noticed, however, that nearly half of this amount is due to a vertical bending of the head. The actual wear, therefore, is but 0.0260 in. or 69.9 per cent of the surface indication per 5-year period. It would be interesting to know how many of the rails on which the wear is measured from time to time in connection with the question of renewal for wear have this same feature, so that no differentiation has been made between the actual abrasion and the abrasion plus the bend in the head and web.



Original and Final Section of Rail Laid in Slag, Detroit

Photomicrographs of the head were also made in order to determine the reduction in height due to cold rolling. While the effect of the cold rolling was shown, the amount of this reduction was negligible in so far as measuring for loss of head surface due to wear.

The apparent surface wear of a rail head as indicated by an inspection of the surface only was really made up of three things: Abrasion, compression of the metal from the wheel passing over it and the depression of the head through the bending of the web from the loadings carried.

As cinders and slag have been recommended for ballast, this article is pertinent in showing the effect of slag on rails in contact therewith.

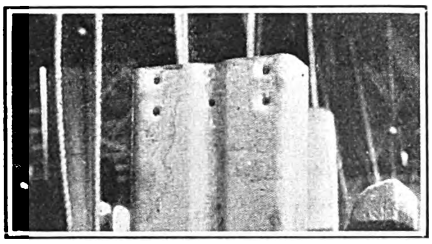
In an article appearing some time ago in the Electric Railway Journal, giving an improved method of placing concrete under steel ties in new track construction as worked out by the Cleveland Railway, the method used was described as follows: ". . . the material used being as mix of slag screenings and cement." This mixture was tamped under the steel tie plate and in intimate contact with both the steel tie plate and the steel channels composing the tie. It is presumed that after the tie fails from corrosion, this failure will be used as an argument against substitute ties, while the practice of using slag ballast against steel rails will be continued.

The rail section from which these sketches were made was of great interest to the writer, and it is hoped that this article will be of interest to way engineers generally.

Equipment Maintenance Notes

Drop Punch for Thin Material

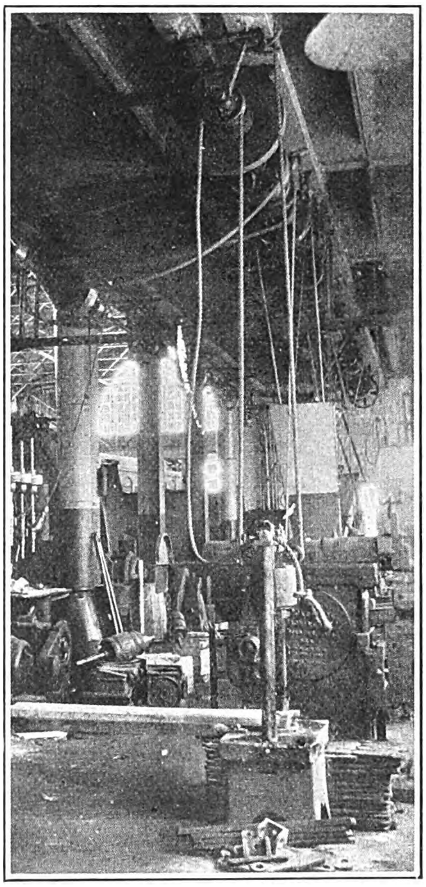
THE pantograph shoes used by the New York, Westchester & Boston Railway require five holes in each end. The holes are ¼ in. in diameter with ¾-in. countersinks, and the pantograph shoes are made of No. 14 gage blue annealed steel. The four outside holes are used for screwing the shoe in place, and the center hole, which comes in the groove of the shoe, is an oil hole.



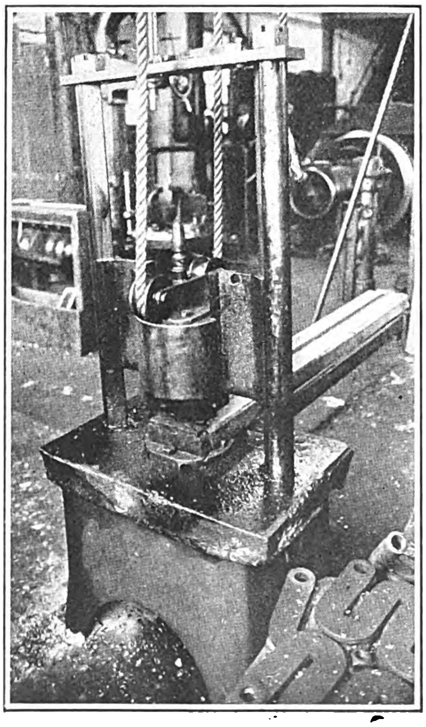
End of Contact Shoe Showing Holes as Punched

A shop-made drop punch has been constructed for punching all five holes in one operation. The bed of the punch is a discarded anvil base the top of which is about 15 in. above the floor. Into this are fastened the two upright guides which were 2½-in. steel shafts. The inner sides of these guides have been planed off to a V shape and the punch weights, together with the removable head for holding the punches, slide up and down between them. The drop weight is a piece of an old 8-in. axle and weighs approximately 125 lb. The weight can drop 18 in. from the raised position. A removable die fits into the bedplate. The drop weight is provided with a top stud extension so that with the weight raised this stud passes through the top support and a spring safety catch fits into a groove of the stud and automatically locks the weight in position. To release the weight a lever is pushed inward, forcing the spring catch out of the groove in the stud. When the machine is not in operation a pin is inserted back of the safety catch to lock it permanently.

The method of raising the weight preparatory to dropping is novel. A ¾-in. rope with one end attached to an overhead support passes downward and through two 2-in. sheaves mounted on top of the drop weight, from where it again passes to a 6-in. sheave mounted on a short shaft overhead. The free end is used by the operator to tighten the rope and thus lift the weight. An 18-in. pulley on the overhead shaft is driven from the shop countershaft. By pulling on the loose end of the rope, the sheave on the countershaft raises the weight until it is automatically locked, so that no effort is required of the operator. In order to drop the weight for punching the safety catch is released.



Rope and Sheave Arrangement for Raising the Punch Weight



Pantograph Shoe in Position After the Punch Weight Has Dropped

An extension arm made of ½-in. x 1½-in. bar steel holds the pantograph shoe in position while it is being punched. With the full drop of 18 in. the holes are punched at one operation. A drop of half this height is used to make the countersinks. The base has a double groove underneath, so that the punchings are fed out of these grooves and one punching pushes the one ahead, so that it is self-cleaning.

Pull-Ins Reduced

THE report of the Electric Railway Association of Equipment Men, Southern Properties, for the first nine months of 1924 shows an

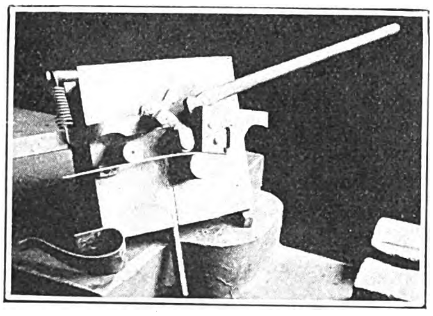
COMPARATIVE STATEMENT OF CAR PULL-INS

	Average Car-Miles per Chargeable Pull-In	Total Average Car-Miles per Pull-In
New Orleans:		
September............	158,272	55,051
Year to date..........	121,919	35,312
Nashville:		
September............	56,901	25,288
Year to date..........	34,844	18,044
Memphis:		
September............	29,924	23,019
Year to date..........	22,119	17,668
Little Rock:		
September............	14,183	10,131
Year to date..........	19,060	14,891
Knoxville:		
September............	25,582	13,644
Year to date..........	18,190	11,888
Birmingham:		
September............	18,883	15,363
Year to date..........	13,658	11,006
Atlanta:		
September............	9,407	7,025
Year to date..........	12,479	9,241
Mobile:		
September............	35,102	29,251
Year to date..........	10,276	7,220
Dallas:		
September............	7,680	5,422
Year to date..........	4,767	3,224
Dallas (Texas Electric)		
September............	7,914	5,845
Year to date..........	......	......
Chattanooga:		
September............	6,151	3,515
Year to date..........	......	2,817

average car mileage per chargeable pull-in of 121,919 at New Orleans as against 110,653 miles for the first five months, as mentioned in ELECTRIC RAILWAY JOURNAL for July 19, page 91. The railways in Nashville, Memphis, Knoxville, Birmingham, Atlanta and Dallas all showed similar improvement. Nashville was again second to the leader, New Orleans, but Memphis was in third place at the end of September, Little Rock having lost that distinction. Figures of the individual companies for the month and for nine months also are given in the accompanying table.

Die for Making Journal Box Cover Springs

DUE to the fact that the cost of the special springs used on journal box covers by the Twin City Rapid Transit Company was high, particularly when they were purchased in comparatively small quantities, the mechanical department of the company found it desirable to make these springs in its own shop.



Journal Box Cover Springs Are Formed at the Rate of 100 per Hour by One Man Using This Ingenious Die that was Developed in the Twin City Rapid Transit Company's Shop

At first these were made by hand at a cost of approximately 18 cents each. Later, however, a special die of the type shown in the accompanying illustration was made up, and through its use it became possible to make these springs at a cost which is about 40 per cent of that of the hand method.

The spring is tapered throughout its length and is formed into a reverse curve of fairly complicated shape.

At one end these springs are 3 in. wide, and taper from that to 1 in. at the narrow end. Stock is purchased ⅛ in. x 4 in. and is cut up into pieces 12½ in. long, which is the proper length for making the spring. This material is split diagonally and the hole punched in one end. The entire forming operation is then carried out on the die.

A blank for one of the springs is shown in position in the die, for the beginning of the forming operation. At the right is the operating handle. In the position shown, this handle has just been pulled down so as to disengage the latch shown at the top of the die. This action allows the roller shown in contact with the blank to descend into place under the action of the helical spring fastened to the lever projecting to the left from the die. In the position shown for the operating handle, the jaw in the die block grips the right end of the spring blank. Above this position of the operating handle this jaw is released, and when the handle engages the latch at the top the roller is also lifted out of position against the action of the spring at the left.

To form the spring the operating handle is swung through slightly more than a semicircle, in a clockwise direction. When this is done the roller holds the blank firmly against the die block which is formed to the proper shape for the completed spring, and as the jaw in the block holds one end of the blank the latter is formed to the shape of the block as the latter is revolved with the handle. As the block nears the end of its cycle the reverse curve in the end of the spring is formed by the die as it presses the blank against the round plug shown just under the roller spring lever.

When the spring has been formed the handle is rotated back until it engages the roller release latch, at which time the jaw in the die is also released. The short lever shown projecting below the die is then used to eject the finished spring.

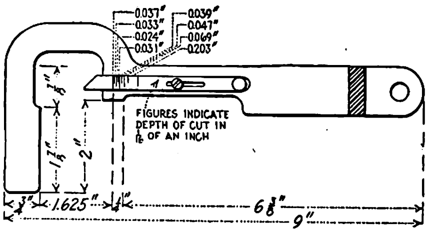
This tool is operated in connection with an oil heating furnace by one man. With this equipment he can heat and form aproximately 100 springs per hour.

Flange Gage for Wheel Turning

IN THE shops of the Department of Street Railways, city of Detroit, the special type of gage shown in the accompanying illustration was developed for facilitating the work of turning flanges of rolled-steel wheels.

This gage was designed and made in the shop. It enables a workman to determine the depth of cut required to bring a flange back to the proper dimensions. A graduated slide shows directly in fractions of an inch the depth of cut required.

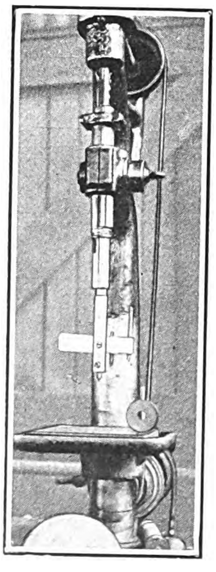
The slide is mounted in the gage so that it comes in contact with the wheel at the proper gage line. When an old pair of wheels is set up in the lathe for turning the gage is slipped over the flange, the slide is moved forward until it comes in contact with the wheel and the amount of metal to be taken off is read directly from the scale. Thus a saving is made not only in the time required for the turning operation but also in the amount of metal taken off the wheel. This prolongs the total useful life of each wheel.



Adjustable Gage for Wheel Flanges

Cutting Magnet Coil Tops

A TOOL has been designed and made in the Decatur shops of the Illinois Traction System for rapidly cutting magnet coil tops out of red fiber without an excessive waste of material. The tool, in appearance, resembles an expansion bit without the intervening cutting blade between the centering point and the outside cutting edge. It has a tapered shank and fits into the customary ⅜-in. taper chuck on the drill press. At its lower end an adjustable cross member, held in place by a setscrew, carries two tool-steel cutting bits. These bits are of quarter-inch round steel ground to a thin cutting point. The cutting end is 1/16 in. wide and ⅜ in. long. The bits are held in place by setscrews in the cross member. The distance between the two cutting tools is approximately 1 in. It is not the practice to cut



Device for Drilling Out Magnet Coils

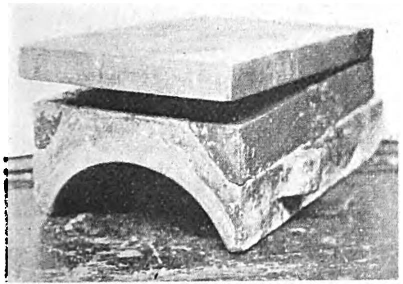
Magnet coil tops are drilled from ¼-in. red fiber insulation material by means of an adjustable cutting tool which fits into a small drill press.

both the inside circle and the outside circle at one operation. Two bits are available in order to expedite the work of cutting both small and large size tops. The red fiber insulating material, which is usually ¼ in. thick, is clamped to the drill press table and after a centering hole has been drilled the tool is brought down upon the fiber in the same manner as in drilling.

Modified M. C. B. Journal Brass

A MODIFIED form of M.C.B. journal brass is used on the high-speed cars of the Chicago, Aurora & Elgin Railroad with good results. The standard M.C.B. journal has beveled corners, and the journal wedge the necessary extensions to fill the space. This type of journal is liable to side oscillation. As a result of the frequent starts and stops of an electric car, brasses are worn out quickly.

The changes in design inaugurated by the shop engineers of this railway include the filling up of the beveled corners on the brass and the elimination of the triangular lugs on the wedge to give a brass with a flat top and a corresponding flat wedge. The construction does away with all journal box oscillation, and gives a longer life to the brass. The redesigned wedge, which can be machined entirely with a shaper, is a flat piece of steel with one surface tapered 1/16 in. in both directions from the ends to the center. This taper allows for a longitudinal oscillation and centering of the brass upon the axle.

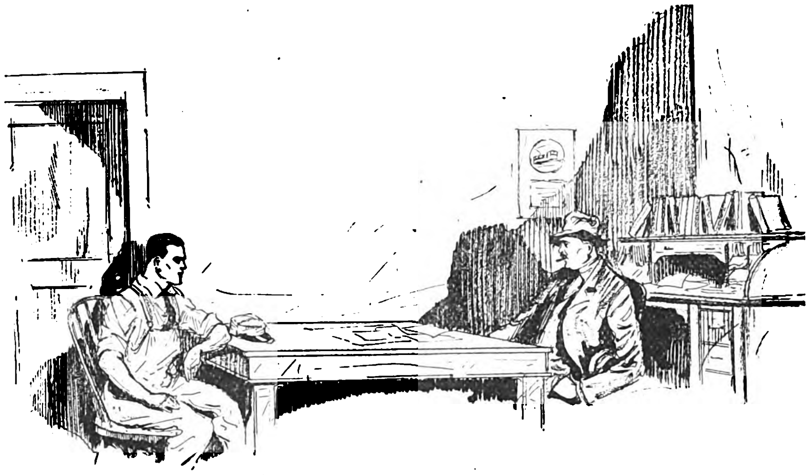


M.C.B. Journal Brass and Wedge Modified to Prolong Their Life

All old journal brasses are built up at the corners by welding on steel pieces, as shown in the illustration. New journal brasses are made according to the modified design. The new type of wedge will operate with either the old or the new designs of brasses.

Dick Prescott's Opportunity

It Finds Him Ready



DICK PRESCOTT felt somewhat uneasy as he knocked on the door of Thomas Mullaney's office. A morning summons from the general foreman was generally considered among the shop employees of the Consolidated Railway & Light Company as an incident boding no good results. Despite his uneasiness, Dick had himself well in hand as he opened the heavy door at the gruff invitation from the interior of the sanctum. The self-confidence generated by habitual sincerity of thought and speech, combined with the consciousness of having made a whole-hearted endeavor to be as useful as possible under the circumstances in which he found himself, gave Dick that feeling of having "played the game" which caused him now to face any eventuality with confidence.

As he opened the door, his eyes sought those of the general foreman in mild inquiry. He was agreeably surprised and relieved by what he saw there. A faint twinkle that he had never noticed before gave him the feeling of one who, upon pulling aside a dusty and forbidding curtain, discovers beyond a cheerful and inviting interior. Dick suddenly realized that all of Thomas Mullaney's "hard-boiled" exterior was merely a cloak which had come about him through many years of routine adherence to precedent, and that the man within was warmly human and likable. He accepted the gruff invitation to be seated with mixed feelings of admiration, respect and sympathy for this crusty old veteran who had kept things going along with a fair degree of efficiency through many changes in conditions and deficiencies in management.

Mullaney got into his subject quickly and in his blunt manner outlined the purpose of the interview. He offered Dick the opportunity of organizing an engineering department in the shop and suggested that if Dick felt able to tackle the job he would ask the general manager to send him and one of the foremen on an extended trip to gather ideas from other properties. It was evident that Mullaney had at last recognized in Mr. Milburn, the new general manager, an executive with vision and courage, and realized that the new era which was dawning on the property called for young blood and new ideas.

After outlining his proposal briefly, Mullaney shifted the inevitable cigar stub to the other side of his mouth and leaned back in his weatherbeaten old chair with a kindly smile at the eager boy across the table.

"Well, what d'you think about it? Believe you could handle that job?"

"I think I could, Mr. Mullaney. I've spent practically all my spare time for some years in railway shops, and also worked for two years when I had to drop out of school because of lack of funds. I've been keeping my eyes open here, and though I'd have to take things slowly at first, I believe I can see a real opportunity for co-ordinating an engineering department with all of the other shop activities from construction to handling of materials, so as to make it a real agency for cutting down lost motion, improving methods and increasing efficiency.

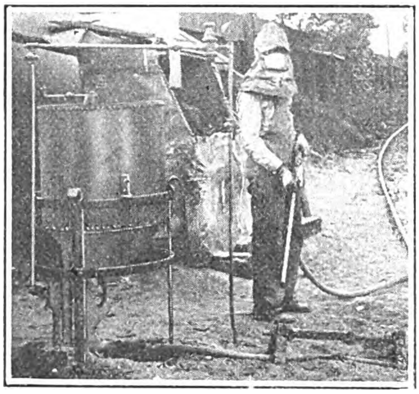
"Your suggestion for a trip to other properties is fine. I'm pretty well acquainted with many of the practices in other shops, as I have been studying the files of the ELECTRIC RAILWAY JOURNAL ever since I came here, and in that way have compared many of our methods with those of other roads. Such a trip would give me some definite ideas as to just how we can get an engineering department under way, so that each foreman will understand that first of all its purpose is to make it easier for the various shop departments to do better work."

"All right, my boy, you've got the idea exactly. You're pretty young, but I think you can handle this thing if you keep your feet on the ground. Get yourself ready to leave next Monday and I'll talk to you again before the end of the week. Now go tell Steve White that I want to see him right away."

As Dick stepped out of the office he was filled with mingled emotions of joy and impending responsibility, but the former took precedence to such an extent that he literally had difficulty in keeping his feet on the ground as he hastened in search of Steve.

Sand Blast Used for Many Purposes

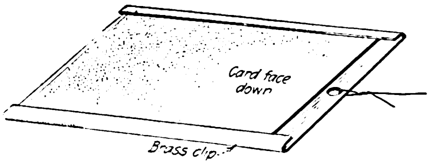
IN THE shops of the Kansas City Railways a sand-blasting equipment has proved useful for many purposes in connection with car overhaul and repair work. On most repair and overhaul jobs men will do better work if the parts are cleaned when they are taken off the cars. Consequently, in addition to its use for cleaning the sides of steel cars, the sand-blast outfit illustrated is used to clean truck frames, parts of door and step mechanism, miscellaneous castings, dash-iron plates, etc. Cleaning such parts makes them easier to handle, and at the same time improves the character of work that is done during repair or overhaul. It also has been found that by thus thoroughly cleaning up the surface of castings and similar parts, defects, cracks and blow-holes are shown up which might otherwise go undiscovered.



By Cleaning Car and Truck Parts with This Sand-Blast Outfit Better Workmanship Is Obtained at Kansas City

Simple Tag Holders

IN MOVING materials between carhouses and shops it is usually necessary to employ some type of tag for indicating the proper destination and other information regarding the material handled. In the shops of the Department of Street Railways, city of Detroit, a very simple type of holder has been devised to prevent the mutilation of these tags as they are handled at various points on the system. This holder consists of a flat piece of brass with two edges folded over so as to form clips for the tag. The two folded edges are cut back at an angle at the corners to allow the card to be inserted readily. The card is put in with its face toward the brass clip, thus preventing the instructions from becoming obliterated (in the handling. A piece of flexible wire through a hole in the holder and the card holds the latter securely in place and also serves to fasten the holder to the box or package in which the materials are packed. This simple device is shown in an accompanying illustration.



Brass Tag Holder Used by Department of Street Railways, Detroit

New Equipment Available

Double-Deck Six-Wheel Buses for Los Angeles

WHAT is said to be the first double-deck six-wheel bus to be used either in this country or abroad was recently placed in service by the Los Angeles Railway. This vehicle is built by the Moreland Motor Truck Company, and it is claimed that the six-wheel construction permits the use of pneumatic tires on the rear wheels. This could not be done with a four-wheel double-deck bus, because of the excessive weight on each wheel.

The construction used is of the Goodyear type, where each axle is attached to a strong semi-elliptic spring hinged in the center. By using this type of suspension, each of the four rear wheels may be raised or lowered to a degree greater than is possible with the ordinary four-wheel construction without raising the body.

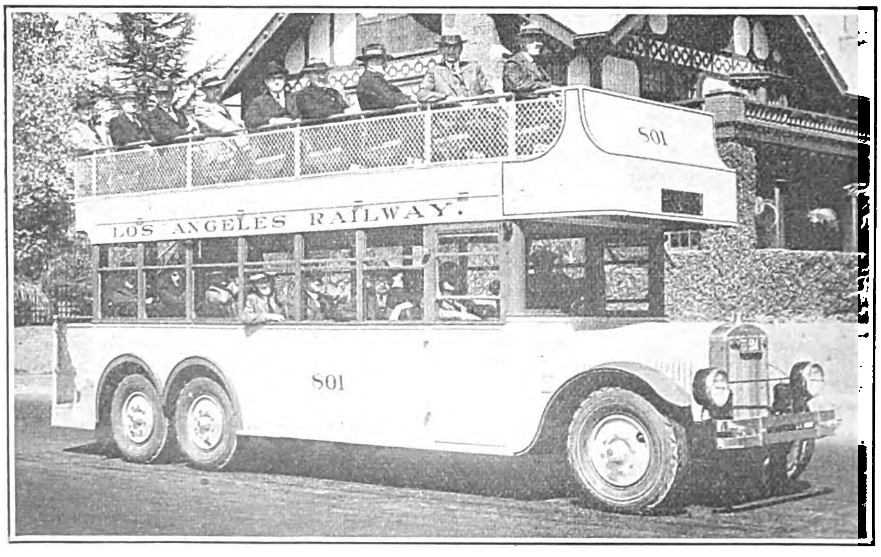
With this design the center of the spring to which the frame is attached moves up only one-half the amount which the wheel moves. Braking is effected on all six-wheels by a combination air-hydraulic system. The sides of the bus are made of Plymetl, and the roof is of Haskelite.

Light-Weight Harp

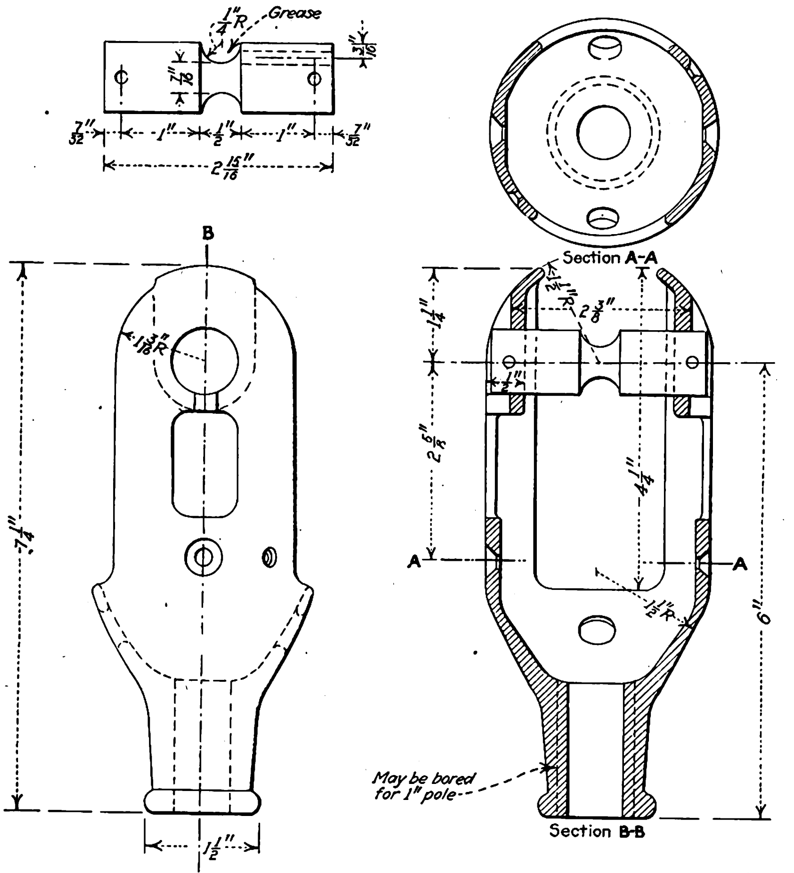
A TROLLEY HARP with increased strength but of light construction is being introduced by the R. D. Nuttall Company, Pittsburgh, Pa. The arms of the harp are rounded on the outside, and their ends have a spherical contour. There are no ribs or other projections, leaving no sharp edges or corners to catch in the overhead wires in case the wheel leaves the wire. All screws and rivet heads come flush with the outside surface, while the axle pins and cotter pins are kept within the outside contour. The weight of the harp and wheel is 6 lb.

Contact washers may be used inside but the contact spring is arranged to bear directly on the wheel hub so that contact washers are not necessary. Contact springs are readily replaced when worn by a slight turn on the clamping screw, which releases the contact spring so that it can easily be withdrawn.

An improved type of axle pin is



Pneumatic Tires Can Be Used on This Double-Deck Bus, Because the Six-Wheel Construction Reduces the Load on Each of the Rear Wheels



A Trolley Harp that Will Not Catch in the Overhead

also a part of the new device. Grease is forced through a hole in the pin which communicates to a large annular groove on the outside, bringing the lubricant in direct contact with the base of the wheel.

Inclosed Coil Heater

A CAR heater is being placed on the market by the Railway Utility Company of Chicago which embodies several interesting new features of design and construction.

The heater unit itself is of the inclosed type, using a resistor of nickel-chromium ribbon, corrugated or reflexed in a refractory insulating material which it is claimed does not deteriorate from the action of sudden high temperatures. This is said to give a unit which will stand the extreme voltage variations encountered in railway work, including extreme over-voltages for quite lengthy periods of time.

A novel feature of the case construction is the provision of a ventilating flue in the back where it is placed against the side of the car and at the top where it would come in contact with passengers. In the panel-type case, which is usually installed under longitudinal seats, this feature is for the purpose of preventing radiation of the heat generated by the unit to the space under the cushions. In the vestibule and truss-plank heaters, this flue feature is said to prevent radiation through the sides or ends of the car.

It is claimed that the flue action is so effective that increased temperature of the elements actually results in decreased temperature of the top and back of the case. This flue construction also makes it permissible to install these heaters without placing fire resisting material behind them.

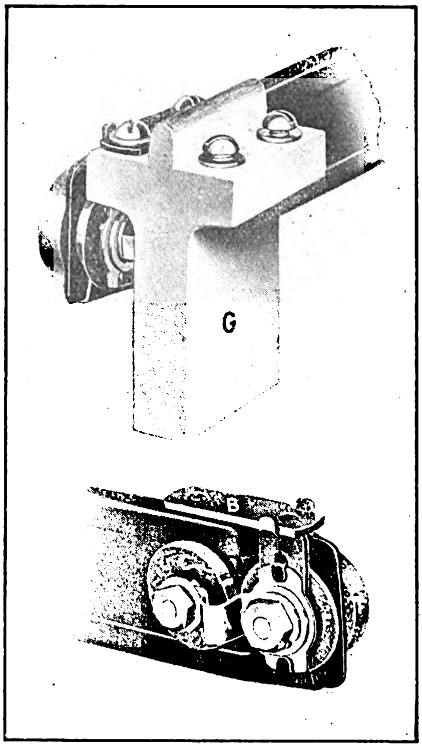
The cross-seat heater is manufactured with a solid baffle on the top, so that it is not required to add sheet metal under the seat cushions to prevent the heated air pocketing at that point.

All the cases are designed to permit access to the interior without disturbing the wiring or conduit.

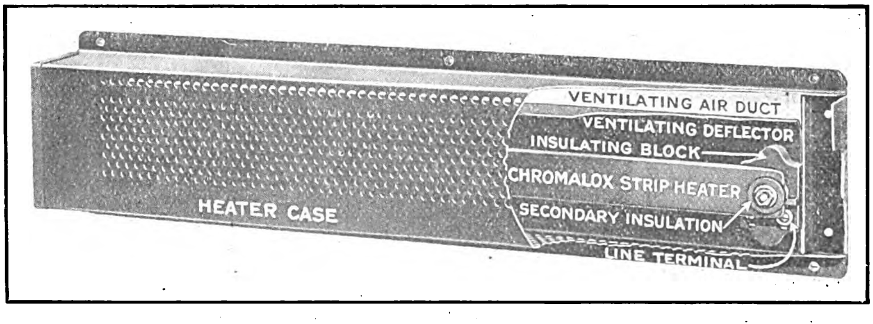
In the accompanying illustration showing the mounting of the heating element, the expansion strap, *A*, is welded to the mounting bracket, *B*, which is fitted with a clearance washer to allow free movement of the heating unit, thereby providing means to relieve the mounting bracket *B* from strain due to expansion and contraction of the unit.

The "Lavarock" terminal insulator, *C*, is designed to seal the outlet, preventing any accumulation of dust or moisture that might cause leakage from the sheath to the terminal. The heater sheath *E* is further insulated from the mounting bracket *B* by heavy "Pyroplax" flanges, *F*, which constitute a secondary insulation between the heating unit and mounting block *G*.

This mounting block is of heavy molded "Pyroplax" insulating material with threaded metal inserts molded in, for fastening.



Detailed Views of the Terminal Mounting, Showing the Arrangement for Safety and Accessibility



A Ventilating Duct in the Case Keeps Down the Temperature of the Top and Back and Eliminates the Need for Insulating Material Behind the Case When It Is Mounted

American Association News

This Year's Exhibits a Half-Million Dollar Show

Equipment for Modernization of All Departments Featured the Display at A. E. R. A. Convention—Space Taken by the 194 Exhibitors 14½ per Cent Greater than in Any Previous Year

THE exhibits at the Atlantic City convention of the American Electric Railway Association this year were bigger and better than ever before. There was more new apparatus and equipment shown than at any previous convention, indicating that the manufacturers are doing their part toward modernization of the industry and following more progressive lines of thought in the design of their equipment. Three railways and the association itself contributed to the educational value of the convention by instructive exhibits.

More space was taken for exhibition purposes than in any previous year. A total floor space of 86,349 sq.ft. was used by 194 exhibitors, an increase of 10,920 sq.ft. over that occupied at the 1923 convention, which was the largest up to that time. In per cent the increase amounts to 14½.

In analyzing the various equipment lines displayed the exhibit of buses was most extensive. Of the entire space 23,743 sq.ft., or 27½ per cent of the total, was occupied by bus displays. There was a total of 54 complete buses on exhibition together with 12 stripped chassis. The buses shown were either of a de luxe type or of attractive design intended particularly for display and to attract attention. Many of the delegates remarked that the very sight of such magnificent buses made them want to ride.

The editors of ELECTRIC RAILWAY JOURNAL collected considerable information this year as to the cost of exhibits to the various manufacturers. Based on information from more than half of those who had displays, it is estimated that about $569,000 was expended by manufacturers in placing their products on display at the Pier. This shows that the manufacturers certainly did their part as a contribution toward making this convention a success.

The decorative features and the scheme of colors used were new and attractive. Probably the most striking feature was the treatment used in the main ballroom at the entrance. The motif followed was Chinese. Stands with Chinese lanterns were placed on the foyer floor and additional Chinese lanterns were carried on supports on the pillars. The balcony was hung with Chinese decorations and a big drop picture at the end of the hall showed a water scene with a Chinese junk in the center. Directly opposite the entrance was a pagoda with Chinese dragons and lanterns. Special treatment was also given to each of the other exhibit halls. Thus the Annex was in green and white, Machinery Hall and the meeting rooms were in white and gold.

RAILWAYS EXHIBIT PROGRESS MADE

Three railway companies exhibited practical examples of their work in booths fitted up in a manner as attractive as those of the manufacturers.

The Chicago Rapid Transit Company and the Chicago, North Shore & Milwaukee Railroad showed samples of the artistic and effective posters that have been used in connection with their work. In addition, some of the original water-color paintings from which the posters were made served to illustrate the care which is taken to obtain high-grade work.

The Public Service Railway displayed pictures of every phase of its big transportation system—cars, buses, ferries, terminals, power houses, and substations. An interesting feature was a map showing the old pre-war 5-cent fare area compared with the present 5-cent area. Charts on one-man car operation, bus time-tables, and window posters were included.

THE ASSOCIATION EXHIBITED STANDARDS AND PUBLICITY MATERIAL

The association attempted more than ever before and it has succeeded in doing more in its exhibit. In short, it kept in step with the bigger, better and brighter than ever slogan. Through the courtesy of various manufacturers and operating companies, a display of standard designs of overhead line materials, track materials and car equipment materials was prepared. In addition, there was a number of charts showing track standards and certain proposed standards.

Another section of the booth was devoted to posters, prepared by the association's advertising and publicity section.

The Association's Bureau of Information and Service prepared a number of charts to show the vital statistics of the industry. These were so displayed that he who runs may read. In addition to these charts the bureau exhibited copies of its various compilations and reports, together with other association literature.

Among the standard devices shown were axles, journal boxes, brake shoes, limit of wear gage, bolted joints for 9-in. girder grooved rails and for 90 and 100-lb. standard A.R.A. and for 80-lb. A.S.C.E. rail. There were in addition standard rail designs and a complete line of standard line material for overhead trolley, as contained in the Engineering Manual, Section D, 102-21. Then there were charts to show the standard uniform system of track spirals, turn-outs and cross-overs, car clearance easements, proper location of tongue switches and dimensions of tongue switches, mates and frogs, bolted rail and manganese steel crossings, together with gages and flangeways.

The committee on city and interurban operation had an exhibit of copies of committee reports and handbook of modern methods and practices. A number of attractive posters, illustrating electric railway advertising, were shown and especial attention was attracted by the posters of the London Underground group, of which a large variety was on display. United Railways & Electric Company, Baltimore, Md., furnished a safety display for use in the schools of Baltimore to teach children the fundamental principals of safety.

MANY ATTRACTIVE BUSES SHOWN

In the exhibit of buses and bus accessories there were many novel designs. The Six Wheel Company and the International Motor Company displayed several models of six-wheel buses. The Transit Equipment Company featured an Uppercu coach with front wheel drive. Advantages claimed for this arrangement include low floor height, simplicity of frame construction and short turning radius. As the tractive effort is always in the direction of travel it is said that a more abrupt steering angle can be used. A bus with 220-in. wheelbase can be turned in a 50-ft. street.

The Yellow Coach Manufacturing Company showed several double-deck models with both pneumatic and cushion tires. This company's new design of sleeve and poppet valves for bus service was of particular interest. The Continental Motors Corporation showed four different types of six-cylinder bus motors. There were various arrangements of power brakes which showed marked improvement both in design and construction. These included air, hydraulic and a combination of the two. Safety devices have also been applied to buses which include a complete pneumatic safety control system, with interlocked accelerator and "deadman's" feature. Air brakes of the Westinghouse automotive type included a 3-cu.ft. high-speed compressor, with capacity for supplying air for all pneumatic purposes.

A new combination air-hydraulic system of four-wheel brakes was shown by the Timken-Detroit Axle Company. In addition to this feature the front axle had a large drop which allowed for low floor construction. The exhibit of buses was noteworthy particularly for its great variety and included many double-deckers, new light-duty types, parlor car arrangements with wide windows, individual seats and smoking compartments. The bodies also showed marked improvement in lighting, heating, and ventilation.

Railway Supply Companies Show New Developments

The modernization taking place in the manufacturing end of the railway industry was shown in many of the displays of the manufacturers and supply companies. These covered a wide range, improvements having been made for practically all departments.

It was easy to spot the new devices shown by the Westinghouse Electric & Manufacturing Company, as each development was marked with a large orange star. A further departure was the display of apparatus still in the experimental stage. Among these were two developments in motor lubrication practice. The first was an oil sealed housing. The new design of housing appears to have many advantages. The feed of oil is made constant at all times by pumping it into the chamber. The separate general supply chamber is kept filled, so that the amount of oil that must be added is not left to the oiler's judgment, and the supply to the waste chamber is automatic. In the second development, a new sealed sleeve bearing, oil is prevented from leaking into the winding and dirt and grit are kept out of the oil. It is claimed that additional oil is required only once or twice yearly.

Recent developments of renewal parts were on display, which included a unique scheme for ventilating old type motors. This scheme is said to increase the continuous capacity of the motors by more than 30 per cent with only 2 per cent additional weight. For convenience in rewinding armature coils, rebanding and repairing commutators, all insulating materials are now assembled in standard packages by the Westinghouse company, so that every item required is ready for the workmen to use. A new development in brush holder design included a detachable box, which facilitates necessary replacement at low cost. Another new type of brush holder shown was provided with a dust cap to prevent the entrance of sand or dirt into the brush holder.

Power men were particularly interested in the new type of oil immersed transformer developed to prevent explosions and increase insulating and cooling properties. In this construction the oil level is below the top of the tank, so as to provide a gas space of sufficient capacity to permit the rise and fall of the oil level. The breathing action of the transformer deoxidizes and dehydrates the inhaled air, thus maintaining the gas space with dry inert gas. A diaphragm construction is provided which ruptures in case an abnormal pressure develops.

The General Electric Company had a large display of its products to show how that company could help modernize electric railway equipment. The car equipment man's attention was attracted to the reduced number of standardized railway motors and to improvements in light-weight multiple-unit control and improved equipment parts. A new type of brush holder with renewable carbon-way has been designed to reduce maintenance cost. New designs of overhead line material and sectionalizing equipment showed the company's effort to reduce the investment in distribution copper. New types of welding equipment were shown, which should make substantial savings in the reclamation of parts. The general idea in the entire exhibit was to show apparatus in actual operation and to group this equipment around a display of parts and materials which could be used for maintenance.

A new idea in the merchandising of line materials was shown by the Ohio Brass Company. It was called a traveling catalog and consisted of a truck equipped with special body, arranged so as to display a full line of O.B. line material when the truck was open for inspection. This truck has made an extended trip of over 100,000 miles and has visited a great many railway properties.

Improvements in Car Heaters

All of the various heater companies showed improvements in electric heaters for cars. The Railway Utility Company showed a new type of inclosed coil heater. The heating element consisted of nickel chromium inclosed in a refractory material. It possesses large overload capacity without danger of overheating and damaging parts. A novel feature of the case construction included a ventilating flue in the back at the top of the case. This feature was intended to prevent radiation through the sides and ends and so decreases the temperature at the top and back of the case.

Interchangeability of heater parts was featured by the Gold Car Heating & Lighting Company. New designs of electric heaters selected for use by the New York Central and Baltimore & Ohio Railroad were shown. The principal feature of these was simplicity in design, so as to reduce the number of parts. Particular attention was given to terminal arrangement.

A new design of heater coil construction was shown by the Consolidated Car Heating Company, which was intended to take up less space and thus could be used in replacement of the inclosed element units. The Consolidated Car Heating Company also showed its new type of pedal control for doors. The particular features of this equipment were the small amount of space required underneath the platform for operation of the doors and their control by depressing a pedal.

The National Pneumatic Company also showed a very large number of door engines and door control equipment. Full-sized models of cars were used to demonstrate the best practice in door engine installation, and the importance of safety in control and operation was emphasized. A new development shown was a four-way selector and grouping valve, which with a single control handle actuates any one of four door engines or couples up any two of them.

An improved type of step construction was shown by the Irving Iron Works. The principal feature was the open construction used, so that dirt, snow, ice and the like would fall through and prevent slippery or wet conditions either on the steps or inside the car. The construction also provided a non-slipping surface under all conditions.

Several new designs of seats for cars and buses were shown by the various seat manufacturers. The American Car & Foundry Company showed a new type of reversing mechanism with link construction. The pedestal was made of pressed steel and was independent of the seat end. A single automatic foot rest was operated by the power arm. All parts subjected to stress were drop forgings and particular attention was given to interchangeability of parts.

A very complete line of new developments in car seats was also shown by the Hale-Kilburn Company. The distinctive features were increased comfort, attractive appearance, and particular attention to producing parts which would lower maintenance costs.

A new contribution to the motor coach seating line was shown by the Heywood-Wakefield Company. This consisted of three types of chairs, which showed the last word in beauty and comfort.

A new type of car flooring called Truss-plate was exhibited by the Wheeling Corrugating Company. This type of flooring has been used by the Boston Elevated Railway and the Interborough Rapid Transit Company with a mastic covering as the wearing surface. It weighs but 4 lb. per square foot, and is of particular advantage in light weight car construction.

Valuable information as to where Haskelite and Plymetl could be used to advantage in reducing car weight was shown in the exhibit of the Haskelite Manufacturing Corporation. This type of construction is also proving of advantage in reducing the noise and drum effect in all-steel car construction and in providing necessary insulation against cold.

The Railway Improvement Company had an exhibit arranged to show improvements that would reduce railway motor maintenance. This consisted of a revamped 101-B motor removed from service on the Connecticut Company. New heads and bearings in this motor were designed particularly to insure long life and decrease trouble. The weight of each axle bearing was reduced from 10 to 15 lb. and special attention was given to provisions that will make the bearings stay tight when installed.

Fare Collection Systems

There were very complete displays of fare boxes and fare registering equipment. A new combination electric coin and token controlled passimeter was shown by the Perey Manufacturing Company. This equipment is adapted to any combination of two coins or tokens. This company also showed an interesting fare box and overhead register combination, which provided automatic, instantaneous, visible and audible registration. Improvements in fare collection were also shown by the Rooke Automatic Register Company in the form of its new automatic register, which takes nickels, dimes and quarters.

The Cleveland Fare Box Company showed a new locked box and key of peculiar design for use with fare boxes. This was a four-way box with eight levers and 16 locking surfaces. A new detail fare recorder was also exhibited by the Ohmer Fare Register Company, which had a capacity for recording fares ranging from 1 cent to $9.99.

A new design of light-weight trolley harp was shown by the R. D. Nuttall Company. The shape of the harp was arranged to eliminate all ribs and projections and give a smooth outline with no sharp edges or corners to catch in overhead construction. All screws and rivets were made flush with the outside surface. Other improvements included an axle pin with special provision for grease lubrication and new design contact springs.

The new type of direct-connected trolley catcher used by the Boston Elevated Railway formed a part of the exhibit of C. I. Earll. With this construction all brackets are eliminated as the catcher is bolted directly to the car. Provision is made for easy removal of the entire unit or the drum may be removed separately for inspection and overhauling.

Improved methods for painting cars proved a live subject for discussion and demonstration at the various paint displays. The R. F. Johnson Paint Company demonstrated some late developments in finishing of cars and buses. A new two-coat enamel system, requiring only a day and a half for application, was one of the late developments by this company.

Aluminum paint for car decoration and painting attracted considerable attention at the exhibit of the Aluminum Company of America. The use of paint as an advertising material and as a preventive of accidents was stressed by all the various paint salesmen and yellows and various orange shades seem to be the colors most in demand. At the exhibit of the Glidden Company demonstrations were given of the economies resulting from the use of Ripolin railway enamels.

FIVE ELECTRIC RAILWAY CARS EXHIBITED

On Arkansas Avenue, just across the Boardwalk from the Pier, were displayed five complete cars. These included one of the new Illinois Traction System's light-weight interurban cars as built by the St. Louis Car Company. This car was arranged for one-man and single-end operation. Light weight was a big feature and this car completely equipped weighed but 36,840 lb. and is taking the place of old equipment in the same service that weighed 90,000 lb.

Another car shown was a double-truck safety car, built at the American Car Company's plant in St. Louis for the Eastern Texas Electric Company, at Beaumont, Tex. Double folding doors were provided at diagonal corners, and a motorman's door on the opposite side of each platform. The weight was 28,500 lb. with seating capacity of 48.

A light-weight interurban car for the York Railways, mounted on Brill 77-E-1 trucks, and a special single-truck safety car built at the Kuhlman plant for the Columbus, Newark & Zanesville Railway were also shown. The York car seats 52 passengers, and the Zanesville car has a capacity of 28.

The de luxe idea in cars influenced the design of another car shown with the group. This had a low level floor, and seats for 48 passengers. Particular attention was given to a pleasing interior finish.

TRACK AND LINE MATERIAL

Way engineers found much of interest in the various track and paving exhibits. An alloy steel crossing built of 9-in. flange-bearing rails rolled to fit with A.E.R.E.A. standard 9-in. sections was shown by the Lorain Steel Company.

A new design of ground throw switch in a very compact box was exhibited by William Wharton, Jr. & Company, Inc. The operating lever lies on top in a recess in the cover of the box. This makes it possible to have a tight fit which will keep out dirt, water and other refuse. The mechanism is steel throughout and will work the same as an ordinary spring box set to throw either way or for one-way traffic.

A bituminous material shaped to fit any rail section was shown by the Philip Carey Company. This is being marketed under the trade name of Elastite rail filler and provides a resilient cushion that takes up vibration and movement of the rail. The construction also provides a watertight joint so as to keep out water and frost.

Many new specialties were shown of interest to the line department. Hubbard & Company showed many new devices for transmission, distribution and signal work. These included pole steps, dead ending clevices, wire holders, pole-top fixtures and spreader racks. A new pole-hole digger was shown by the Buda Company. This company also showed many specialties in trackwork.

The accounting department of railways found much interest in the labor-saving machines exhibited. A new typewriter key punch was shown by the Powers Accounting Machine Company. This was a combination of a standard typewriter and a key punch so as to eliminate punch operators. The typist in making out invoices can punch the tabulating card at the same time as the other record is made. A new duplicating machine for making copies of reports, statements, bulletins and other forms written with typewriters, pen or copying pencil was shown by the Beck Duplicator Company. This is being marketed under the trade name of "Speedograph."

A new type of coin assorting and accounting machine, which is in use by the Conestoga Traction Company, was exhibited by the Lancaster Automatic Coin Assorting and Counting Machine Company. This machine automatically feeds coins to the sorter and counter without an attendant. A variety of new machines for sorting, counting and wrapping coins or tokens was also shown by the Sattley Company.

Engineering Executive Committee

THE first meeting of the new executive committee of the Engineering Association was held at Atlantic City Oct. 9. Those present were President Charles H. Clark, chairman; C. R. Harte, Daniel Durie, M. B. Rosevear, R. H. Dalgleish, F. H. Miller, G. C. Hecker and Past-Presidents H. H. Adams, J. H. Hanna and H. A. Johnson.

The report of the committee on subjects was read and approved with minor modifications. This report was published in the issue of ELECTRIC RAILWAY JOURNAL for Oct. 11, page 650. The principal modifications were the following:

The committee to consider carhouse wiring and car wiring rules of the National Electric Code was instructed to include in its studies the subject of wiring of garages used by electric railways for storage and maintenance of buses and trucks.

Two new subjects were added to the assignment of the committee on equipment: (6) Continue the study of helical and spur gearing; (7) study methods for reducing noise in car operation in co-operation with the committee on way matters.

An additional subject was assigned to the committee on heavy electric traction: (4) Continue the study of train operation, with particular reference to articulated trains.

Subject (2) of the assignment of the committee on power generation and conversion, as published, was eliminated. This was the study of uniform methods for reducing failures of power apparatus and interruptions to service originating within the generator or substation.

A new subject was assigned to the committee on power transmission and distribution: (8) Co-operate with A.S.T.M. on the following projects: (a) Bring into complete conformity the hard-drawn copper trolley wire specifications of the two associations; (b) prepare specifications for high-strength low-conductivity trolley wire for adoption as recommended standard.

A new assignment to the committee on way matters is as follows: (8) Study methods of reducing noise in car operation in co-operation with the committee on equipment.

A special committee on recording power failures was authorized with the assignment to study of uniform methods for recording failures of power apparatus and interruptions to service. This formerly had been assigned to the committee on power generation and conversion.

A letter from T. K. Murphy of Pratt & Lambert, Inc., was read, which outlined the advantages to the railways and manufacturers of standardizing colors for use in finishing electric railway cars. It was stated that there are more than 100 shades of green, yellow, orange, red, cream, etc., now in use and that a heavy overhead expense is involved in manufacturing all of these special colors. After a lengthy discussion it was the opinion of the committee that standardization of colors as proposed by Mr. Murphy would be impractical and it was voted to drop the matter.

It was voted to adopt the suggestion of C. F. Gailor that stickers be furnished railway member companies with the inscription "We use A.E.R.E.A. standards." It was also suggested that manufacturers might indicate in their catalogs which of the materials listed were standard.

A letter was read from H. C. Wallace of the Department of Agriculture inviting the association to send representatives to the national conference on utilization of forest products, to be held in Washington Nov. 19 and 20. R. H. Dalgleish volunteered to represent the association and invitations were also sent to committee chairmen interested.

A letter was read from A. B. Foote of the Division of Simplified Practice inviting the association to be represented at a conference to prepare a tentative simplified schedule of gages and sizes of sheet steel. The secretary was requested to have a representative of one of the car builders present at this conference.

Mr. Miller stated that the equipment committee had been requested to co-operate with the Society of Automotive Engineers committee in assisting the Public Utility Commission of New Jersey to arrive at a reasonable set of specifications for bus design standards which would be satisfactory both to operators and designers. After considerable discussion the matter was referred to the executive committee of the American Association with the statement that the Engineering Association stands ready to assist in this work if authorization is granted.

News of Other Associations

Commission Regulation Indorsed

Investment Bankers Consider Utility Problems and Make Recommendations on Powers of State Commissions

AT THE annual meeting of the Investment Bankers' Association of America, held in Cleveland, Sept. 22-24, Thomas N. Dysart, of William R. Compton Company, St. Louis, was elected president for the ensuing year, and Henry C. Olcott of the Continental & Commercial Trust & Savings Bank of Chicago was appointed chairman of the public service securities committee of the association. The report of this committee was the principal point of electric railway interest at the Cleveland convention. It was presented by Henry R. Hayes, chairman. An abstract follows:

REPORT ON SECURITIES OF PUBLIC SERVICE COMPANIES

In view of the increased popularity of public utility securities, especially noticeable this year, it is not today of prime importance to discuss methods of improving the acceptability of such securities. Investors generally recognize the inherent soundness of the public utility business. Essentially this condition has been brought about by the industry itself giving a frank and open story of its business and, in part, by its selling securities direct to the consumer. Besides this, the state regulatory commission and court decisions have had the effect of assisting the industry in adjusting itself to post-war conditions as well as protecting the business from malicious attack, too often of political origin.

The committee this year has been more concerned in studying problems which are or will soon be of concern to investment bankers, namely, those attendant on the great expansion of the public utility industry, which is destined to take place in the next twenty years.

The position of this association with respect to state regulation is defined in general terms in the 1923 annual report of this committee, as follows:

> The committee recommends, therefore, that members of this association urge, wherever lacking, that the state commission be vested with authority over the valuation, rates, services, and capitalization of privately-owned plants and that there be required and published full financial reports of operation.

This opinion assumes that state-wide regulation must necessarily be administered in a broad and judicial manner in the interests of the public served, as well as of the investor. This association has not recognized any conflicting interest between the public served and the investor. On the contrary, it has pointed out that the interests of both are identical (see the 1922 annual report). However, it is far from being unaware that many, including self-seeking politicians, would have the public believe otherwise.

In the great expansion of the industry which is taking place there is keen competition for investment funds. Investors, therefore, can and actually do pick and choose their investments with discretion, favoring to a marked degree investments in those properties which are protected best by scientific regulation, rather than properties which are subject to the whims and fancies of state or local legislative bodies or executive officials.

We are continually reminded of the fact that more development takes place and rates and services are best in those states where state-wide regulation has not been subject to attack. There, we find, too, strong support of state regulation on the part of the public. Such results are obtained only when a legislature appropriates adequate funds for administration, and commissions are of proper caliber for their tasks.

For the present this committee has postponed, except in special instances, studies of the regulatory laws with respect to privately-owned properties in the following states and territories: Alabama, Arizona, California, District of Columbia, Georgia, Idaho, Illinois, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Tennessee, Utah, Vermont and Wisconsin.

Those states have been eliminated from its studies for the present, largely because there does not appear to be any immediate need for comprehensive changes.

With regard to the regulatory laws of states other than those above mentioned, it has recommendations to make to the district groups for their consideration. With respect to the laws of states not now reported upon, recommendations will be made in interim reports or direct to district groups.

The laws of many of the states vary greatly with respect to the term of franchises. State laws through constitutional provisions provide for the issuance of franchises of short duration—say 20 years. As we know, where the laws permit bonds are more often in good markets issued for longer terms. From the point of view of providing conditions for the issuance of securities it is distinctly in the interests of sound banking desirable to have issued by state commissions the so-called "indeterminate permits" as distinguished from franchises perpetual or limited in term.

This subject was discussed in the 1923 report, which sets forth, among other things, the states which do not require of these kinds of properties a standard system of accounting. The district groups of this association are again urged to exert efforts to accomplish sound accounting on the part of municipalities. As purchasers and distributors of municipal obligations it is surely a duty to do all that is possible to require sound accounting and administration on the part of municipalities.

The report was signed by Henry R. Hayes, chairman; Eli T. Watson, vice-chairman; H. M. Addinsell, Russell D. Bell, Charles R. Blyth, Chester Corey, John Esmond, Edgar C. Rust, C. J. Waddell, James C. Willson.

New England Club Meets Oct. 30

THE October meeting of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, Mass., on Oct. 30. The afternoon meeting, which will be called to order at 4 p.m., will be devoted to a series of papers on the following subjects:

"Comparison of Maintenance Costs of Old and Modern Car Equipment," by W. C. Bolt, superintendent of rolling stock and shops Eastern Massachusetts Street Railway.

"Lubrication of Railway Motors," by H. N. Ransom, Railway Improvement Company.

At the evening meeting the topics will be:

"Education," by Edward Dana, general manager Boston Elevated Railway.

"Co-ordination of Motor Vehicle and Electric Railway Service by Electric Railway Companies," by A. E. Potter, president United Electric Railways, Providence, R. I.

"Observations at the A.E.R.A. Convention," by R. D. Hood, the general manager Massachusetts Northeastern Street Railway.

The News of the Industry

Protest Against Interstate Lines

Electric and Steam Railroads in Massachusetts Agitated Over Inroads of Unregulated Bus Lines

Electric railways in Massachusetts are resisting the alleged unfair competition of buses, particularly those proposed for interstate business. On the other hand the Attorney-General is being appealed to by the bus promoters to pave the way for such operation. In consequence the situation in central and eastern Massachusetts is growing acute.

The principal question appears to be: Shall interstate bus lines, which run from one state into the next, almost express between terminals, be permitted? If such lines are permitted, then the question appears to be: To what extent can the interstate lines be regulated?

Several interstate lines are now operating. Some of them have a joint terminal station in Providence. In some Massachusetts cities the Mayors have declined to grant any licenses to such lines; in others licenses have been granted, and in some the companies are operating without licenses on the contention that they need none. They claim that no state law can prevent a transportation line from carrying a passenger into another state, and in at least one instance a bus line has been brought into a local court and fined $10 for operating without a local license, and it has appealed the case in order to test the matter in a higher court.

PROTESTS OVER-RULED

Thus far the railroads have opposed the granting of licenses to these interstate bus lines, but the Massachusetts Public Utilities Department has overruled the railroads and granted state licenses on the ground that there is no law to prevent these companies from organizing and carrying passengers. Street railways also have protested, but it has been pointed out to them that they have the same right to establish bus lines as the new bus lines themselves. So far as the railroads are concerned, they have been acting separately thus far, but it is understood that they are formulating a general policy toward the interstate bus lines to be followed whenever the occasion arises.

A case under immediate consideration is that of the Interstate Limited Motor Coach Company, which operates a bus line between Fall River and Providence. James M. Swift, former Attorney-General of Massachusetts, is an officer in this company and is counsel for an association of such companies, known as the Motor Coach Association of New England. Mr. Swift has already argued his case once before the present Attorney-General, Jay R. Benton, to prevent the institution of injunction proceedings against the interstate bus lines. His association represents companies which run lines from New Bedford to Providence, from Taunton to Providence and from Boston to Providence. These lines have been granted joint station rights in Providence by the police authorities of that city.

Mr. Swift argues that the interstate lines are not law-defying organizations, but desire to give safe and reliable service so as to win good will. Hence they do not need local control as a police measure, and the opinion is that the law does not compel them to take out local licenses. Where they have asked for local licenses, so that their legality should not be questioned, the street railways have opposed them. Such is the case in Fall River, where the Eastern Massachusetts Street Railway offered the opposition. The railroads and the street railways contend that the interstate bus lines take traffic away from them to such an extent that the existing companies may be forced to abandon service.

Mr. Benton has been asked by a number of city solicitors to proceed in court to have the interstate lines enjoined from operating without license from the cities and towns traversed. He has given some semi-public hearings in his office at the State House and has more hearings scheduled for the near future.

Rapid Transit Plans Submitted in Chicago

Entire Situation There Reopened by Proposals Made by Mayor Dever, Mr. Blair, Mr. Busby and Mr. Insull, Together with Engineering Report by R. F. Kelker, Jr.

THE final determination of the Chicago city administration to push its own subway plan to a test vote on municipal ownership, possibly as early as next February, has been revealed by Mayor Dever. In a message submitted to the City Council on Oct. 22 he offered a proposal in competition to one drawn up by Henry A. Blair, president of the Chicago Surface Lines; another by Samuel Insull, representing the elevated lines, and one by Leonard Busby, head of the South Side Lines. These proposals and several alternate proposals are now before the local transportation committee of the Council and a fifth major proposal for a $225,000,000 subway system is being drawn by the reincorporated Chicago Municipal Subway Company.

Mr. Blair submitted his project as a private citizen. He came out for a consolidation of the surface and elevated lines under a unification plan which ultimately would figure beyond $350,000,000. Under it the city would be permitted to purchase the entire system "upon due notice" or by amortization of a price based on recent valuations of the lines plus $66,550,000 in surface and elevated lines extensions purposed to be completed in the next six years.

Following Mr. Blair's lead, Mayor Dever expressed hope of accomplishing virtually the same result through a different channel. He aims for eventual unification, with the city taking the lead. Mr. Blair would have the city as a partner throughout, but Mr. Insull did not provide for such partnership or for participation of the surface lines in his subway scheme.

With Mr. Insull in Europe, his attorney, Patrick J. Lucey, indorsed Mr. Blair's declaration that unification is the only solution of the Chicago transportation problem. Mr. Blair, in his transmittal letter, summarized his aims as follows:

> A single fare and universal transfers for both rapid transit and surface lines, service at cost, municipal partnership in operation and eventually municipal ownership. It should be possible for a Chicago citizen to board the street car in front of his home, transfer to a rapid transit train and enter the loop through a subway all for one fare.

Mayor Dever said he hoped the surface and elevated lines would come to terms, but that he could never consent to take up the $90,000,000 elevated securities and the $262,000,000 surface lines securities as suggested by the bankers' committee in the purchase negotiations.

Mayor Dever declared himself virtually committed to city ownership because the state laws governing utilities have been extended until the city has no control whatever over transportation or rates of fare.

His subway proposal is said to be largely the same as that suggested by Major R. F. Kelker, Jr., the city traction expert, who submitted a detailed plan for a downtown subway and projecting elevated lines to the City Council committee on local transportation.

The Mayor said:

> Unified service should be rendered at the lowest possible cost and at no profit, in order that a reasonable rate of fare can be maintained. The settlement should be on such a basis as to permit the car riders to transfer between the subway, the elevated lines and the surface car lines and ride from any one part of the city to any other part of the city. The settlement will not be satisfactory unless it involves a

restoration to Chicago of home rule over the local transportation facilities and unless it avoids increasing the present burdens of general taxation.

In my opinion, a comprehensive settlement producing these results can now be brought about only by the acquisition of the existing surface line and elevated properties by the city through the use of the special bonds which I have heretofore described and by the immediate building of subways by the city, to be operated in conjunction with those properties so acquired by the city.

If it becomes clear that a settlement cannot be brought about on that basis because the persons holding the securities of the private companies cannot agree with the city on a fair price, then it seems to me that the city will obtain the largest measure of substantial relief in the shortest time through the immediate building by the city of a rapid transit system, including subways, to supplement the existing services by the surface and elevated lines.

This municipal rapid transit system should be planned, (a) so as not to duplicate the service now rendered by the surface and elevated companies, (b) so as to make possible co-ordination with the service furnished by the Chicago City Railway, the Chicago Railways and the Chicago Rapid Transit Company if and when any or all of them shall have been acquired by the city and (c) so that the system can be extended as rapidly as the city's financial condition will permit if none of the existing systems is acquired by the city.

Mr. Blair's proposed system would be capable of carrying 2,000,000,000 revenue passengers a year and, with the service-at-cost provision, he said financiers had declared the project to be a good investment. He revealed that he has had engineers and other experts working for two years to perfect the details. He is ready to go in for full unification or to enter a partnership with the city if the elevated lines object to consolidation. Special legislation, he said, would cause some delay, after which the consolidation would be ready to go ahead with the construction outlined in two three-year periods as shown in the table in the next column.

Mr. Blair called attention to the fact that the city's $40,000,000 traction fund was obtained through the 55 per cent split of surface lines receipts paid entirely by street car patrons and said it was only fair that this money be used to construct the underground link connecting the systems.

Some of the major paragraphs in his summary read as follows:

Service at Cost.—The lines to be operated under a service-at-cost agreement between the city and the companies which will, subject to regulatory statutes, provided rates of fare adequate to produce all operating expenses, taxes, maintenance, renewals and replacements, a fair return on the capital investment, an amortization fund for city ownership at a rate to be agreed upon, fare stabilizing fund and any other proper and necessary charges arising out of the operation of the transportation facilities.

Rates of Fare.—A one-city-one-fare system with free transfers between the several types of service included; rates of fare to be automatically adjustable to the cost of the service through the operation of a fare-control fund to be set up and maintained between certain maximum and minimum limits to be agreed upon.

Right of City to Purchase.—Acquisition by the city of all of the railroad properties at any time, upon due notice, through direct purchase or through the gradual amortization of capital in favor of the city.

Reorganization.—A reorganization of the financial structures of the companies which will bring the total security issues to par with the established capital value of the properties from year to year.

Supplemental and Auxiliary Bus Service.—Provision will be made for the development of such supplemental and auxiliary service by motorbuses wherever the demand exists and conditions for its operation are suitable.

Control.—Until under the provisions of this plan the operation of the railway properties is acquired by the city, or the city purchases the properties, the control shall remain with the companies, the city to be given its representation on the board of direction when the plan becomes effective and the representation of the city on the board to be increased from time to time in direct ratio to the equity of the city in the properties.

FIRST THREE YEARS

City-built subway on State Street, four tracks	$27,000,000
City-built subway on Washington Street from Grant Park to Union Park, two tracks	8,400,000
Elevated line construction and equipment	17,600,000
Surface Lines construction and equipment	15,000,000
Total	$68,000,000

SECOND THREE YEARS

City-built subway on Jackson Boulevard and Franklin Street from Grant Park to a connection with the east portal of the Van Buren Street tunnel	$4,000,000
Elevated lines construction and equipment	26,950,000
Surface lines construction and equipment	7,000,000
Total	$37,950,000

SUMMARY FOR SIX YEARS

City-built subways	$39,400,000
Elevated lines construction and equipment	44,550,000
Surface lines construction and equipment	22,000,000
Total for six years	$105,950,000

IMPROVED SERVICE RESULTING FROM ADDITIONAL DEVELOPMENT

Present rush-hour service in business district in cars per hour:	
Surface cars	1,103
Elevated cars	1,228
Total	2,331
Improved service possible in business district in cars per hour under proposed plan:	
Surface cars	1,703
Elevated cars	3,200
Total	4,903
Increase in cars per hour under proposed subway plan:	
Surface cars	600
Elevated cars	1,972
Total	2,572
Increase in cars per hour under proposed subways and rapid-transit development	1.10%

Mayor Dever and Alderman U. S. Schwartz, chairman of the local transportation committee of the Council, revealed that they had had an oral summary of the Blair plan from Mr. Blair while the recently dissolved transit purchase conferences were in progress. Mr. Schwartz said that he told Mr. Blair then that the people of Chicago would never consent to franchises for long periods and that without the long franchises the plan could not be financed.

Mr. Insull is seeking franchises providing for $23,000,000 of additional construction, including an entirely new north and south line crossing the city a mile west of the loop and connecting with the established lines at both ends.

Twin Cities Fare to Be Settled by January

The Minnesota Railroad & Warehouse Commission has decided that its report on fares to be charged in Minneapolis and St. Paul by the Minneapolis and St. Paul street car companies will be concluded by the end of December and will be submitted by Jan. 1, according to a recent statement of Commissioner Bowen. Briefs are to be filed by the two municipal corporations and the railway corporations on Oct. 15. Later final arguments on the briefs will be presented and the commission will begin to prepare its decision.

The controversy in these cities has been going on now for practically two years. The first action was enactment by the 1923 Legislature of an act which placed rate-making powers for the railways in control of the state commission, instead of the city councils. The 6-cent rates prevailing in the Twin Cities were undisturbed when hearings began before the commission in October, 1923. In view of the issue to be decided these rates are still on a temporary basis.

Receivers at Kansas City Await Instructions on Buses

The receivers of the Kansas City Railways are effecting a crystallization of their ideas regarding bus service, and it now seems fairly certain that such service will be installed by the company. It is reported, however, that some of the bondholders do not favor ownership and operation of buses by railways in a community no larger than Kansas City. On the other hand the receivers are said to be considering various plans of operating buses. One plan of this kind is said to contemplate a service with buses in the congested area with transfers to street cars that serve outlying districts. This downtown service would take up the present overflow. A 10-cent fare would be charged, it is said, with transfers free to the street cars. The receivers are also considering the installation of bus service into residence districts and the installation of a deluxe bus for special trips or sightseeing.

The receivers consider that the officials of Kansas City, Kan., have not fulfilled the agreement they made in July to withhold consent to bus operation in compensation for additional railway service into the industrial section. The agreement was made in July. But instead of bus service being eliminated, a tentative agreement was made with a new bus company, the H. H. Moore organization, under which ten or more buses are now being operated, some cross-town in Kansas City, Kan., covering a field in which it was intended to provide additional railway service.

The receivers also consider that the city has not played fair with it by permitting buses to use the intercity viaduct. The railway pays rent for the use of the tracks on this city-owned viaduct. The buses, however, do not follow the routes of street car lines except on the viaduct. The receivers expect definite instructions from the federal court in November in regard to the extent to which they may go in the matter of installing buses.

"Read as You Ride."—The Grand Rapids Railway, Grand Rapids, Mich., in co-operation with the Grand Rapids *Herald*, has installed the "Read as You Ride" boxes in all cars and papers are furnished early morning patrons quickly and easily. The service will be daily except Sunday.

Lively Hearing in New York on Buses

Board of Estimate Finally Gets Around to Work of Publicly Considering Recent Applications—Public Gets First Chance to Air Its Views—Another Hearing Oct. 29

POLITE figures of speech lack the virility necessary to characterize properly recent political history in New York or to convey an accurate and adequate idea of the present tumult over transit affairs. Perhaps the nearest accurate picture to the current happenings is contained in Shakespeare's "Macbeth." If memory does not play us false there is a scene there in which the caldron boils and bubbles in a world of toil and trouble. Well, the transit situation in New York is something like that, only more so. In this case the Mayor of the second greatest city in the world is sitting on the lid doing his best to hold it down, but succeeding only partially.

Apparently everybody wants to run buses or pretends that he wants to run them. A semi-official count says that there are 51 applicants for bus rights, with new ones coming in every hour. More than 213 miles of routes are covered by these proposals. Not a neighborhood or section has been overlooked, except perhaps Staten Island. Staten Island is remote to most New Yorkers, but will be discovered sooner or later.

Anyway, the long deferred hearing on the bus applications was begun before the Board of Estimate and Apportionment on the morning of Oct. 22. Estimates of the number of persons in attendance vary, but a conservative opinion put it at more than 500. Extra police were on guard. Comptroller Craig sat silent throughout the whole proceedings. In fact, he read a book most of the time. The title of this he carefully guarded, but it is believed to have been "The Anatomy of Melancholy." Except for this the meeting was of the usual complexion. As the writer for the *Evening Sun* aptly put it:

"Murray Hulbert, president of the Board of Aldermen; Borough President Riegelmann of Brooklyn and the Mayor vied with each other in coining witticisms, epigrams and bromides. Some of the spectators openly growled the opinion that this was supposed to be a serious meeting, where wise decisions should be made rather than 'wise cracks.'"

To help make a long story short it can be said that the Mayor read a prepared statement. As for the proponents of the bus grants, all that were heard recommended that temporary franchises be granted by the city to the private companies and that the city abandon, at least for the present, any idea of municipal ownership and operation of buses. The Mayor said:

> Because of the vicious activities of those who have been opposed to the administration's transit policies, and because of the unnecessary hardships afflicted upon the traveling public by reason of such activities, the situation which confronts the people of the city of New York today is this:
>
> Either the duly elected responsible local officials of the city of New York must wait until a Legislature will empower them to proceed with the municipal ownership and operation of buses, which, however, from past experience does not appear to be very likely in the near future, or they must grant recapturable bus franchises to applicants acceptable to the people and the Board of Estimate and Apportionment upon terms which will permit of the taking over of such franchises when the Board of Estimate and Apportionment is legally empowered to proceed with the plan of bus ownership and operation.
>
> The Board of Estimate and Apportionment will not do anything inimical to the best interests of the traveling public. It is desirous of granting the wishes of the people in this very vexatious transit situation. A public expression of sentiment upon the disposition to be made of the bus problem will receive immediate and careful consideration of the members of the Board of Estimate and Apportionment, who are anxious to provide the immediate surface transportation service so absolutely essential to the comfort and convenience of the traveling public.

Out of this wilderness of words a public clamoring for more transportation is apparently supposed to figure out where it gets off. By liberal interpretation in some quarters this statement has been taken to mean that the city is prepared to meet the ideas advanced by the representatives of the taxpayers in attendance at the meeting. That was as far as things got. None of the representatives of the 51 individuals and corporations that have applied for franchises had an opportunity to be heard. Presumably they will have their inning at the session on Oct. 29, to which date the hearing was adjourned.

VARIED VIEWS ON TRANSIT REPORT

If the Mayor should adopt the policy of granting short-term franchises such action would be in keeping with the report made to the Board of Estimate by the Board of Transportation, a body appointed by the Mayor and authorized to study the transit situation. That report, abstracted elsewhere in this issue, is generally regarded as taking an advanced view of the situation and as being designed to help matters if its recommendations are followed. As to that, however, the Mayor said a few weeks ago that he did not intend to be bound by the recommendations of the report. The B.-M. T. sees that report as a good thing. G. M. Dahl, chairman of the board of that company, has indorsed the findings. So has the Citizens' Union. Well, the report says among other things that 5-cent bus fares are not always practicable and that for the present, at least, municipal ownership and operation are not feasible.

But that is only part of the story. The Broadway Merchants' Association wants the street cars off Broadway and the Forty-second Street Property Owners' Association wants the street cars off Forty-second Street. On the other hand, property owners along exclusive Park Avenue can't see the bus for a moment. They insist they will not have their thoroughfare ruined by a bus line operated in front of their doors. Falling in with some of the ideas of the Broadway Merchants' Association, the New York Railways, still in receivership, announced on Oct. 22 that it was prepared to rip up 46 miles of line at once and to substitute buses, with possible abandonment ahead of more railway lines if events justified their replacement with buses. In general the officers of that company are in agreement with the terms for operation set down by the City Transit Board. That company proposes an interchange of transfers with the cars of its railway lines, but the Mayor sees little advantage in this particular phase of the proposal because he regards the surface lines as a dead issue. Meanwhile property owners along Third Avenue are urging the demolition of the elevated line along that street.

As if this were not enough, the passages at arms are kept up between the Mayor and the Transit Commission, a state-created body. On his part the Mayor says he will petition Governor Smith for the removal of the commission under charges of culpable negligence and malfeasance in office. He is harking back to the Brooklyn accident some months ago. This may, of course, be a pre-election gesture, but Mr. Delaney, appointed to the city Board of Transportation by the Mayor, has issued a word of warning. He says that he has always found that mere argument and assertion in support of a case are not satisfactory to any trial officer.

In reply to this Chairman George McAneny of the Transit Commission made public a thinly veiled threat that he would hold responsible under the laws against criminal libel such members of the Board of Estimate as may append their signatures to the formulated charges drawn up and presented by Mayor Hylan.

Mayor Hylan the following day called the attention of Mr. McAneny to certain provisions of the Penal Law about threatening public officials who have a duty to perform. Mr. McAneny thinks the Mayor is threatening him and the Mayor appears convinced that Mr. McAneny is threatening the city officials. There the matter rested on Oct. 22.

Major-General O'Ryan, a member of the Transit Commission, replied by radio on Oct. 20 through the city's sending station to the Mayor's recent talks about transit from the same station. The cure which the commissioner recommended for the relief of the city's transit ills was the plan advanced a year or more ago by the commission for the unification of all desirable transit lines under the centralized management of a board of control, the existing franchises to be acquired by the city and the whole unified system, though not municipally operated, to become the property of the city. This project contemplates the taking over of all necessary subway, elevated and surface lines with their consent and at a valuation fixed between them and the proper authorities. The Transit Commission many months ago held protracted public hearings on this proposal and its valuations committee made an exhaustive report upon the value of the properties concerned, which, in most instances, have been disputed by the corporations as too low.

Hundreds of years ago Plato wrote about the ideal commonwealth and More wrote his "Utopia." In the light of recent events in New York humanity does not appear to be in any immediate danger.

Increased Service Imperative

Transportation Board Urges Private Bus Operation for New York City —Says City Has No Power to Run Buses

Some of Mayor Hylan's pet transit theories are knocked into a cocked hat by a report of the Board of Transportation, appointed by the Mayor himself. The commanding features of the report, submitted on Oct. 15 by that body, are private ownership and operation of buses in New York City governed by revocable franchises, granted by the Board of Estimate and recognition that it might not be practicable to demand a 5-cent fare for all lines. All the recommendations were concurred in by the three members of the Transportation Board, Chairman John H. Delaney and Commissioners, Daniel L. Ryan and William A. DeFord.

The board recommends that the city should choose one of the larger companies instead of giving grants to a large group of small operators. The report says:

> Franchises covering comprehensive systems of routes that serve a broad extent of territory are preferable to grants authorizing disconnected short routes, and so far as practicable all routes should be designed with a view to the ultimate unification in a single comprehensive city-wide system.

On this subject the board further recommends:

> Franchises should be granted to applicants that can demonstrate financial and operating solidity so that the traveling public may be adequately served and the investing public protected from exploitations.

In its proposal for a "reasonable fare" the board says:

> Franchises should stipulate a rate of fare for a continuous ride, but the conditions attending bus operation are not identical with surface or rapid transit operations and therefore a universal 5-cent fare may not be practicable in regard to all omnibus lines.

Another salient feature which deals with the possibility of eliminating some of the existing surface lines is the following provision of the report:

> Franchises for new routes should be granted only to corporations organized specifically for the purpose of operating omnibus service, and that are subject to continued control by the franchise-granting authority of the city in respect to quality of service to be rendered. Existing street railroad franchises should not be enlarged so as to include the right to operate omnibus lines, unless long-term franchises are surrendered for new grants containing conditions similar to those to be incorporated in omnibus line franchises and providing that the city authorities will have the power to require a change from street car to omnibus operation to relieve traffic congestion.

LIMIT ON FRANCHISE TERMS

To insure eventual control of the bus lines the board declares that all franchises should embody in their terms provision that no franchise shall exceed a life of ten years; that the city reserve the right to purchase the tangible property upon a basis of valuation to be defined in the franchise-contract, when the franchise expires or is otherwise terminated, and the right of the city to control capital investments and regulate the amount and quality of service.

Other terms include audits of accounts, power to abrogate franchise if insolvency intervenes, or for failure to fulfill conditions of grants or for any change in the agreed fare.

Transfer of ownership or control or consolidation of routes is prohibited without the consent of the Board of Estimate.

Nine corporations are mentioned by the board as having proposed to establish "comprehensive systems" for which a preference is expressed. Eight of these have submitted definite plans, while the Interborough Rapid Transit Company and the New York Railways have expressed a willingness to undertake bus operation. The major applicants are:

Fifth Avenue Coach Company, Surface Transportation Company, Manhattan Bus Corporation, Service Bus Corporation, Audubon Transportation Corporation, People's Electrobus Corporation, Brooklyn-Manhattan Transit Corporation and Queens Bus Line, Inc.

The reasons for proposing recommendations as to policy are outlined by the board as follows:

> The bus is a more flexible and desirable surface transit facility than the trolley car because:
>
> A smaller capital investment, in proportion to the service rendered is required for installation.
>
> Street capacity for vehicular traffic will be increased by the ability of buses to load and discharge passengers at sidewalks without requiring other vehicles to halt.
>
> Greater safety to passengers and pedestrians will be assured.
>
> Variation of routes is always possible to avoid temporary obstruction to traffic, and better to serve the people.
>
> Rush-hour traffic can be more efficiently handled by the constant placing of equipment at the times and places where traffic is heaviest.
>
> Operations will not be slowed down or stopped if one transportation unit is disabled.
>
> Recreation facilities will be increased.

Of the 51 applications pending, 25 propose to charge a straight 5-cent fare, nine have a 10-cent fare, two ask for a combination fare of 5 and 10 cents, one recreational route asks 25 cents, another recreational route 50 cents, and 13 fail to state the fare to be charged. The applications cover practically every main thoroughfare in the city and most of the principal crosstown streets.

In the opinion of the board the imperative need is for the immediate establishment of increased service, whether to supplement rapid transit lines, to render crosstown service or furnish long-haul service.

Fares to Be Advanced in Boston

Imposition of $500,000 Additional Yearly Expenses Under Wage Award Just Announced a Serious Burden—Majority and Minority Wage Findings Reviewed at Length

BECAUSE of the award announced by the arbitration board giving the Boston Elevated Railway employees an increase in wages of 2½ cents an hour, the trustees of the company have decided to cancel all 5-cent fares in the city on Nov. 1 and install a 6-cent fare instead, except for school children, who will continue to travel for 5 cents. Five tickets will be sold for 30 cents, but the passenger who does not offer a ticket will have to pay 10 cents.

The 5-cent fare in Boston was a reduced fare, established on short runs not in real competition with the basic 10-cent fare lines. The 5-cent routes had, however, become so numerous all over the system that 1,000,000 people rode at this reduced rate last year.

The road must earn more than the extra $500,000 that the wage increase will cost, because it has been operating at a loss for three successive months. The $1,000,000 reserve fund has been completely wiped out. The net result today is that the company has a deficit of $1,200,000 to meet.

Certain additional economies will be practiced. More one-man cars will be placed in operation soon. If it is found that any of the 6-cent routes compete with the basic 10-cent fare there may be curtailment of the 6-cent routes. The 6-cent fare applies also to the company's buses.

As noted briefly in the ELECTRIC RAILWAY JOURNAL for Oct. 18, page 710. Chairman John D. McLaughlin of the board of arbitration and James H. Vahey for the union decided upon a wage of 72½ cents an hour for two-man operators, while the differential of 8 cents an hour for bus drivers and one-man car operators was continued. From these findings C. W. Mulcahy, arbitrator for the company, dissented. The opinions expressed by the arbitrators are of considerable general interest. As Messrs. McLaughlin and Vahey reviewed the matter the principal question was whether the former maximum wage, fixed by the board of arbitrators at 70 cents an hour and effective as of July 1, 1923, should be reduced to 65 cents, as the company requests, or increased to 95 cents, as the employees request, for the year ending June 30, 1925.

6,500 TO 7,000 EMPLOYEES AFFECTED

In round numbers the arbitration affects the earnings of from 6,500 to 7,000 employees, of whom half, perhaps, are motormen and conductors, the other half being engaged in miscellaneous work.

It was agreed that the board need determine only the wages of the motormen and conductors of two-men cars and that the wages of all other employees, known as miscellaneous employees, be adjusted by adding to or deducting from the hourly rates of the miscellaneous employees the number of cents per hour by which the hourly rate of the blue uniform men was increased or decreased by the arbitration.

The request of the company that the wages be reduced was supported by evidence to the effect that the basic wage, judged by all reasonable standards, was excessive, and much evidence in the way of comparative statistics was introduced to support this contention. More emphasis was placed on the present condition of the company's finances;

on the fact that in its last fiscal year, from June 30, 1923, to June 30, 1924, and beginning last December, a marked diminution has developed in its receipts from passenger traffic, resulting on June 30 of this year in what would have been a deficit of more than $140,000 were it not for the receipt of income to about this amount from other and unexpected sources, and on the present trend on the part of the public toward less riding on the cars, as shown by a decrease of more than $40,000 in receipts for September, 1924, compared with September, 1923. The comment of the majority opinion on this aspect of the case follows:

> The principle which applies to the relation between wages and the financial condition of employers, as generally stated by arbitration boards, by federal judges in receivership matters and by such authorities as Justice Higgins of the Arbitration Court of Australia and Chief Justice Taft when chairman of the War Labor Board, is, in substance, that the employee is not a partner or joint adventurer, sharing in profits and losses, and that his remuneration ought not to depend on these contingencies. Slightly paraphrasing a remark of one of these judges, "If the profits are 100 per cent, the fair and reasonable remuneration must be paid, and if the profits are nil it must be paid." It may be said, however, that the board does not adopt this principle *in toto* and without modification, as will appear in the ultimate decision of the case.

PUBLIC CONTROL ACT DISCUSSED

After discussing the provisions of the act to provide for the public operation of the Boston Elevated Railway, commonly known as the public control act and under which the board of trustees was created, the majority opinion said:

> It may be further said that under the provisions of this act, when, after a deficit has been borne by the public, receipts begin to exceed expenses the taxing district must be reimbursed for moneys advanced. But there is no provision for reimbursing employees whose wages have been cut in the process of reducing expenses, and have thus indirectly contributed toward bearing the deficit. It seems to us that so far, at least, as the facts in this case are concerned, the disparity between income and expenditure is not a reason for decreasing wages.

With respect to the claim that the wage itself is excessive, the majority opinion said that the questions as to what is a fair, just and reasonable wage can be answered only by applying "such standards or definite and accepted principles as seem plainly consonant with justice." The opinion said:

> No one would deny, we think, that the basic wage should be sufficient to enable the employee to support his family in reasonable comfort, to maintain a normal American standard of living, according to his position in life, and as established or fixed in his own locality or community, to educate his children and to lay by something for the future in the event of sickness or death. It is, however, more difficult to apply the standard than to define it.
>
> The eight-hour day is expressly recognized, as between the company and its employees, as the just, reasonable and basic period of labor, and the board is of the opinion that in fixing the wage rate only the amount received for six days' work a week should be considered. The present rate of pay as fixed by arbitration for the period from July 1, 1923, to July 1, 1924, is 70 cents an hour or $5.60 a day. It is true that the average wage earned is $5.94 a day for 6.46 average days a week. But these earnings evidently imply work in excess of the eight-hour period and six-day week, which, it must be conceded, are the fair criteria or norm of the justice of the wage. At the $5.60 rate for a day of eight hours, if we allow the employee fifty-two days as the equivalent of the Sundays of the year, and fourteen days in addition, as the equivalent of a vacation for that period, without any deduction for holidays, he will earn about $1,675 a year, provided nothing interferes in the way of sickness or other pressing necessity to require his absence from work. If, however, he must be absent from his work for a day he must lose a day's pay, because he is hired by the day and not by the year or the month. It is proper, however, to say in this connection, lest the fairness of the company as an employer be questioned, that employment with it is practically as permanent as the employee may desire; that the turnover is negligible in amount; that employees are not discharged except for cause, and that the working conditions are unexcelled in any city of the country, a manifest spirit of co-operation and mutual interest existing between the company and the men which could not but impress a disinterested observer.
>
> While we think that 75 cents an hour would under more favorable conditions constitute a just and fair basic wage, in the present circumstances, giving due consideration to the present trend of the company's income and to the large total outgo entailed by an increase of even 1 cent per hour, we are of opinion that 72½ cents an hour is a reasonable hourly wage, and we accordingly fix it in that amount.

The other questions submitted to the board of arbitration concerned "free transportation," "vacations with pay," "men called when off duty," "service car motormen," "time for reporting and turning-in," "station receivers," "one-man cars and bus-service," "pay for motormen operating trains," "guards riding between cars," "temporary changes in employment," "night work," "pay for employees not assigned," "loaning employees from one division to another," and "over-time in the department of maintenance."

Concerning the pay of employees for operation of one-man cars and bus service, the board awarded 8 cents an hour in excess of the 72½ cents an hour awarded to motormen and conductors on two-man surface cars. This is the same differential which has been in effect for the past three years.

The board denied the specific request for a vacation, as well as for free transportation.

The remaining questions affect working conditions and the opinion of the majority of the board was that such questions should so far as possible be arranged between representatives of the company and the association.

It was recommended that back pay from July 1, 1924, until date when the new rates are actually put in effect be computed at the rate of 3.55 per cent of the actual earnings of each man from July 1 to the date when the new rates begin. Payment of back pay is to be made on or before Jan. 15, 1925.

COMPANY ARBITRATOR'S DISSENTING OPINION

In the dissenting opinion of Mr. Mulcahy he said that he did not believe that the question of what is a fair and just wage should be determined in the abstract upon the basis of a theoretical budget as to how much a wage earner should have to support himself and his family according to a certain standard of living sometimes called the "American Standard," or according to one's individual ideas on the subject, without consideration of the industry involved, the conditions which it is obliged to meet, the wages paid in comparable occupations, the purchasing power of the wage as affected by changes in the cost of living, and the effect upon the other parties in interest. It seems to him that this was particularly true in the case of an essential public utility where the proper functioning of the industry was a matter of public necessity. By this he did not mean that the public may assert its interest against a particular group to deprive that group of a minimum fair living wage, but after wages have advanced beyond this minimum level it was in the interest of every one concerned, not the least of all of the employees themselves, that all these factors be considered to the end that the wage awarded might not cripple the industry or unduly restrict it in the performance of its service.

It seems to Mr. Mulcahy very plain that the imposition of the $500,000 burden which the majority award entailed was unjustified unless it could definitely be made to appear that these employees were not receiving a fair wage. It was his opinion that the men were not underpaid but, on the contrary, were well paid and were receiving on the average more than other groups engaged in comparable occupations. In his written opinion Mr. Mulcahy included a comparison to show that since December, 1914, the cost of living in Boston had advanced approximately 63 per cent, while during the same period the hourly rate of wages of the blue uniform men on the Boston system had advanced from 31½ cents to 70 cents an hour, or 124 per cent. During this period the hours of labor were reduced from nine to eight; a guarantee of a minimum pay for eight hours a day had been established; certain allowances in addition to the basic hourly rate had been increased, and the period of service required to attain the maximum rate had been reduced from six years to one. Mr. Mulcahy said that as a matter of fact the men actually worked on the average of 6.46 days a week and received an average weekly wage of $38.63 or more than $2,000 a year. He also said that a comparison of the rates of wages paid on other railways led to the conclusion that the men on the Boston system were well paid and that their wages compared favorably with those of men employed in the crafts.

He said that a year ago the wages of the Boston men were increased by a board of arbitration nearly 15 per cent so as to put them on a "fair and somewhat permanent basis," and in his opinion no changes had occurred since that time to justify an increase of the wage then awarded. In conclusion he said:

> Fully appreciating the desirability of having men well paid, it must be apparent that there is a limit beyond which a group of employees in public service cannot have wages increased without working an unjust hardship upon others. The wages of these men have been advanced step by step by successive arbitration until, in my judgment, this limit has been passed.

One-Man Cars Authorized

The City Council of Macon, Ga., has recently passed an ordinance granting the Macon Railway & Light Company the right to put into service one-man cars on all lines of the city. The permission is granted with the understanding that the city shall have full control and that if two men are required to give satisfactory service, such service will be given.

Extension of One-Man Cars Refused

The Public Utilities Commission of the District of Columbia recently refused to allow the Washington Railway & Electric Company to add ten one-man cars to those it has now in operation. The decision followed a public hearing and an inspection of the new type of rear-exit one-man cars which the company has developed. The commission took no action against the one-man cars now in use, nor does its order bar future extension. It refused the extension because it was believed that one-man cars were slower than the two-men type, that the presence of the conductor meant increased protection for the riding public and greater assistance to individual riders and because there was no unusual emergency confronting the railway company at this time.

An intimation that higher fare might be asked for if one-man cars were ruled out of use was made by William F. Ham, president of the Washington Railway & Electric Company, at a recent public hearing.

Mr. Ham presented testimony to show that street car traffic is falling off rapidly on the lines of both the Washington Railway & Electric Company and Capital Traction Company. Mr. Ham said:

> I should prefer not to have to raise the rate. Whether that is possible or not I don't know. The loss of traffic has been beyond our expectations, and if it continues something is going to happen. If the commission and the public do not sustain us in trying to operate as economically as possible, I presume an increase in fare will have to be asked.

Atlanta's Jitneys Scored

The revenue figures of the Georgia Railway & Power Company, Atlanta, Ga., for the month of September fell off $47,000 compared with revenues for September, 1923. The report of the company charged this decrease in revenue to unregulated jitney bus operation and added that "continued operation of the street cars is in serious jeopardy and something must be done immediately to save the city's transportation system."

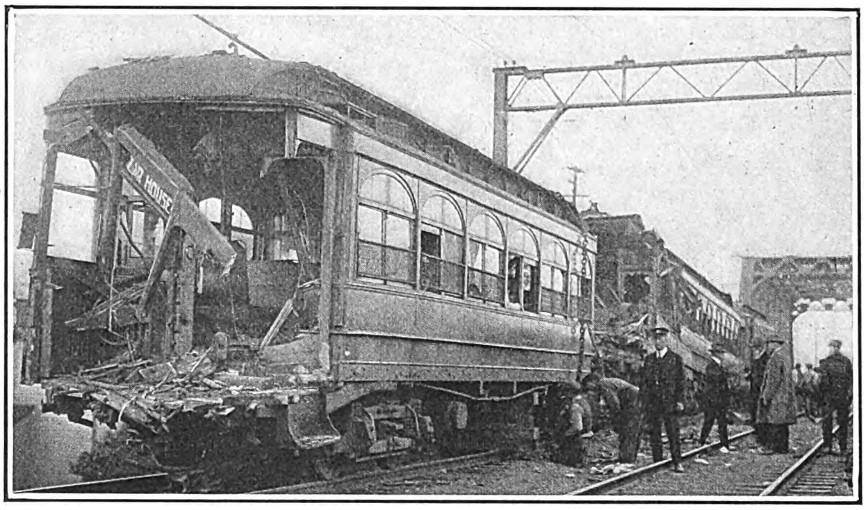
Simultaneously with the giving out of the September report the Atlanta Federation of Trade Committees issued a report following a special investigation declaring that property and rights of individuals must receive just protection and that the only position from which to view the subject was that of an adequate transportation system for Atlanta; that the jitneys do not and cannot furnish adequate transportation, but that the jitneys are meeting a need of some of the people. The committee concluded that the railway should be allowed to make a fair return on its investment and that jitney traffic should be regulated to meet the needs of those people whom the street cars are not serving. The committee stated that if the trolley cars were to run there should be the necessary protection to enable them to run at a reasonable profit after adequate maintenance expenses had been paid.

Chairman Ashley of the Federation of Trades investigating committee, brought out figures to show that in January, 1923, there were 125 jitneys licensed in Atlanta and that during that month the railway's earnings had been $12,000 in excess of the similar month the previous year. In July, 1924, the number of jitneys operating in Atlanta had increased to 362 and the earnings of the company for the month were $38,000 under the same period for the year before.

Serious Accident on Buffalo-Niagara Falls Line

Three passengers were killed, at least a score mortally injured and almost 100 were seriously injured in a rear-end collision on the Buffalo-Niagara Falls high-speed line division of the International Railway at Ellicott Creek crossing at Tonawanda, N. Y., on Oct. 19.

The three-car trains were running as the first two of two sections of an excursion carrying passengers from Philadelphia and New Jersey points between Niagara Falls and Buffalo. The six cars were demolished on a 20-ft. embankment near the bridge over Ellicott Creek.



Employees of International Railway Engaged in Clearing Away Wreckage Caused by Collision of Cars

The first section of the series of three-car trains had come to a stop because of trouble with the trolley pole. The second section was rolling along 5 minutes behind the first train with the other sections following at close intervals. The collision telescoped the second and third cars in the first section and the first car in the second section, but none of the cars plunged down the 20-ft. embankment near the creek. It took almost eight hours to clear the wreckage.

The dying and injured were removed to Buffalo and Tonawanda hospitals in more than a score of ambulances and private automobiles.

Five separate investigations are being made to determine the cause of the collision. It was believed by state police that no flagman had been sent back from the first section to stop the onrushing second section. The motorman of the second section was seriously injured, but before he lapsed into unconsciousness he told company officials he did not see the stalled first section until he was too close to bring his train to a stop. The brakes of the second section had been set.

Owing to the heavy traffic Sunday on the Buffalo-Niagara Falls high-speed line, the International Railway was using the old type wooden coaches for the Philadelphia-New Jersey excursion special. The heavy all-steel cars were being used for the regular traffic. Although the wreck occurred at 1:10 o'clock in the afternoon the sharp turn in the high speed right-of-way near the point of the fatality prevented the motorman of the second three-car train from seeing objects any great distance ahead.

Governor Wants Quick Action on P. R. T. Valuation Case

The Pennsylvania Public Service Commission was recently asked in a letter from Governor Pinchot to speed its investigation of the Philadelphia Rapid Transit Company's fare case. In his communication to W. D. B. Ainey, chairman of the commission, the Governor pointed out that three weeks had elapsed since the chairman replied to the Governor's criticism of the commission's "unseemly haste" in handling the rate matter, but that so far the Attorney-General had not been asked for an opinion.

The Governor suggests that the Public Service Comission will ask the opinion of the Attorney-General right away on three points: First, whether the commission is bound in regard to valuation in the P. R. T. case by its decision of June 21, 1923; second, whether the commission is not required by the law and the decisions of the courts to reopen and consider anew from the beginning the whole question of the P. R. T. valuation, and, third, whether the commission is in any sense bound by the admissions of the counsel for the city of Philadelphia, or other complainants, concerning the valuation of the P. R. T., or whether, on the contrary, it is not required, while giving due weight to all evidence submitted, to reach its own conclusions upon the basis of its own investigations.

News Notes

Exclusive Bus Right Sought in Indianapolis.—A franchise which would exclude all other bus lines from the use of 53 principal Indianapolis streets and boulevards for a period of 25 years will be sought of the Board of Public Works and the City Council by the Indianapolis Motorbus Terminal Realty Company. This company is said to be a holding company for the Indianapolis Motorbus Terminal Company, an association comprising about 18 bus firms. An unsigned copy of the proposed franchise was left in the offices of the city legal department. It was submitted to the Board of Public Works on Oct. 13 by William Bosson, city attorney, who asked for instructions as to its disposition.

Universal Transfers in Wilmington.—Under traffic arrangements with the Tidewater Power Company a new type of transportation service operated by the Coast City Transportation Company will be inaugurated in Wilmington, N. C. Free transfers will be issued from the Coast City Transportation Company's buses to the street cars and exchange tickets will be issued from the street cars to the buses on payment of 3 cents extra. The buses have a seating capacity of 16 passengers. The chassis is built by Graham Brothers, with a Dodge engine and bodies by the Straton Bliss Company. It will require two buses to maintain a 20-minute schedule. The third bus will be kept in reserve, and also will be operated during periods of heavy traffic. One of the noteworthy facts concerning the line is that it will go out of its regular path morning and evening for two or three trips in order to take care of the high school children.

Greenville System Expands.—The Southern Public Utilities Company recently began operating a bus line in Greenville, S. C., following authorization by the City Council. The line will serve the northern section of the city not heretofore supplied with transportation service. The fare on the bus is 10 cents and free transfers will be given to all lines of the railway system. A charge of 3 cents will be made for transfers from the trolleys to the bus.

P. R. T. Wants to Operate Over Bridge.—At a meeting on Oct. 17 of the Delaware River Bridge Joint Commission, the Philadelphia Rapid Transit Company and a Camden Bus Company made franchise proposals to operate cars or buses across the bridge. The Continental Coach Company, Camden, also indicated by letter its interest in the transportation over the bridge, but made no definite offer. The P. R. T. franchise proposal was signed by Ralph T. Senter, vice-president. It said that the rapid progress in the construction of the bridge made it imperative that arrangements for carrying passengers over it should be determined upon promptly. A committee will be appointed to study the transit needs of the bridge.

Terminal Plans Announced.—A vast improvement program to be undertaken within the next year jointly by the Pennsylvania Railroad, the Philadelphia Rapid Transit Company and the city of Philadelphia was announced recently by Gen. W. W. Atterbury, vice-president of the Pennsylvania Railroad. The plans call for the construction of a passenger station west of the Schuylkill, which will mean the elimination of the present Broad Street Station, and the substitution of an underground station for suburban traffic. The plan calls for modern construction throughout, with eighteen terminal tracks for through trains and eight tracks for suburban trains. The railroad will electrify the suburban zones as far south as Wilmington and eventually portions of the New York and Schuylkill Valley divisions. General Atterbury intimated that electrification to Baltimore and Washington was also in sight. The city's share is put at $12,000,000. It is planned to start the work next year and to finish it at the end of five years.

Will Renew Wage Agreement.—The Boston & Worcester Street Railway carmen's union, which recently took a poll on the wage question, has voted to accept the offer of the company and renew the wage agreement in effect since Oct. 1, 1923. The demands called for a wage of 90 cents an hour and an eight-hour day. The first local voted to submit the issue to arbitration and arbiters had been chosen by both sides. The company primarily wanted to eliminate the 7 cents an hour extra paid one-man car operators. Subsequently, the company offered to renew the wage scale and working conditions as of the period up to Oct. 1 of the present year. The wage scale accepted provides for 58 cents an hour for motormen and conductors on two-man cars and 65 cents an hour for men on one-man cars, on a nine-hour-day basis.

Relieved from Paving. — The Virginia Corporation Commission recently handed down a decision allowing the Newport News & Hampton Railway, Gas & Electric Company to discontinue its tracks along Locust Street from Queen Street to Malloy Avenue in Newport News. It also suspended the payment of the paving obligations assessed against the company for Locust Street by the City Council until "such time as the company is operating its lines at a profit." The company was also allowed to abandon its tracks from Wood's Corner in Elizabeth City County to Buckroe Beach, but it is required to operate the car service from Wood's Corner through East Hampton into the city.

Wants Buses Off Car Streets.—Arthur Gillion of South Bend, attorney for the Chicago, South Bend & Northern Indiana Railway, has conferred with Michigan City officials in regard to enforcing a city ordinance which says buses shall not run on streets on which the street cars operate. The Jahns Bus Company, which operates from Michigan City, Ind., to South Bend, via Laporte, would be affected by the strict enforcement of the measure.

Combination Service for East St. Louis.—G. W. Welsh of the East St. Louis Railway, East St. Louis, Ill., which has applied to the St. Louis Board of Public Service for a permit to operate buses over the St. Louis Municipal Bridge, states that his company will furnish a 15-cent combination street car and bus service from any part of East St. Louis to downtown St. Louis. Permission to operate a bus line along Tenth Street in East St. Louis from Missouri Avenue to the bridge has already been obtained from the East St. Louis City Commission and the Illinois Commerce Commission. The fare across the bridge will be 10 cents with an additional 5-cent charge if the rider wants to proceed further into East St. Louis. Along Tenth Street the charge will be the same as on the East St. Louis car lines, including transfers.

Appropriation for City Survey.—The St. Louis, Mo., Board of Estimate and Apportionment has appropriated $12,500 for a survey of the city transportation needs. An additional $12,500 for this purpose will be included in next year's municipal budget. C. E. Smith, consulting engineer for the city, in urging the appropriation pointed out that the United Railways will shortly ask for a new franchise and the city should be prepared to deal with the company.

Bus Permit Under Consideration.—The Board of Public Utility Commissioners of New Jersey has reserved decision on an application by the Central Transportation Company, a subsidiary of the Trenton & Mercer County Traction Corporation, to operate two buses from Trenton, Asbury Park and Bay Head. The Coast Cities Railway, operating both trolley cars and buses, objected to the approval, claiming that the Trenton company should not be allowed to compete with it among the shore resorts.

Competition to Be Eliminated.—The New Albany, Ind., City Council recently adopted an ordinance eliminating bus competition from the railway lines of the Interstate Public Service Company. A special committee to which the measure had been referred reported that after a thorough investigation the committee decided that the city could not support a bus service and the railway service and that the railway service was more essential to the public than the service of buses.

Bus Line Planned.—The Williamsport Passenger Railway, Williamsport, Pa., is planning to operate a bus line to connect with trolley cars of the South Williamsport division, to Duboistown, to connect with Newberry cars at the postoffice, or to connect with Third Street cars. The three plans are possible, the company to accede to the wishes of patrons on each route. L. W. Heath, general manager of the company, announces that application will be made at once to the State Public Service Commission for a certificate of public convenience. Service is contemplated before the first of the year. The bus route was promised following the company's announcement that the finances were not great enough to build a trolley extension on West Third Street over the Newberry-Duboistown bridge.

Financial and Corporate

Receivership Deferred

Application for Receivers for Oklahoma Railway Continued Until January —President Reviews Situation

For the present at least the prospect of the appointment of receivers for the Oklahoma Railway no longer impends. This does not mean that the problems of the company have been solved, but rather that a start has been made on a course which gives promise for the future. In consequence the application made on behalf of the Mississippi Valley Trust Company by its attorneys for the appointment of receivers for the railway has been continued by the court until Jan. 15, 1925. Meanwhile the company will go along under the new 8-cent cash fare with two tickets for 15 cents and the other changes noted in the ELECTRIC RAILWAY JOURNAL for Oct. 11, page 665. The previous rate had been 7 cents with four tickets for 25 cents.

The entire controversy was reviewed at length by John W. Shartel, president of the railway, in the issue of the Oklahoma *News* for Sept. 29 in an article written before announcement had been made of the decision to permit the fare increase. He would prefer to run the lines on a 5-cent fare, but it could not be done successfully. He said he had no disposition to extort anything from his patrons and that his past record bore out this statement. His remarks show that on Oct. 1, 1923, the cash investment in the interurban lines was $3,031,416. The gross revenue of the interurbans for the first eight months of the year was $421,941. Operating expenses and taxes were $320,458. Gross earnings for the eight-month period were $101,483. The falling off in their receipts has been alarming this year.

In regard to the city lines, they are operating at a distinct loss. City operations proper for the first eight months of 1924 show that the gross revenue was $533,960. Operating expenses and taxes were $447,387. The gross income, above operating expenses and taxes, was $86,573. Fixed charges were $167,526. The deficit on city operations for the eight-month period was $80,963. In other words, the city lines lacked $80,000 of meeting their actual expenses, to say nothing of depreciation, dividends, or paying for necessary repairs or forced improvements.

Mr. Shartel said very frankly that in order to meet this deficit it was found necessary grossly to overcharge the interurbans to furnish current funds to live on day by day.

For 1923, the interurbans paid the city lines $99,111 for passenger fares, for which nothing but power and tracks were furnished. This amounts to 30 cents per car-mile or more than the Belle Isle and Capitol Hill street cars earn.

The interurban also operates at its own expense the suburban line from Needham to Britton, and turns over to the city lines all of the earnings between Needham and Belle Isle.

The city lines also receive their mileage pro rata on all mail, express, baggage and freight. These items alone amount to $48,637, making a total of $147,748 which the interurbans contributed to the city lines in 1923.

This rental is more than 150 per cent more than the customary rental charged by city lines for use of tracks to interurbans with which they are not associated.

This is the basis of charge by the city lines, and the same is in effect for 1924, except the proportion is slightly larger, due to the fact that there is a greater decrease in volume of business on the city lines than there has been on the interurbans.

September Operations Increase Deficit in Toledo Fund

Operations of the Community Traction Company, Toledo, Ohio, for September showed a loss of $45,654 despite operating economies amounting to nearly $38,000 and some increased revenue due to recent fare increases. The total deficit in the stabilizing fund is now $123,000 plus the orginal $400,000 in the fund. Gross revenue for September was $269,007, as compared with $301,421 for the same month last year. Operating expenses were $222,519. Actual operating cost, exclusive of extraordinary maintenance, was $194,194, as compared with $246,331 for the similar month last year. Cost of transportation was cut to $95,543, or 18.036 cents per car-mile, which is the lowest total cost for any month. This is largely due to the extended use of one-man cars and elimination of an unprofitable line.

During the last month, the report of acting Commissioner E. L. Graumlich shows, car riding dropped to its lowest point since the Milner ordinance has been in effect. The daily average was 114,383 revenue passengers. Factory unemployment, bus competition, increased use of private automobiles and the increased fare are cited as contributing causes.

During the first nine months of the year $105,000 has been set up as extraordinary maintenance to take care of renewals on the Cherry and Summit Street lines. There is a cash credit in this fund and the regular maintenance fund of $79,535 ready for the work, which will probably not go forward until next spring.

The Community Traction Company is not now earning the interest on its $7,178,000 of first mortgage bonds outstanding and will probably have to borrow money to pay the interest coupons due in January.

So far in October a gain in revenue has been shown with the first 14 days about $8,000 ahead of last month.

$50,000,000 Gross for Canada

Record Earnings, but Net Shows Decline Due to Tax Burden, Expenditures for Improvements and Bus Competition

For the first time the electric railways of Canada in 1923 had a gross income of more than $50,000,000. Despite this fact, however, the roads were unable to show better dividends for shareholders, or, in the case of publicly-owned roads, to return better surpluses to the citizens. Factors that worked against the companies were the increasing tax burden and the necessity of spending millions on new equipment and extensions that increased interest charges without increasing revenues in the same proportion.

Of 64 railways only nine paid dividends. However, 20 Canadian roads are publicly owned. Of the 64 companies 15 showed operating deficits, and, after paying all charges, 40 showed corporate deficits.

USE OF ONE-MAN CARS GROWING

According to the annual report of the Dominion Bureau of Statistics, one-man cars are coming into quite common use. In fact, more than one-tenth of the 5,000 street cars in Canada are one-man cars.

Comparative figures of income and deductions of Canadian street railway systems are given for two years past:

	1922	1923
Earnings and Income:		
Gross earn. from operations	$49,660,485	$50,191,387
Operating expenses	35,986,871	36,171,922
Net operating revenue	13,673,513	14,019,464
Miscellaneous income	4,195,536	3,940,663
Total corporate income	17,869,149	17,960,128
Deductions from Income:		
Taxes	1,730,718	1,958,045
Interest—funded debt	6,545,825	6,765,078
Interest—floating debt	816,406	1,094,822
Other deductions	1,467,251	1,776,176
Total deductions	10,560,202	11,594,122
Total net income	7,308,947	6,366,005
Deductions from Net Income:		
Reserves, etc	4,664,822	4,589,081
Dividends	2,554,567	2,322,561
Total	7,219,389	6,911,643
Deficit	*$89,557	$545,637

* Surplus.

In commenting on these results the *Canadian Financial Post* says that in the operation of suburban lines, particularly around large urban centers, the bus has grown to be an important factor. This is particularly true around Toronto, where the buses compete with Hydro Radials. Recently a new tariff of license fees has been put into force by the Ontario Works Department. The contention is that the buses are using the provincial highways for gain and should pay adequate fees. The bus men claim that the tax levied is such that it will force them out of business. They say that it is not an equitable tax, inasmuch as it is not on the same basis for all bus lines, and contend that the buses in direct competition with Hydro Radials are being taxed so high and in such an arbitrary manner as to prevent them giving adequate service.

Alabama Traction Deal Approved

Stockholders of the Alabama Traction, Light & Power Company have approved the sale of the common stock and other securities which it owned in the Alabama Power Company to the Southeastern Power & Light Company, the American company recently organized for the purpose of taking over those holdings.

In a statement issued by Thomas W. Martin, president of the Alabama Power Company, it is explained that under the plan the common and preferred stock of the Canadian company will be converted into the common and preferred of the American company. The new company assumes the payment of all the obligations of the Canadian company, including the interest on the bonds at maturity. It was said that about 90 per cent of the common stock of the traction company is now owned by American citizens.

Will Foreclose Mortgage Against Titusville Property

Announcement was recently made that the holders of the bonds and mortgage against the property of the Titusville Traction Company, Titusville, Pa., have decided to foreclose. Without formal court proceedings the property will be advertised at trustees' sale. No interest has been paid on first mortgage bonds since January, 1920, nor on second mortgage bonds for the past ten years. The company, because of the increasing use of the automobile, has been unable to keep up the business. Recently only one car has been operated and that over the line between Pleasantville and Hydetown.

The line is 16 miles long. It was organized 27 years ago by the late M. B. Dunham, Warren. The first section of the line was built between Titusville and Pleasantville.

Illinois Farmers Do the Trick

After six weeks of operation in the control of 300 farmer-owners, the Fox & Illinois Union Railway, in Illinois, has announced a net profit of $24,000. The sharp contrast of the $8.40 gross profit for the first seven months of 1924 as shown by the Illinois Commerce Commission brought out the source of the recent big income as a $23,000 contract for power lines along the right-of-way.

For its entire life of eleven years the road has been a losing proposition, and when the farmers took it over recently for $89,000 they did so to keep it from being junked. They paid $25,000 cash, raised by an assessment of $2.50 for each acre owned by the farmers it served. It is the only freight outlet for five co-operative grain elevators owned by the same farmers, and although the junk value was placed at $117,000, the former owners took the farmers' bid as the best of several submitted.

The power right-of-way was sold to the Public Service Company of Northern Illinois, an Insull corporation. Mr. Insull agreed to receipt a bill for $8,000 for power, assumed in the purchase, and to pay $15,000 cash.

The line is 21 miles long yet passes through no incorporated town or village. The 300 owners have agreed to pay ½ cent bonus for each bushel of grain they ship, in the hope that the line can be extended 9 miles into the untapped Millington, Ill., district, where a large silica sand bed awaits development. The grain bonus will bring in $10,000 a year.

Pennsylvania Line to Be Sold at Auction

The trolley road of the Pennsylvania & New Jersey Traction Company, running from Morrisville, Pa., to New Hope, Pa., and Lambertville, N. J., will be sold at public auction on Nov. 17, in Philadelphia, to satisfy a claim for interest on a mortgage for $200,000. The mortgage is held by the Northern Trust Company, Philadelphia. The traction company is charged with default in payment of interest on the mortgage for 90 days. The sale will also include rolling stock consisting of five passenger cars, one freight car, three work cars, two snow plows and parcels of land in New Hope and Newtown. Cars are still running between Trenton and Morrisville, Pa., and Yardley, Pa., and from Trenton to Princeton, N. J.

Hearing Begun on Suit to Compel Eastern Massachusetts Dividend Payments

The case of L. Sherman Adams against the trustees of the Eastern Massachusetts Street Railway, Boston, Mass., to compel the payment of dividends on adjustment and common shares is on trial before Hon. Frederic H. Chase as master. In opening the case Boyd B. Jones, attorney for the plaintiff, outlined the claim of the plaintiff and referred to the books kept by the defendants and their reports to the Public Service Commission in their answers to interrogatories filed to them in the case. These, Mr. Jones asserted, abundantly supported the plaintiff's contentions.

Caleb S. Jackson, vice-president and treasurer of the railway, said that personally he did not believe the trustees had a legal right to resort to reserve fund for payment of dividends. He was not sure whether the matter of applying the reserve to this purpose was discussed at the time of making up the answer to an interrogatory in which the trustees said they had paid such dividends as had been earned, nor could he recall whether said trustees in January, 1923, when dividends on preferred and sinking fund stocks were decided upon, discussed such application of the reserve fund. The trustees did, however, discuss resorting to the reserve fund to pay dividends at various times.

Some time in September, 1922, the fund first appeared on the company's books. Mr. Jackson himself created this fund with the approval of the trustees. Some of the latter were decidedly of the opinion that the reserve fund was not applicable to the payment of dividends. It was the general opinion of the trustees that dividends on preferred and common stocks were included in cost of service. In substance, the trustees knew the fund was applicable to meet deficiencies in income in order to cover the cost of operation.

Mr. Adams is a Boston dealer in investment securities. He has on several occasions recommended the purchase of Eastern Massachusetts securities to investors.

Conspectus of Indexes for October, 1924

Compiled for Publication in this Paper
by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Oct. 1924 **7.15**	Sept. 1924 **70.8**	Oct. 1923 **6.95**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Sept. 1924 **151.4**	Aug. 1924 **152.6**	Sept. 1923 **163.2**	Sept. 1920 **247.5**	Sept. 1924 **151.4**
Street Railway Wages* 1913 = 100	Oct. 1924 **221.9**	Sept. 1924 **221.4**	Oct. 1923 **217.5**	Sept. 1920 **232**	Apr. 1923 **207.3**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Sept. 30 1924 **3.47**	Aug. 31 1924 **3.29**	Sept. 30 1923 **5.04**	July 31 1920 **11.12**	July 31 1924 **3.19**
U.S. Bank Clearings Outside N. Y. City (Billions)	Sept. 1924 **15.90**	Aug. 1924 **15.25**	Sept. 1923 **14.59**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures	Sept. 1924	Aug. 1924	Sept. 1923	Jan. 1924	Sept. 1924
Number	**1,276**	**1,432**	**1,279**	**2,231**	**1,276**
Liabilities (millions)	**26.95**	**40.96**	**30.83**	**122.95**	**26.95**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Oct. 1924 **207.6**	Sept. 1924 **211.2**	Oct. 1923 **220.3**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Sept. 1924 **148.8**	Aug. 1924 **149.7**	Sept. 1923 **153.7**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Oct. 1 1924 **13.00**	Sept. 1 1924 **12.81**	Oct. 1 1923 **13.10**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	Oct. 1 1924 **190.9**	Sept. 1 1924 **188.7**	Oct. 1 1923 **190.9**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Sept. 1924 **146.8**	Aug. 1924 **144.2**	Sept. 1923 **149**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Sept. 1924 **163.7**	Aug. 1924 **162.8**	Sept. 1923 **163.4**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Albany Southern Railroad Changes Name

The rearrangement of the capital structure of the Albany Southern Railroad, Albany, N. Y., and a change of name to the Eastern New York Utilities Corporation has been decided upon by the directors and approved by the stockholders. New financing of a comparatively small amount is contemplated by the sale to stockholders of a new prior preference stock of no par value which has just been authorized and issued.

The new stock has been authorized in the amount of 25,000 shares, to have preference over the existing common and preferred stocks, but only 3,000 shares of the issue is to be sold at this time. Stockholders of record, Oct. 18, will be permitted to subscribe for the new prior preference shares at $95 a share in the ratio of 8.814 per cent of the present holdings. The proceeds of the sale of stock will be used to pay floating indebtedness incurred for extensions, additions and betterments and to pay for further capital improvements.

The company operates 60.9 miles of third-rail railway and does a general power and lighting business.

Maumee Valley Line Will Be Abandoned

The Maumee Valley Railway, Perrysburg, Ohio, now in the hands of Receiver B. A. Webster, has been granted permission by the State Public Utilities Commission to abandon its lines. The west side line to Maumee will be abandoned at once and the east side line to Perrysburg will cease operating as soon as the new bus equipment of the Maumee Valley Transportation Company can be put into service. There were $345,000 of first mortgage bonds outstanding against the railway property.

The same interests have formed the new bus company to take the place of the former belt line railway. The commission has authorized the new bus line to do business on the east side of the river, but has withheld a certificate of convenience and necessity for the line on the west side because of present competition between bus lines already operating there and the Toledo, Bowling Green & Southern Traction Company's line.

Abandonment of Routes Approved by City.—Permission for the Oklahoma Union Railway, Oklahoma City, to surrender franchises for the Forest Park and Fife Place lines has been given by the City Council, subject to the approval of the Corporation Commission.

Personnel of Common Stock Committee Announced.—Howard Cook, Jefferson City, Mo., vice-president of the Central Missouri Trust Company, has been named by the holders of the common stock of the United Railways, St. Louis, as a member of a committee to represent the stockholders in negotiations with New York financial interests engaged in managing the present reorganization. The committee named consisted of Judge Fred L. English, Edward C. Singleton, president of the Missouri State Life Insurance Company, and Mr. Cook, with the Mercantile Trust Company, St. Louis, as depository. This committee has been named by virtue of an agreement among the holders of this stock to organize and vest all of their privileges and powers as stockholders in the committee for the protection of the interests of the holders. The common stock consists of 249,130 shares, a large portion of which is owned by the North American Company.

Approval of Refunding Issue Is Sought.—The Twin City Rapid Transit Company, Minneapolis, Minn., was authorized recently by the Railroad & Warehouse Commission to have its subsidiary, the Minneapolis Street Railway, issue $5,000,000 of 5½ per cent refunding notes to be dated Nov. 1, 1924, and due Aug. 15, 1928, to redeem $5,000,000 of extended first mortgage bonds issued jointly by the Minneapolis Street Railway and the Minneapolis, Lyndale & Minnetonka Railroad. As noted in the ELECTRIC RAILWAY JOURNAL for Oct. 18, page 715, the issue was recently sold to Dillon, Read & Company, New York.

Long Island Property Will Be Auctioned.—Property of the New York & North Shore Traction Company will be sold at auction Oct. 29 at the company's carhouse in Flushing, L. I. Several years ago the company operated between Flushing and Whitestone, Bayside and points in Nassau. The power plant and machinery at Douglaston, the carhouse in Flushing, private rights-of-way in a plot of ground in Whitestone will be disposed of.

Purchase Negotiations Considered.—A basis to negotiate either for the purchase of the Hamilton Street Railway System, Hamilton, Ont., or the renewal of its franchise was reached at a conference recently between officials of the city and of the company. No proposals were set forth by either group. All the city asked for was a definite proposal from the company so that the question might be submitted to the rate payers at the forthcoming municipal elections.

Vote to Take Over Company.—Stockholders of the Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., at a recent meeting voted to take over the Chicago, North Shore & Northern Railroad. The latter company was organized to construct the extension line between the right of way of the Chicago Rapid Transit Company and Niles Center, a distance of 5½ miles. The capitalization of the Chicago, North Shore & Northern was nominal.

Allowed to Abandon Passenger Service.—The California Railroad Commission has granted permission to the Visalia Electric Railroad to discontinue passenger train service from Visalia, Woodlake and Elderwood via Exeter and Lemon Cove, Tulare County. The company showed an operating loss of $50,000 a year for several years.

Wants to Abandon an Interurban Line.—The Olean, Bradford & Salamanca Railway has applied to the New York Public Service Commission for permission to abandon its interurban division between Salamanca and Little Valley, a distance of 8 miles. The company says the line cannot be operated at a profit. The commission will hear the application at Hornell, N. Y.

Sale of Power House Reported.—The sale of the Holyoke Street Railway power house on the bank of the Connecticut River near the Berkshire Street grounds at Holyoke, Mass., to the Turners Falls Power & Electric Company is said to have been definitely arranged. The transaction means a reported saving of about $50,000 to the railway in operating expenses. It is also said to mean the purchase of power for railway purposes from the Turners Falls Company.

Line Being Dismantled.—The Alamance Street Railway, Burlington, N. C., has abandoned operation and is now being dismantled. Early in the present year J. H. Bridges was appointed receiver as a result of defaulted payment of interest on $120,000 in bonds held by the petitioner. The receivership order was signed by Federal Judge E. Yates Webb on petition of the American Trust Company of Richmond, Va. At that time the receiver was authorized to continue the operation of the line connecting Burlington, Graham and Haw River. The railway is 8 miles long.

Properties Purchased.—The Public Utilities Commission has authorized the Ohio Public Service Company, Cleveland, to purchase the properties of the Sandusky Gas & Electric Company, the Port Clinton Electric Light & Power Company, the Northwestern Ohio Railway & Power Company and the Central Ohio Gas Company for $13,725,000, subject to present incumbrances. The commission also authorized the Ohio Public Service Company to issue $4,800,000 of 7 per cent preferred stock, $2,525,000 of common, $8,000,000 of 5 per cent first mortgage bonds and $1,000,000 of 5 per cent mortgage bonds.

$200,000 Verdict Against Denver Tramway.—The United States Court of Appeals sustained the city of Denver in its effort to collect approximately $200,000 from the Denver Tramway, money owed the city as a franchise tax. When the city sought to collect the tramway presented a signed agreement by the former Mayor of Denver that the city would allow the tramway $50,000 for the work it would do on the new viaduct at Sixteenth Street. It is understood that the $50,000 deduction from the taxes owed will cover labor and material as used by the tramway. If that be true, then the tramway gets the right-of-way over the viaduct and pays nothing toward the construction. The use of the viaduct by the tramway is essential to safe and fast operation.

Describes Property's Progress.—H. M. Byllesby & Company, Chicago, Ill., has issued an illustrative pamphlet describing the extent and growth of the properties of the Standard Gas & Electric Company and telling of its advantages as a utility investment. A map is included showing the territory served with electric lines, hydro-electric plants, telephone lines and electric railway service.

Personal Items

F. A. Cummings Vice-President

Former Newspaper Man Appointed to Executive Office with the Eastern Massachusetts Street Railway

Fred A. Cummings, who left the Boston newspaper field in 1919, to become public relations representative for the Eastern Massachusetts Street Railway, Boston, Mass., has been appointed a vice-president of the company. Since September last year he has been assistant to the chairman of the public trustees.

As just indicated, Mr. Cummings was formerly a newspaper man. In recent years it seems almost to have become the fashion for newspaper men to go into electric railway work just as in the past they have gone into other callings, particularly banking. Offhand, a score or more of similar instances are recalled. Notable among them are the cases of Fred Buffe, J. V. Sullivan, Ross Schram, J. W. Colton, John L. O'Toole and Paul Shoup. As journalists, all of these men know that you cannot live on yesterday's reputation. If your star is to continue high in the firmament you must be constantly up and doing.

What is the answer to the success that usually attends the newspaper man who enters another calling? Perhaps more than anything else it is the lesson of loyalty that he early learns. Certainly if there is any department of life in which the proverb "a good name is rather to be chosen than great riches," it is in newspaper work. It was H. H. Kohlsaat, former publisher of the Chicago *Record-Herald*, who died a few days ago, leaving the impress of his personality indelibly written on the pages of the history of American journalism, who said: "There is no place in journalism for the man who would break a confidence." Newspaper men err, but never guiltily.

Mr. Cummings entered railway work steeped in the ethics of journalism. He was formerly a special writer on the Boston *Globe* and before that was a member of the staff of the Lynn *Item*. He knew the state of the public mind, and so when the work of rehabilitating the road was begun his help and advice were sought. The Boston *Herald* once said that when the new era of railway management arrived in the Eastern Massachusetts Street Railway under public control the men selected to rehabilitate the property "looked around for a man who had spent his years finding fault with the system and they naturally turned toward Cummings." That is only partially true.

Anyway, Fred Cummings entered upon his work with all the fealty that is the newspaper man's. He told the trustees what he thought and he told the public what he thought. The public and the trustees winced in turn. There is one thing about it. Fred Cummings is progressive. And he is militant. More than one local politician has been brought down impaled upon the winged words of the man who knows bunk when he hears it and isn't afraid publicly to call a spade a spade.

Fred Cummings has worked unremittingly to have the railroad serve the best interests of the people who pay the fares, and to have the people cooperate with the trustees. As a result he has absorbed since 1919 a wide fund of knowledge of other departments from the intimate contacts which he has had to preserve with them, and so he goes into his new post not technically trained in the engineering sense, but with a far richer fund of all-around experience than it is often possible for the technically trained man to acquire in a similar length of time. In addition he is fortified with a keen recognition of the broad problems which the executive is constantly being called upon to meet.

Frank I. Hardy has resigned as manager of the Chelsea District of the Eastern Massachusetts Street Railway, Boston, Mass., to accept a position with the Boston & Maine Railroad. Mr. Hardy has been connected with the Eastern Massachusetts Street Railway since 1919. At that time he succeeded Timothy A. Donohue in charge of the Salem division. Mr. Hardy has been in the electric railway business since 1900. He has in the past been connected with the Union Traction Company of Indiana, the Fort Wayne & Northern Indiana Traction Company, the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway. He was also at one time general superintendent of railways of the Northern Ohio Traction & Light Company, Akron, Ohio.

F. J. O'Donoghue, manager of the Haverhill Division of the Eastern Massachusetts Street Railway, Boston, Mass., has been transferred to manage the Lowell Division. The duties of Garfield S. Chase, manager of the Lawrence Division, will be extended to include jurisdiction over the Haverhill Division.

Maurice E. McCormick, manager of the Lowell Division of the Eastern Massachusetts Street Railway, Boston, Mass., has been promoted to the position of manager of the Chelsea Division, including jurisdiction over the Melrose-Woburn Division.

George H. Whitfield has accepted the position of director of public utilities of Richmond, Va., succeeding E. W. Trafford who has served in that capacity since 1919. Mr. Whitfield is well known in Richmond, having served as engineer for the Virginia Railway & Power Company during the reorganization period in 1902. He was serving as engineer of the New Jersey Department of Institutions and Agencies when he received the present appointment.

H. F. Fritch Joins Boston & Maine Railroad

Howard F. Fritch, assistant general manager of the Eastern Massachusetts Street Railway, Boston, Mass., has been appointed assistant to Homer Loring, chairman of the executive committee of the Boston & Maine Railroad. It was Mr. Loring who was mainly responsible for the successful rehabilitation of the Eastern Massachusetts property and in that work, under him, Mr. Fritch took no small part. While the Boston & Maine is primarily a steam railroad the system does embrace a number of important electric railway properties and several bus lines.

Mr. Fritch has been connected with the Eastern Massachusetts Street Railway and its constituent companies since 1910. In June that year he entered the employ of the Boston & Northern Street Railway, one of the underlying companies that later went to form the Bay State Street Railway, the forerunner of the Eastern Massachusetts Street Railway. His first work was in the time-table department, then being organized. The scope of this department was later enlarged to include traffic studies and the compilation of statistics in connection with labor matters and fare cases.

For several years Mr. Fritch was assistant in active charge of the department, and in 1916 was placed in charge as superintendent of the traffic department. With the formation of the Eastern Massachusetts Street Railway he was made assistant general manager in charge of transportation. Then was evolved the plan of separating the system into units, each to be self-contained, with a local district manager in charge. In the capacity of assistant general manager Mr. Fritch worked in close co-operation with the managers of the several self-contained local units so as to make each of them successful under the conditions that obtained in its particular locality.

Mr. Fritch was graduated from the Worcester Polytechnic Institute in electrical engineering, class of 1910. He was born on Sept. 24, 1888.

New Head of Canadian Suburban Electrics

D. E. Galloway has been appointed assistant vice-president in charge of a number of suburban electric lines of the Canadian National Railways. Mr. Galloway is a native of Hamilton, Ont., and joined the Grand Trunk Railway in a clerical capacity in that city in 1901. He later served in various clerical positions in Montreal until June 1, 1906, when he became private secretary to the second vice-president and general manager. In 1911 Mr. Galloway was appointed assistant to the president and became assistant vice-president in 1922. When Sir Henry Thornton assumed his duties as chairman and president of the Canadian National Railways, Mr. Galloway was appointed chief assistant to the president. The companies which will come under Mr. Galloway's charge serve a large territory in the neighborhood of Montreal and Toronto.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Improvements Planned

Program of Rehabilitation for Madison to Cost $898,370—Twenty-nine Cars to Be Purchased

Representatives of the city of Madison, Wis., the Wisconsin Railway Commission and the Madison Street Railways recently held a joint meeting to consider the tentative program of street paving and street railway improvement which the Madison Railway is to fulfill for the next six years.

The committee which drafted the program consisted of: C. M. Larson, chief engineer; G. C. Matthews, chief statistician of the Railway Commission; Dudley Montgomery, vice-president; Warren Montgomery, treasurer; J. S. Allen, consulting engineer; E. J. Schubring, attorney for the Madison Street Railways Company; J. H. Brown, T. J. Ross and E. E. Parker, city engineer, for the city of Madison.

The total cost of all of these additions and improvements is estimated at $898,370, of which $690,740 is the Madison Street Railways' share and $207,630 is to be borne by the city of Madison. A committee of the Council is now working to embody the plan in an ordinance. It is the intention to complete the above work by 1930.

The features of the plan as agreed upon by the committee, listed in the order of importance, are as follows:

1. Rebuild and pave 300 ft. of single track at Highland and Regent Street.
2. Resurface and pave 600 ft. of single track on West Washington Avenue.
3. Rebuild and double track Atwood Avenue, including 5,600 ft. of single track, two crossings, one turnout.
4. Purchase 17 new cars and scrap 9.
5. Rebuild and pave 2,500 ft. single track and resurface and pave 1,000 ft. of single track on Williamson Street.
6. Resurface and pave 520 ft. of double track on Jenifer Street.
7. Replace track layout at carhouse and add new trackage and construct new storage shed.
8. Resurface and pave 785 ft. of double track on North Hamilton Street.
9. Rebuild and pave 1,950 ft. of double track, resurface and pave 400 ft. of single track and rebuild and pave 4,600 ft. of single track, overhead, crossings, turnouts, curves on Breeze Terrace and Monroe Street.
10. Resurface and pave 700 ft. of double track, resurface and pave 3,000 ft. of single track and pave 700 ft. of double track and build and pave 2,100 ft. of single track on Oregon Road.
11. Rebuild and pave 3,200 ft. single track, eight turnouts, twelve curves on four sides of Capitol Park.
12. Build and pave 4,350 ft. of double track with overhead for same on University Avenue.
13. Purchase 12 new cars and scrap 5.
14. Resurface and pave 3,700 ft. double track, two curves on Jenifer and Baldwin Streets.
15. Resurface and pave 1,500 ft. double track, resurface and pave 3,800 ft. single track, build and pave 3,800 ft. single track, four curves and four crossings on Mills and Emerald Streets.
16. Resurface and pave 2,700 ft. single track, rebuild and pave 2,700 ft. single track, two railroad crossings, one crossover on Winnebago and Atwood Streets.
17. Resurface and pave 2,800 ft. single track, build and pave 2,200 ft. single track on East Johnson Street.
18. Rebuild and pave 1,500 ft. single track, resurface and pave 2,400 ft. single track, build and pave 1,500 ft. single track, build and pave 2,400 ft. single track on Winnebago and West Main Streets.

Big Increase in Use of Wood Preservatives

That the year 1923 was a banner year in the wood preserving industry is shown by figures compiled by the Forest Service, United States Department of Agriculture. More treating plants were in active operation and the quantities of material treated as well as preservatives used were larger than ever before reported for any of the 15 years for which these statistics have been compiled. During the year 135 treating plants, or seven more than reported in 1922, were in active operation. They treated a total of 224,375,468 cu.ft. of wood, representing an increase of 57,755,121 cu.ft., or 34 per cent, over the 166,620,347 cu.ft. reported the year previous.

Increases were registered in 1923 over the quantities reported in 1922 in each of the seven classes of material treated, the largest occurring in cross-ties and poles in the order given. Of the former there were treated a total of 160,830,525 cu.ft., or 36,881,103 cu.ft. more than in 1922. In the case of the latter the total was 26,886,904 cu.ft. and the increase amounted to 9,878,264 cu.ft.

The preservatives used in the treatment of wood in the United States in 1923 consisted of 127,417,305 gal. of creosote, 1,570,932 gal. of paving oil, 28,830,817 lb. of dry zinc chloride and 4,706,968 gal. of miscellaneous preservatives. Zinc chloride was the only one of the four classes of preservatives used that did not show in 1923 an increase in the quantity used over that reported the previous year.

The 127,417,305 gal. of creosote used by the treating plants in 1923 represent an increase of 41,095,916 gal., or 48 per cent, over the quantity consumed in 1922. The consumption of paving oil was greater by 156,250 gal. and the quantity of miscellaneous preservatives used was more than double the amount reported in 1922. As mentioned above, the zinc chloride consumption was less in 1923 than it was in 1922, the decrease in consumption amounting to 1,037,822 lb.

Ever since the compilation of these statistics started in 1909 cross-ties have constituted the bulk of the material treated each year, because the wood preservation industry has been built up largely upon treated wood for railroad use, principally ties.

In 1923 out of a total of over 224,000,000 cu.ft. of wood that were subjected to preservative treatment more than 160,000,000 ft., or 71 per cent, were cross-ties. The actual number of ties was 53,610,175, or 12,293,701 more than in 1922. Although both electric and steam railroads are users of treated cross-ties, the latter employ the bulk of such material. The number of ties for electric railways that were treated during the year was 564,968, and of this number 20,106 were bored, 28,500 were both adzed and bored and 516,362 were neither adzed nor bored. The cross-ties intended for use on steam railroads numbered 53,045,207, consisting of 2,084,841 adzed, 793,776 bored, 3,045,496 that were both adzed and bored and 47,121.094 that were neither adzed nor bored.

The relative quantities of ties treated by different processes since 1909 are shown in an accompanying table.

CROSS-TIES TREATED IN THE UNITED STATES BY YEARS (CUBIC FEET)

	Creosote	Zinc Chloride	Zinc-Creosote	Miscellaneous	All Preservatives
1909	29,830,080	24,153,162	8,095,794	(a)	62,079,036
1910	44,525,229	27,587,583	6,354,219	(a)	78,467,031
1911	49,532,163	28,337,883	7,312,374	(a)	85,182,420
1912	57,461,515	28,532,874	8,214,303	2,974,317	97,183,009
1913	75,998,307	36,051,816	6,938,838	1,792,287	120,781,248
1914	67,774,329	50,020,755	5,868,834	7,877,043	131,540,961
1915	51,231,207	53,457,852	6,548,136	19,560	111,256,755
1916	62,576,403	43,859,028	5,935,242	37,431	112,408,104
1917	48,685,554	44,529,954	6,482,046	680,856	100,378,410
1918	34,638,147	51,166,146	6,023,334	(a)	91,827,627
1919	44,938,215	58,912,323	8,850,222	3,021	112,703,781
1920	40,114,551	87,398,160	7,414,866	35,019	134,962,596
1921	66,139,398	90,797,841	9,183,702	29,604	166,150,545
1922	60,625,086	52,254,303	11,045,913	24,120	123,949,422
1923	104,167,710	46,138,005	10,507,173	17,637	160,830,525

(a) No statistics.

Interborough Orders 150 New Steel Cars

The Interborough Rapid Transit Company, New York, N. Y., notified the Transit Commission on Oct. 22 that it had let a contract for 150 new steel subway cars, the last of the 350 required under the commission's orders, to meet increasing traffic demands. The cars will be made by the American Car & Foundry Company and will cost about $4,000,000.

The additional cars were called for in the commission's orders for May, 1922. The first 100 new cars were put in service a year ago. Seventy-two of the second 100 have been delivered and the remaining 28 will be available in November. Deliveries under the final order, beginning in February, will be completed by next fall.

The company has financed the purchases largely with car trust certificates. The new cars, together with additions to power plants necessitated by the increased car service, involve a total expenditure of about $11,000,000. Completion of the program will give the Interborough 2,277 cars, an increase of 19.2 per cent over the number in operation in 1921. The order for the electrical equipment of the new cars has been awarded to the General Electric Company.

The original order for the 350 additional cars was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 6, 1922.

Metal, Coal and Material Prices

Metals—New York	Oct. 21, 1924
Copper, electrolytic, cents per lb.	13.25
Copper wire base, cents per lb.	15.125
Lead, cents per lb.	8.40
Zinc, cents per lb.	6.75
Tin, Straits, cents per lb.	51.625
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.425
Somerset mine run, Boston, net tons	2.05
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.375
Central, Ill., screenings, Chicago, net tons	1.175
Kansas screenings, Kansas City, net tons	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N. Y., cents per lb.	17.75
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.08
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.12
Turpentine (bbl. lots), N. Y., per gal.	0.85

Rolling Stock

South Carolina Gas & Electric Company, Spartanburg, S. C., has ordered nine new buses from the White Company.

Brooklyn City Railroad, Brooklyn, N. Y., is sending out specifications for cars similar to the lot ordered last year, namely, four-motor, double-end cars with center exit. The number of cars to be purchased has not yet been determined.

Track and Line

Grand Rapids Railway, Grand Rapids, Mich., is making preparations with the city of Grand Rapids for the laying of new track on at least a half mile of Division Avenue and the paving between the tracks. The work would be begun next summer. Division Avenue, now a main artery, the city hopes soon to make a 100-ft. street. To facilitate operating conditions in the downtown section the company this fall will construct a new wye at Michigan Street and Monroe Avenue, the cost to be about $15,000 and the work to be completed in three weeks after starting.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., started work on the relaying of tracks on South Eleventh Street from Mitchell Avenue to Garfield Avenue on Oct. 1. This is an important reconstruction job with practically a mile of double track to relay. In this work 672,000 lb. of steel rails will be used. The cost of the rails alone will be nearly $20,000. For this work approximately 1,500 steel ties will be used. They will cost $10,650. Altogether about $50,000 will be spent in St. Joseph for material and supplies.

Washington Railway & Electric Company, Washington, D. C., has agreed to spend $105,000 in laying a new set of tracks for the Georgetown and Tennallytown line, in the center of Wisconsin Avenue. The District has agreed to allot, out of the $350,000 appropriated by Congress for the paving, the sum of $64,000 toward the trackwork.

Grays Harbor Railway & Light Company, Aberdeen, Wash., has announced the resumption of through service to Cosmopolis. The company has expended $14,500 laying new tracks and is contemplating considerable work on the Aberdeen-Cosmopolis line. The company has applied to the City Council for permission to place a single track across the new Wishkah River bridge.

Pacific Electric Railway, Los Angeles, Cal., has completed the extension of its line from the foot of East Second Street, Long Beach, to Naples Junction. The extension is more than 1½ miles in length. The Belmont Shore Company donated the right-of-way through its tracts and contributed $63,000 toward the cost of the line's construction.

Boston, Mass. — Construction work will begin soon on the new rapid transit line in Boston, from Andrew Square to Mattapan. The Boston Elevated Railway has signed an agreement with the city of Boston Transit Department for the lease and operation of this new line when it is completed. Bids were asked Oct. 20 by the Transit Department for the construction of the first section, out of Andrew Square. This is a tunnel section, and the excavated material will be used for fills at other points along the route. A part of the route will be the Shawmut branch of the New York, New Haven & Hartford Railroad, which was bought for $950,000. The railroad stations that will be discontinued are Field's Corner, Shawmut, Ashmont, Cedar Grove, Milton, Central Avenue and Mattapan.

Third Avenue Railway, New York, N. Y., is reconstructing 1½ miles of double track on Broadway from 242d Street to the Yonkers city line. The new construction is with 7-in., 122-lb. standard A.E.R.E.A. grooved girder rail on new creosoted ties with welded joints. The old construction consisted of 9-in. grooved girder rail on untreated wood ties spaced at 2-ft. centers with bolted joints. It is estimated that this improvement will cost approximately $180,000.

Trade Notes

Winona Service Equipment Company, Indianapolis, Ind., has been incorporated to deal in rolling stock and equipment for street or interurban railroads. The directors are Harry Reid, J. F. Wild and Ira E. Guthrie. It has a capital of $30,000 common and $60,000 preferred stock.

Hynes & Cox Electric Corporation, Albany, N. Y., has been formed to enlarge and carry on the electrical heating business established by Lee P. Hynes. Mr. Hynes has not severed his connection with the Consolidated Car Heating Company and the new firm, although handling industrial work, will not deal in any materials which conflict with the work of the Consolidated Car Heating Company.

H. T. Heath has been appointed western department manager of the Hegeman-Castle Corporation of Chicago, owned and controlled by the National Railway Appliance Company of New York. Mr. Heath was at one time connected with the Westinghouse Electric & Manufacturing Company and later with the Economy Electric Devices Company.

Eisemann Magneto Corporation, New York, N. Y., announces that O. S. Stanley has been placed in charge of the middle Western territory, with headquarters at 2005 South Michigan Avenue, Chicago, vice P. G. Sedley, resigned. Irving W. Edwards has assumed the duties of district manager, with headquarters at 85 Second Street, San Francisco.

John F. Folkers Engineering Corporation, Mobile, Ala., has been appointed agent to handle sales and service for the Triumph Electric Company in the Mobile territory.

New Advertising Literature

Atlas Valve Company, Newark, N. J., has issued edition No. 1 of Bulletin 5-A, which is devoted entirely to its line of Victor damper regulators. The functions of damper regulators are listed under nine separate headings. Hydraulic operation as compared with other methods of operation is discussed. Diagrams show how to apply the regulators to boilers. A technical description is given with illustrations explaining in detail the method of operation of the high-pressure damper regulator.

Engineering Products Company, Chicago, Ill., has issued a new price list and descriptive circular covering its line of rail benders, track drills, gages and levels. Copies of this new list will be furnished on request.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 48,941A, entitled "CR-9006 Enameled Resistor Units." It is an 18-page illustrated booklet describing the uses and advantages of these units and giving standard ratings and dimensions.

Scovill Manufacturing Company, Waterbury, Conn., has issued "Brass Facts," a 28-page booklet dealing with the characteristics of copper alloys, especially brass. The book classifies and gives the chemical composition of the most popular brass mill alloys such as brass, bronze, nickel silver and cupro nickel. It tells in detail how brass and nickel silver are made free cutting. Annealing for degrees of softness of brass is gone into, with numerous illustrations, showing the microstructure of annealed as well as rolled brass. This booklet also contains a detailed description of the method of manufacture of cup drawn Admiralty and special Muntz Condenser tubing and seamless tubing.

The Universal Coal Spreader Company, Chicago, Ill., has issued a seven-page pamphlet entitled "The Universal Coal Spreader." The pamphlet describes, with illustrations, operation with and without the Universal coal spreader.

New York, Saturday, November 1, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 18

Are We Determining Street Railway Wages in the Right Way?

TWO serious questions are raised by the increases in wages since the first of the year on a number of electric railways as the result of wage arbitrations. First, what is the industry going to do if wages continue to go up, or even if they remain at their present level? Second, is the right method being used generally now to determine the rate of wages to be paid?

As to the fact that wages on electric railways are very high at present, there can be no question. Albert S. Richey's index figure for October, 1924, published in this paper last week, was 221.9. This is larger than at any time during the war, and in the history of the industry it has been exceeded only for thirteen months in 1920 and 1921, at a time beginning at the peak of all the other common index figures.

Another disquieting fact about the present wage index figure is that during the last year and a half it has constantly been going up. Thus in April, 1923, it was 207.3. During the next six months it gradually went to 217.5. In January of this year it was 218.9 and in February it was 219. By June it had reached 220.4. In July, August and September it was 221.4 and October showed the figure of 221.9, already mentioned. The figures quoted are weighted, according to the method Mr. Richey has been following, on the basis of passenger cars operated by the different companies.

Obviously, if railway companies could increase their receipts in the same proportion as wages go up, their balance would still be on the right side of the ledger, but it is not always easy legally to raise fares nor always advisable economically to do so. Boston, it is true, has raised its local suburban fare from 5 cents to 6 cents due to its recent wage increase, but the effect on traffic is yet to be determined.

The second question likely to be raised in connection with recent wage increases—and closely connected with it—is whether the right method is being used generally by arbitration boards to determine the rate of wages. As a rule, in such proceedings held recently, the decision on whether wages will go up or down involves the question of whether there has been an increase or decrease in living costs, as shown by the various index figures and testimony on local conditions.

There are three manifest objections to the use of changes in the cost of living as the basis for a change in wages. The first of these is that the fairness of a wage schedule so determined must depend entirely upon the fairness of the one previously used. The second is the difficulty of determining the exact percentage of change in cost of living from the testimony usually presented. The third objection is that the extent to which it is used requires a corresponding disregard of the old measure of "supply and demand."

One advantage of the "supply and demand" method of determining wages is that generally it is capable of only one interpretation. Where the turnover is large, the wages are probably too low. If the turnover is very low, the wages may be unnecessarily high. Many electric railways have recently enjoyed a very low labor turnover. By itself this is a very desirable condition, but it is also evidence that employment conditions must be very satisfactory as compared with those, including wages, existing in other industries. In such circumstances, the question naturally arises: Is an increase in wages economically justified if those paid at present are enough to attract and retain competent employees?

Twenty Years of Transit Development

THE dinner given this week celebrating the twentieth anniversary of the opening of the first of New York City's subway lines, at which Frank Hedley, president and general manager of the company, was guest of honor, marked in a fitting way this milestone in the progress of metropolitan transit. The need for better facilities had been felt for a long time. The original elevated railways had been built some 30 years earlier, and operated first with steam and much later with electricity. Surface cars were installed on all the principal streets of the city, and were working to the limit of their capacity. Even subways had been projected years before, the first one having been proposed as early as 1868 and others following from time to time. Subway building, however, costs more money than the early planners could command. It took the courage and tenacity of August Belmont and his associates to finance the project, which in those days was an enormous undertaking for private capital.

At the time the subway was begun it was difficult to see the profound effect that event would have on the future development of the city, for the new line was looked on only as a supplement to the existing system of elevated lines which had been developed for many years. It was built in preference to an elevated largely on account of a civic pride that barred all overhead obstructions from the better streets of Manhattan, and incidentally to save damage claims from property owners. But on account of removing these objections it was possible for the new line, unlike the elevated roads that had been built earlier, to make its path through the heart of Manhattan, and as an extension on an elevated structure, well out into the Bronx. Soon it was extended to the center of Brooklyn through tunnels under the East River, doing away with the ferries and the transfer at the Park Row terminus of Brooklyn Bridge. Then, too, it gave a type of high-speed express service never thought possible on a purely urban railroad.

This original subway was but the beginning of a network that has been made to cover four of the five boroughs of the greater city and weld them into a homogeneous city, far greater than that dreamed of before rapid transit was a reality. While before the transportation systems were the child of the city, the city became the child of the transportation system. The entire face of the metropolis was transformed. Manhattan, once complete in itself, became the workshop of the greater city, and the farms and pastures of the old days became the residence districts. Instead of the promoters having to beg the city for permission to build, the city is now in the position of being the subway promoter, as it has been realized that only by rapid transit can the city prosper.

But a subway once built must be operated, and to be successful financially it must carry more people and at less cost than any other form of transportation. As one of the speakers at the dinner humorously remarked, it took a genius to pack 'em in for twenty years in the rush hours in such a way that the people still demanded more subways. That is the accomplishment of Mr. Hedley, who has managed the property during the entire 20 years of its existence, as well as the network of elevated lines of the Interborough system. One of the speakers remarked that his job is the hardest railroad job in the world. Under his direction the road has not only been operated as planned, but stations have been enlarged, trains have been lengthened, signals have permitted much closer headways, and automatic devices on the cars have permitted higher train speeds with a material reduction in the platform labor needed, so that the original subway is now carrying about four times as many passengers as it was designed for. With all this rush and bustle, the service continues day after day with scarcely an interruption. And "The New York subways always have returned to every customer more than full value for every nickel received." Surely this is an accomplishment of which any man can be proud, as the speakers at the dinner pointed out in paying tribute to the leadership of Mr. Hedley.

Making Anti-Friction Bearings Win

IT IS to be hoped that something more than a quizzical raising of the eyebrows will greet the account of progress with anti-friction bearings on some thirty-seven continental properties, as presented to the Internationaler Strassenbahn und Kleinbahn Verein in a paper by Karl Pforte, manager of the Hagen Street Railways. This report, abstracted elsewhere in this issue, is a strong reinforcement of a like statement on Franco-Belgian street railways by Ch. Harmel, manager of the East-West Tramways of Liége, which was abstracted in the issue of Aug. 30, 1924.

On the mere face of American experiences with anti-friction bearings, a certain degree of doubt as to their value would be justified. Operators in this country have tried, discarded and tried again both the ball and roller bearing in motors and for car journals. Most of the unfortunate experiences, also, have been with the journal bearings rather than those in the motors.

Manufacturers of anti-friction bearings no doubt began to use them on electric car equipments without a full realization of the hard service to which they would be subjected. But going deeper than a superficial summary it will be found that the manufacturers have been far less at fault than the assemblers and maintainers of car equipment, as well as those responsible for standards of track upkeep. One case comes to mind where it was absolutely impossible to run a batch of cars fresh from the builder because the ball-bearing journal boxes had been wrongly installed. Again, more than one failure of anti-friction bearings has been traced back to the shops where a graduate of the village smithy rather than a precision mechanic had the responsibility for results. In many cases, also, it was forgotten that a street car bearing has no rubber tires to absorb shocks that are ruinous to the anti-friction types.

If so many European properties can show good results from the use of anti-friction bearings, there must be several good reasons aside from matters of design and quality of material. Two reasons, undoubtedly, are the employment of better-skilled labor and the insistence upon smoother track. Certainly there is no reason why Americans cannot obtain results as good as those across the Atlantic.

Tell the Men the Real Meaning of Transportation

IN THE broiling heat of a summer afternoon, a railway shopman is engaged in the tiresome job of cleaning and inspecting the equipment of a snow sweeper. Such a task on such a day seems a cruel mockery. Who can blame the man for performing his work half-heartedly? Yet, because he is a real railway man, he does it with the same care and attention that the painter uses when decorating the exterior of a car.

Railway operation at times is full of interest, excitement—and sometimes of danger. The work of the moment may be to clear a blockade quickly, or to reroute cars in case of a fire so that passengers will not be delayed. It may be to pick up a fallen live wire or to keep the lines open during a terrific storm. Transportation means providing service as safe, as speedy, and as comfortable as may be possible—in the face of whatever obstacles nature or man may place in the way.

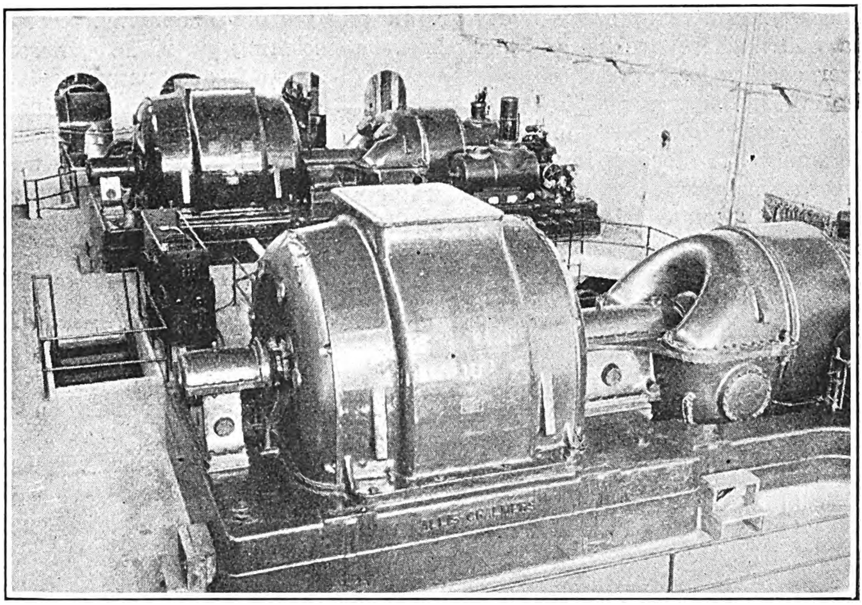
But transportation has another and less romantic side. It means keeping everlastingly after small details. It means inspecting brakes, tightening nuts, testing signals or walking the track in a dark subway. The excitement that sustains the men engaged in the actual operation of cars is lacking to those in the mechanical, electrical, or track departments.

There is nevertheless a certain satisfaction in knowing that the lives of the passengers may depend quite as much on the thoroughness of the man working unseen in the pits as on the care exercised by the man at the controller. Old railway men realize this. They know that responsibility for carrying the public safety rests equally on the men in every department and that the real reward in the transportation industry is not the wage paid but the consciousness of service rendered. Money alone would hardly induce a mechanic to work for hours in the heat of summer to put equipment in shape for the winter. Only the knowledge that it was part of the game would make him do a good job.

But new blood must be brought into the industry if it is to survive and progress. The new men taken into railway organizations every year do not always understand and share the point of view of the experienced transportation man. Yet nothing is more important than that every workman should be an enthusiast about his own business. No pains should be spared, therefore, in imbuing the new men with the spirit of transportation that has always made it one of the favored vocations of men with ability and vision.

Denver Tramway Modernizing the Power Plant

Faced with an Urgent Need for Increased Power Supply, and Unable to Buy Additional Power Advantageously, the Denver Tramway Has Increased the Capacity of Its Platte Street Plant So as to Meet All of Its Needs for a Number of Years



Interior View of New Section of the Turbine Room Shows the Two Units Recently Installed. The Entire Cost of the Plant and Buildings Is Now Less than $63 per Kilowatt of Capacity

RECENTLY completed changes and additions to the Platte Street power plant of the Denver Tramway represent the final solution of a serious and perplexing power supply problem that faced this company in 1922. At that time the economical generating capacity of the railway plant, together with approximately 15 per cent of purchased power, was insufficient for its needs. In addition, there was no reserve capacity to take care of the existing demand in the event of a shutdown of the principal turbine unit, and available facilities of power companies in the district offered no advantageous relief.

With this situation confronting it, the management made a careful analysis of the existing conditions and also of the probable future requirements for power. Finally, through a fortunate purchase of surplus generating equipment from the government, the railway company has been able to modernize its plant thoroughly and also to provide on an economical basis reserve capacity for the future.

LOW INVESTMENT AND OPERATING COST

The cost of the completed plant as now operated is less than $63 per kilowatt of capacity. This includes not only the cost of new equipment and installation labor in that part of the plant which is now operated, but also includes all real estate and buildings (a good portion of which is taken up by a building that houses old reciprocating equipment which will ultimately be disposed of). It also includes the total cost of six 750-hp. capacity Stirling boilers and the cost of a considerably larger boiler room than is actually required for the equipment which is now being used. This boiler room gives available space for future expansion of boiler capacity.

For a comparatively small station, the total costs of generated power are also maintained at a low figure. On page 760 a table gives a consecutive record of the cost of power to this company for a period extending back to 1910. In analyzing these figures it must be borne in mind that this is practically all railway load, which has an inherently poor load factor, and that the increased use of private automobiles has resulted in making this condition worse than was formerly the case.

OLD PLANT LACKED CAPACITY

An approximate idea of the situation confronting the company in 1922 may be obtained from an examination of the conditions existing before the plant was reconstructed. At that time the power was supplied by the equipment listed below.

In addition to the generated energy, the tramway company purchased approximately 15 per cent of its requirements in the form of hydro-electric power from the Colorado Power Company.

Combining the capacity of the plant and the purchased power gave a total of 19,575 kw. available. With No. 8 turbine shut down this capacity was reduced to

Platte Street Power Station		
Nos. 1 and 2	Two 800-kw. d.c. generators, engine driven	1,600 kw.
No. 4	One 1,600-kw. d.c. generator, engine driven	1,600 kw.
No. 5	One 1,500-kw. a.c. generator, engine driven	1,500 kw. at unity p.f.
Nos. 6 and 7	Two 2,000-kva. a.c. generators, turbo driven	4,000 kw. at unity p.f.
No. 8	One 7,500-kw. a.c. generator, turbo driven	9,375 kw. at unity p.f.
Total generating capacity		18,075 kw. at unity p.f.
Delaware Substation 60-cycle purchased power		
Rotary	One 1,500-kw. rotary converter	1,500 kw.
Total capacity of all sources of power		19,575 kw.

10,200 kw. The hourly peak load averaged 11,500 kw., so that with the No. 8 turbine out of commission, the maximum hourly peaks of 13,500 kw. could not be taken care of. Swing peaks were running up to approximately 16,000 kw. Because of the high water rates of the two small turbines and the reciprocating units the boiler capacity was only sufficient for about 10,125 kw. with No. 8 turbine shut down.

From the foregoing, it is apparent that if No. 8 turbine was shut down the old generating equipment would not be able to take care of the demand except under excessive overloadings. Its age and physical condition was such that this was taking unwarranted chances. No. 8 turbine was five years old and getting to a point where overhauling periods were becoming longer each year.

For years the average kilowatt demand of the system changed very little, but the maximum demand during rush hours has steadily increased. This is due to the increased rush-hour business of the company and the effect the automobile has had in holding down the off-peak load.

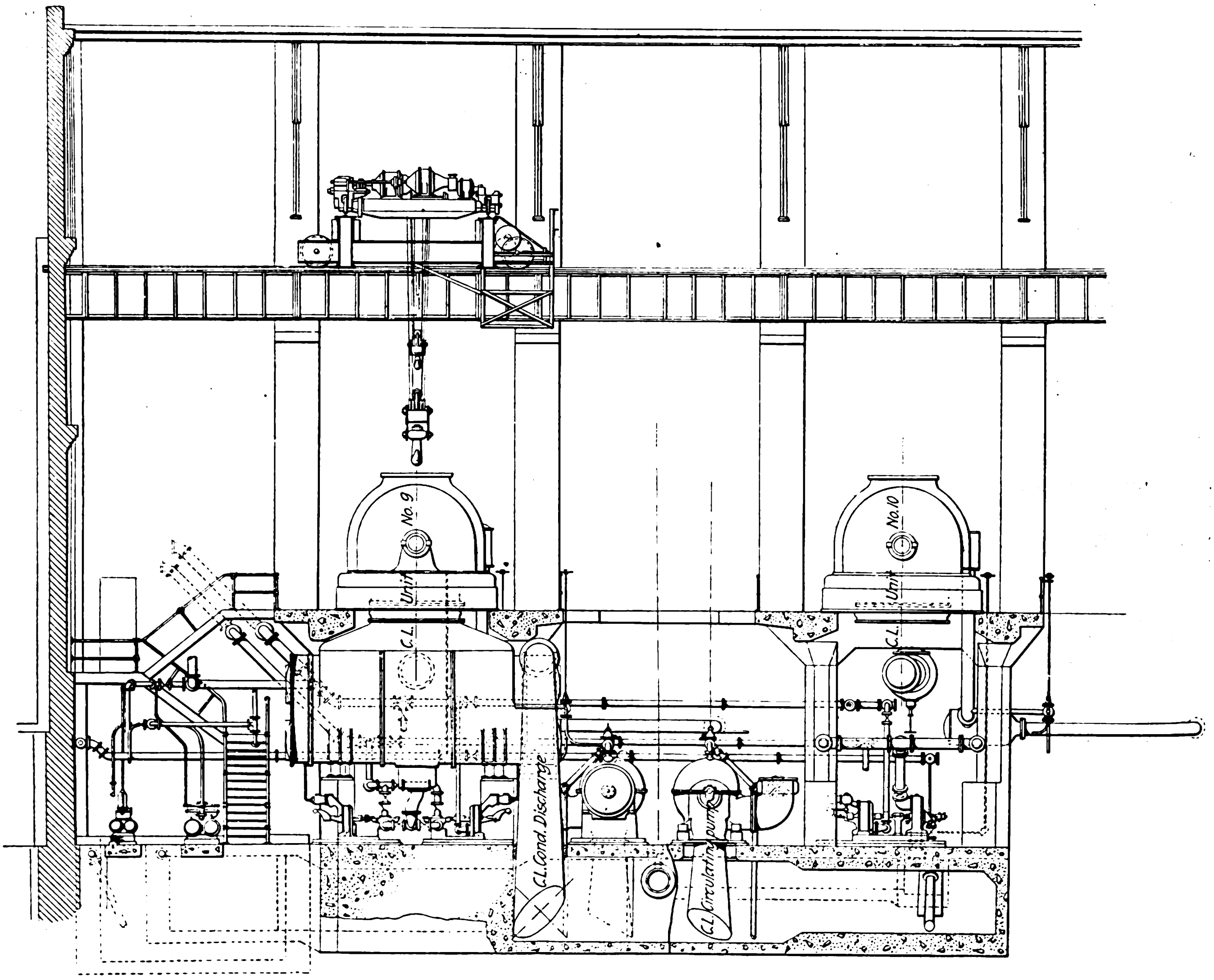
The capacity of generating equipment is determined by the maximum demand and the economy of the plant, and the proper size of generating units is fixed by the load factor. To determine just what was needed in the way of additional capacity, load factor curves were prepared, which took into consideration past loads, rate of increase in population, increased use of passenger automobiles, capacity of business district to accommodate parked automobiles, size of motors necessary under rolling stock, car speeds, number of cars required, etc. A period of 15 years was covered.

THREE PLANS OF PROCEDURE CONSIDERED

In view of the above situation it was necessary either to install more generating equipment or enter into contract for additional purchased energy. Three possible plans of procedure were considered.

1. To purchase all of the energy required by the company.
2. To generate all of the energy required by the company.
3. A combination of generation and purchase.

These plans were studied carefully. The "all purchase" plan was found impossible. There were two power companies in the field. The first did not have sufficient capacity to take care of the entire railway requirements, and even with sufficient capacity available, the rate was not attractive to the company. This situation was further complicated by the fact that the power would be delivered over long-distance transmission lines, making it necessary to have sufficient steam standby available to take care of interruptions. Steam



Cross-Section Through the Remodeled and Enlarged Platte Street Plant Shows the Arrangement of Turbines, Foundations and Auxiliaries standby in sufficient amount to guarantee continuity of service meant fixed charges to be added to the power company's charges.

A second power company in the field was not in a position to furnish the railway with power and suggested that it wait until a project the power company was working on had been completed. However, the time was too far in the future and the company was faced with the danger of a breakdown at any time. The rate offered, compared with the railway's own generating costs, also put this plan out of the question.

Another important reason why the company could not consider the purchase of all of the energy required by it was that its substations were all 25-cycle and the power companies were proposing to furnish 60-cycle energy. The conversion losses would be high, or if the company was required to sell the 25-cycle equipment and install 60-cycle apparatus, an expense of $600,000 would have been incurred with very little opportunity for recovering any part of this expense through the sale of the 25-cycle equipment.

The third proposition was a combination of purchase and generation, and this was rejected for some of the reasons outlined in the preceding paragraph, and also because the power company could not supply energy at a cost low enough to be attractive.

All Generation Plan Adopted

The second proposition of "all generation" was finally adopted. With the fact established that it was impossible to work out a satisfactory purchase scheme, either for all or part of its power, there was only one proposition left for the tramway company and that was to increase the generating capacity. The contract with the hydro-electric plant was expiring and could not be renewed on the old basis, so inquiries were made for one additional turbine unit of 10,000 kw. or larger capacity, which with No. 8 would have given approximately 20,000 kw. modern generating capacity. Proposals were solicited from the various manufacturers, estimates prepared and plans started for the addition of one new unit. There was sufficient building capacity to house this unit and sufficient boiler capacity available to supply the necessary steam requirements.

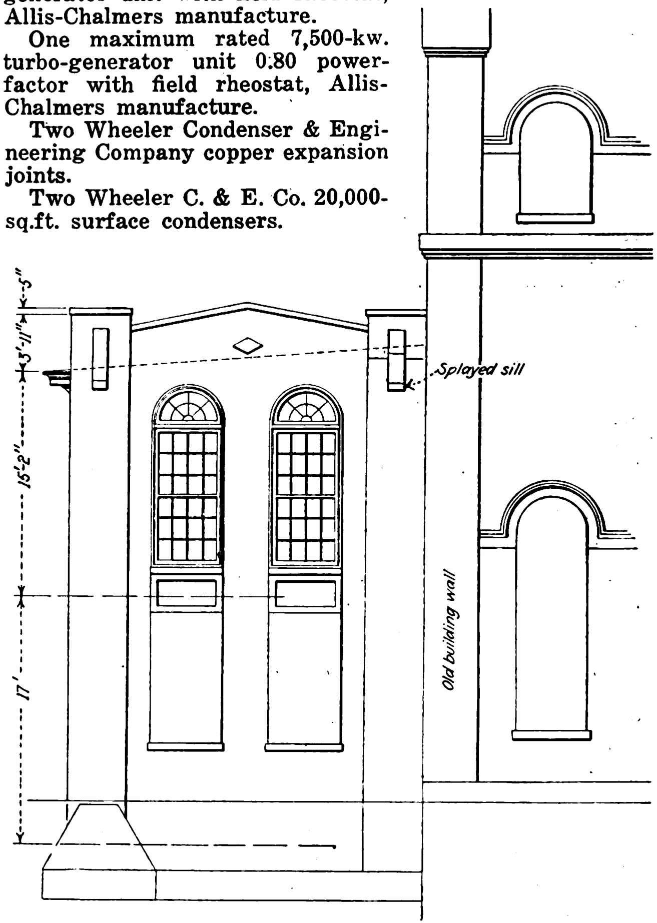
While securing bids the company's attention was directed to an advertisement by the government offering for sale generating equipment at one of the arsenals. The specifications of this equipment were identical with those covered in the specifications for the proposed additional capacity. Negotiations were started and resulted in the purchase of this equipment, which included the following:

One 10,000-kva., 8,000-kw., 0.80 power-factor turbo-generator unit with field rheostat, Allis-Chalmers manufacture.

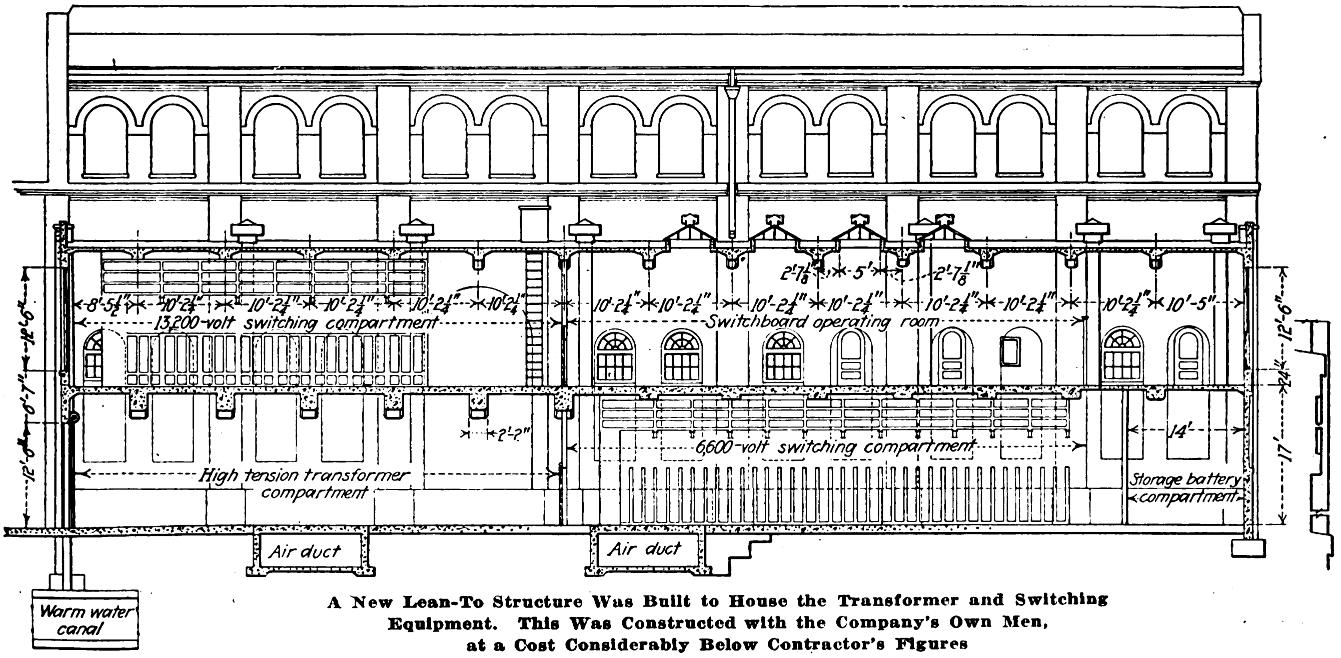
One maximum rated 7,500-kw. turbo-generator unit 0.80 power-factor with field rheostat, Allis-Chalmers manufacture.

Two Wheeler Condenser & Engineering Company copper expansion joints.

Two Wheeler C. & E. Co. 20,000-sq.ft. surface condensers.



End View of Addition Housing the Transformer and Switching Equipment



A New Lean-To Structure Was Built to House the Transformer and Switching Equipment. This Was Constructed with the Company's Own Men, at a Cost Considerably Below Contractor's Figures

ENERGY COST ON DENVER TRAMWAY, 1910-1924

Year	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923*	1924†
Energy generated and purchased, cost per kilowatt-hours (cents)	0.81	0.89	0.82	0.88	0.92	0.87	0.77	0.70	0.72	0.80	0.84	0.88	0.79	0.74	0.68
Pounds of coal per kilowatt-hour	4.97	5.03	4.91	4.89	4.90	4.48	4.19	3.94	2.51	2.46	2.57	2.55	2.55	2.47	2.53‡

*First new unit tried out November, 1923.
Both new units in service and old machines shut down—Nos. 8, 9, 10 in regular service and No. 4 as standby.
†Colorado lignite slack, average about 9,000 B.t.u.
‡Four months.

Four Wheeler C. & E. Co. hot well pumps direct connected to G.E. turbines.

Two Wheeler C. & E. Co. centrifugal air pumps direct connected to G.E. turbine.

Two Wheeler C. & E. Co. 24,000-gal. per minute circulating pumps direct connected to Allis-Chalmers motor with compensator.

Three "Rex" revolving intake screens, with motor drives.

Two Crane Company steam separators.

One General Electric Company 100-kw. exciter with field rheostat direct connected to G.E. turbine.

One G.E. 120-kw. exciter with field rheostat, direct connected to G.E. motor with compensator.

One "Northern" 50-ton electric traveling crane with 10-ton auxiliary hoist.

Three 750-kva., three-phase, 25-cycle, 6930/13860Y/480Y, G.E. transformers.

One Laidlaw-Dunn-Gordon 600-cu.ft. air compressor belt driven by G.E. motor with compensator.

One Allis-Chalmers 400-gal. per minute centrifugal boiler feed pump direct connected to Allis-Chalmers turbine.

One Allis-Chalmers 300-gal. per minute centrifugal service pump, direct connected to Allis-Chalmers turbine.

Two American Spray Company 25,000-cu.ft. per minute air washers with motors.

This equipment was new; some of it had never been uncrated; one of the units had been partially set up and the other was on the floor just as taken off the cars. It developed that these two units, having a total capacity under the conditions obtaining in railway operation of nearly 20,000 kw., which had never been used, could be purchased at a reasonable price. It was impossible to negotiate with the government for the purchase of one machine, so therefore, inasmuch as they and their auxiliaries were so well suited to the needs of the Denver Tramway, both units were purchased and installed. The net result is that this power plant is thoroughly modernized and has sufficient capacity to produce power economically for years to come. From a study of the load forecast it was apparent that a single 10,000-kw. machine would have given sufficient capacity only until 1926.

INSTALLATION OF NEW EQUIPMENT HAS GIVEN RAILWAY ADEQUATE CAPACITY

The two units purchased from the government are known as Nos. 9 and 10. They are located in the power house in the same position as No. 8, set on reinforced concrete foundations, column design. The condensers are at right angles but directly underneath the discharge end of the turbine, close connected. These condensers are Wheeler C. & E. Co. 20,000 sq.ft. capacity ultimate, now equipped with 12,500 sq.ft. of tubes. They are served with Wheeler C. & E. Co. hot water pumps connected to G.E. turbines and Wheeler C. & E. Co. centrifugal air pumps connected to G.E. turbines. There are two hot well pumps for each condenser. Each condenser also has a Wheeler C. & E. Co. circulating pump direct connected to an Allis-Chalmers motor. Allis-Chalmers service pumps of 300 and 400 gal. per minute are installed. The air intakes to the generator are protected with an American Spray Company 25,000-cu.ft. per minute air washer, motor operated.

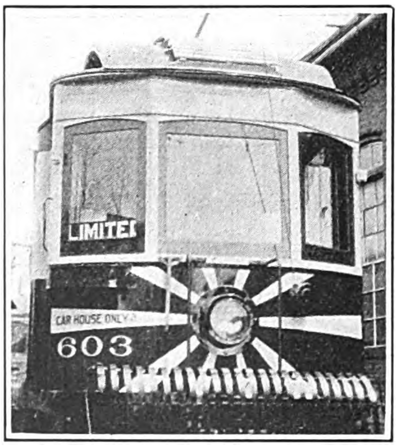
The high-tension switches for this station had been located in a building that had long since become overcrowded, and it was necessary to build a new structure to house this equipment. This new switch house is of concrete lean-to construction, two floors, housing the high-tension transformers, 13,000-volt concrete bus-cell structure and the 6,600-volt concrete bus-cell compartments; also the generator feeders and the auxiliary switchboards, which in the old arrangement were located in the lower part of the old engine room. The transformers, oil switches and bus construction are of modern design.

All of the foregoing work was undertaken and consummated by operating forces of the tramway company with the exception of one Allis-Chalmers superintendent of erection and the construction costs were appreciably lower than those estimated in the bids which were submitted by contractors.

The new equipment was installed with no interruption of service. The turbines were erected, tested out and placed in operation in conjunction with the old equipment. At no time was it necessary to shut down the plant on account of this construction work. The changeover from the old switch house to the new was carried on under operation.

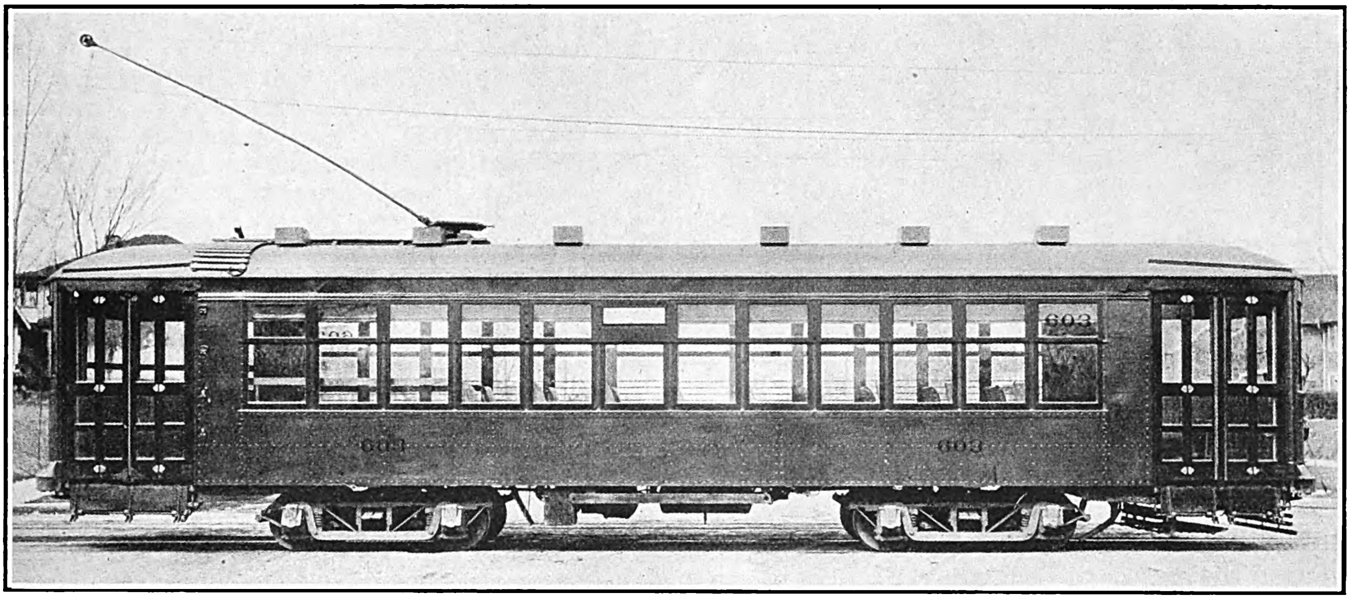
Painting to Widen the Car

AN UNUSUAL camouflage scheme is being tried on the dash painting of a number of the cars of the Schenectady Railway. The design shown in the accompanying illustration is worked out to give the appearance of greater width than actually exists. By an optical illusion the car at a casual glance appears to be several inches wider than it actually is and the object of this is to deceive automobilists and truck drivers into giving the car a little more room than they ordinarily would. It is being tried out by Niles Persons, master mechanic of the railway. It is believed that it will reduce accidents of the side-wiping type between street cars and other vehicles on the street.



How Schenectady Cars Are Camouflaged to Give Appearance of Greater Width

Another peculiar painting design was tried on the new cars of the Brooklyn City Railroad, but in this case it was for the purpose of attracting attention to the new cars as a means of inviting traffic and informing passengers that it was one of the new front-entrance, center-exit type cars.



These Low-Floor Cars Have Proved Popular with the Riding Public in Des Moines

Medium-Weight Low-Floor Cars in Des Moines

New Cars Have Proved Popular with Passengers—Single-End Construction Gives Seating Capacity of 48 and Total Weight of 38,000 Lb.

TEN new cars of moderate weight and pleasing appearance, which were put in service in Des Moines early in the summer, have proved very popular with the riding public. These cars are arranged for single-end operation and are equipped with four G.E. No. 247 motors and K-35 control. They are of the straight side girder type of construction with arch roof and folding doors and steps at front and rear. The platform floors are carried flush with the car body floor, and a 3½-in. ramp from the bolsters to the end sills serves to reduce the height of steps.

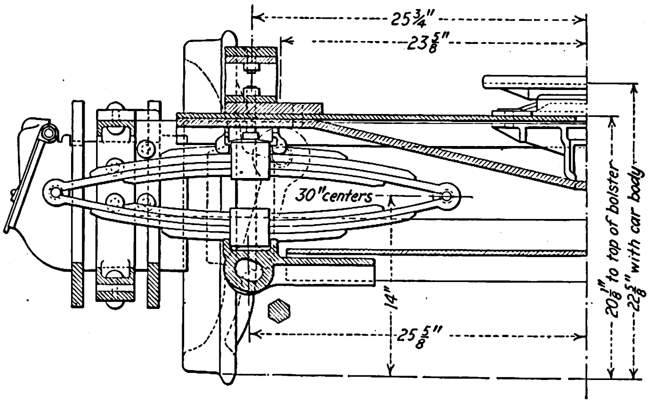
Side posts are spaced on 2-ft. 5¼-in. centers; and with an over-all length of 46 ft. a seating capacity for 48 passengers is obtained. By carrying the inside lining close to the girder plate the cross-seat width is made 35 in. and the aisle is 25⅜ in. between the seat aisle plates. The seat backs are offset at the aisle end so that the distance between the edges of the backs across the aisle is 29⅜ in.

Cherry is used for the interior trim. The headlinings are painted cream color and all interior rails and stanchions are of aluminum.

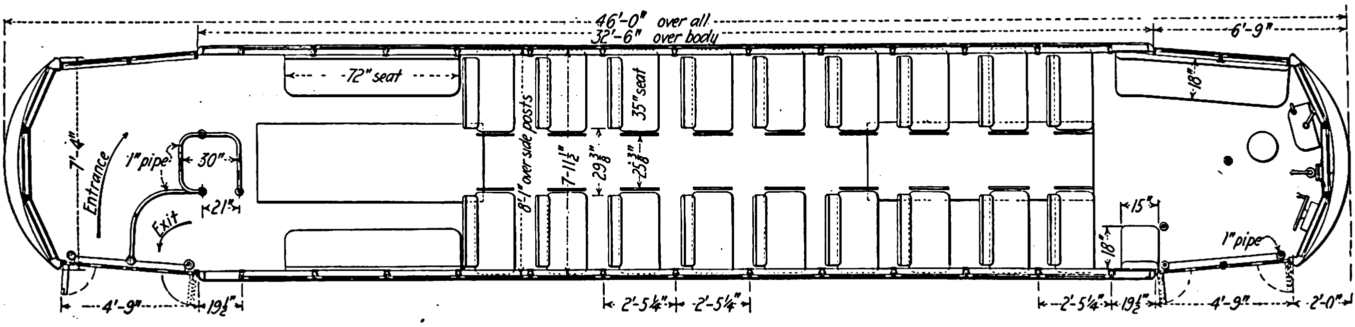
The principal dimensions and distribution of weight are as follows:

Length over all	46 ft.
Width over all	8 ft. 2 in.
Bolster centers	20 ft. 6 in.
Side post centers	2 ft. 5¼ in.
Width over side posts	8 ft. 1 in.
Height over trolley board	10 ft. 11 9/16 in.
Height from rail over car floor	33½ in.
Height from rail to bottom of side girder	26 13/16 in.
Height from rail to platform floor	30 in.
Height from rail to step	15⅝ in.
Height from step to platform floor	14⅜ in.
Wheel diameter	26 in.
Wheelbase of truck	5 ft. 6 in.
Weight of car body complete	20,000 lb.
Weight of truck with four GE-247 40-hp. motors	10,000 lb.
Weight of equipment	8,000 lb.
Total weight completely equipped	38,000 lb.

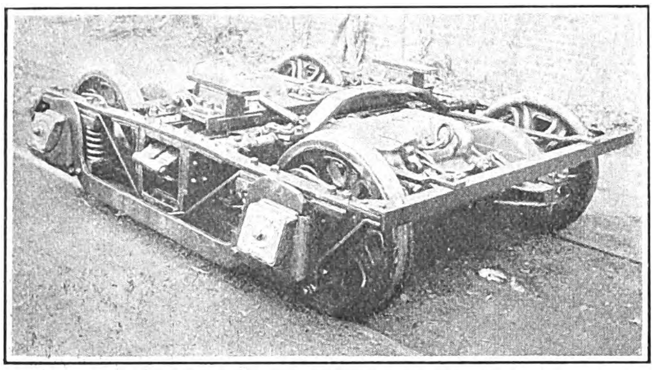
The cars were built by the McGuire-Cummings Manufacturing Company, and are mounted on McGuire-Cummings type MC-62 low-level trucks. These trucks are



The Arched Brake Beam on the Special Type of Low-Level McGuire-Cummings Truck Has Two Long Shoes that Ride on Longitudinal Straps and Keep the Beam from Tilting



Single-End Construction Gives a Seating Capacity of 48—Folding Doors Are Pneumatically Operated



Low Car Level and Ample Road Clearance Are the Objectives in the Truck Design

of the equalizer type and are specially designed to give the low level and at the same time maintain a minimum clearance of 4 in. above the rail. The brake rigging is arranged with an arch brake beam having a long forged sliding shoe at each end which rides on top of longitudinal members extending from the transom to the end frame, and which are designed to keep the brake beam from tilting. The double-length brake hangers are provided with a spring on the top to prevent chattering. Compensating-type full elliptic bolster springs are arranged to provide for variation in the live load.

All wearing parts of the trucks are case hardened, including pins and bushings. Pedestals are made of forged steel, machine finished. A cast-steel yoke connects the 2½-in. x 7-in. flat-bar transom to the side frame, and heavy gussets are provided to reinforce the corners and support the brake rigging. The bolster is of built-up construction, composed of channels and plates. Journals are 3¾ in. x 7 in.

Four GE-247 40-hp. motors provide the motive power for these cars and the control is type K-35-JJ. The detailed specifications and list of equipment are as follows:

Compressor	GE CP-27
Seats	Heywood-Wakefield upholstered rattan
Heaters,	Consolidated Car Heating Co.
Thermostats,	Railway Utility Co.
Ventilators,	Railway Utility Co.
Curtain fixtures	Ring No. 88
Curtains,	Double-face pantasote
Hand brake	Peacock
Headlining	Agasote
Control	GE K-35-JJ
Trolley base	US-13E
Door equipment,	National Pneumatic Co
Headlight	Golden Glow
Sand trap,	Des Moines standard
Outside paint,	Pratt & Lambert Vitrolite
Axle	Standard Steel Works
Wheels	Illinois Steel 26-in. rolled steel
Lifeguards	H-B
Register	International R-5

Saving by Radio Announcing

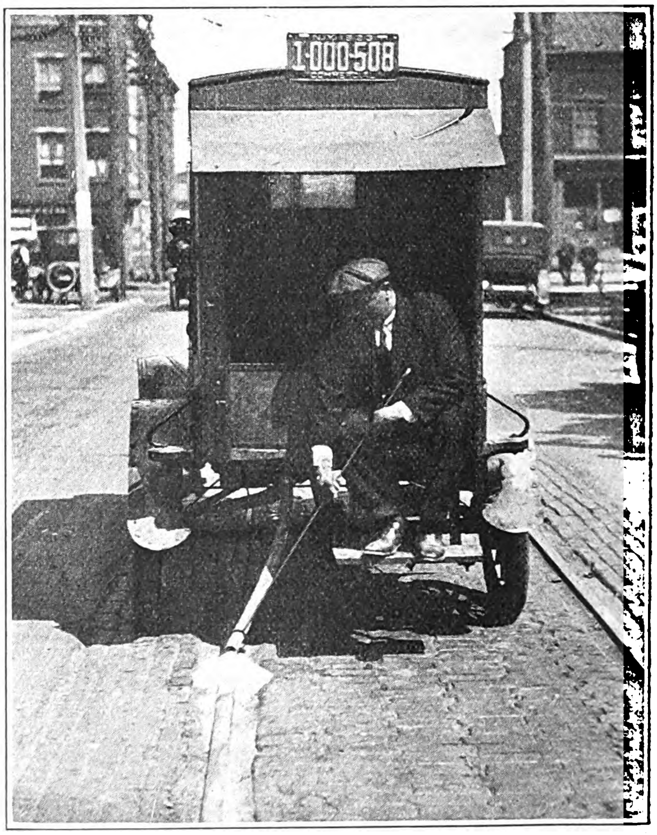
AN INTERVIEW in the Detroit *News* with H. M. Gould, assistant general manager of the Department of Street Railways, Detroit, gives the savings up to date from the use of radio for summoning repair crews. An account of the method followed in this matter was published in the ELECTRIC RAILWAY JOURNAL for July 12.

During May, June, July and August of this year, 113 radio calls went to the emergency trucks, whose crews were able to spend 3,655 hours at routine work, when, without the radio, they would have remained idle. The saving to the Department of Street Railways is estimated at $14,109.19 for the four months. The cost of operating and maintaining the receiving sets and the salary of the additional radio operator required is placed at $907.19, making a net saving to the city of $13,202.11.

The broadcasting at present is done only between 11 a.m. and 3 a.m., except on Sundays and holidays. Later, it is expected that the system will be in force 24 hours a day. It is also planned to equip with radio the six construction trucks now in use by the department, one fire truck, and the track department's two emergency trucks. In addition to its use by the Department of Street Railways, the broadcasting station is used to call the "cruisers" and "flyers" of the Detroit police department. In fact, the station was installed primarily for this service, and the use for the street railways came later. The police cruising cars are equipped with portable receiving sets and have no difficulty in receiving messages while they are running at a high rate of speed.

Auto Truck Sands Track in Utica

BECAUSE track is sanded ordinarily only on the grades in Utica, the New York State Railways has found a small Ford auto truck to be superior in that city to a trolley sand car for this work. It is stated that much time is saved by its ability to cut across from one street to another and that it is cheaper to operate than a railway car. A 4-ft. piece of air hose extends from a hole in the bottom of the truck down to the rail. The position of the free end is controlled by a light steel rod manipulated by a man who sits on the back of the truck, as shown in an accompanying illustration.



Track in Utica Is Sanded by Means of This Small Auto Truck

The flow of sand is stopped simply by pulling up the end of the hose.

In winter this truck is also used to carry around men who salt the track switches. Two men on the truck take the place of about 12 men who formerly were required for this work. During the construction season the truck is used also to deliver materials for small maintenance jobs.

Careful Engagement Reduces Turnover

The Method of Engaging Trainmen on the System of the United Railways of St. Louis Has Secured an Excellent Selection and the Turnover Has Become Negligible—The Forms Used in Employing and Training Men Show the Care Used

THE success of a method is proved by its disuse. This may seem a contradictory statement, but it is true when applied to the employment methods of the United Railways of St. Louis. The plan followed in engaging men is the result of extended experience and has brought into the service such a group of satisfied and satisfactory employees that the turnover has become very low. In fact, the report of the employment department on July 1, 1924, that no new platform men had been hired since the corresponding report of May 1, and that no new men would probably be required until the end of August, shows a notably satisfactory condition of affairs. It should be said that the number of motormen and conductors on the company's payroll on May 1, 1924, was 3,748, which is a large number to keep practically intact in these days of business activity.

Of course, a large factor in this low turnover is the fact that excellent relations exist between management and men, and this keeps down both resignations and discharges, but an equally large factor in the situation is the care taken in the selection of the men in the first place. Every effort is made to discover the unfit man before he is engaged. This is of benefit to both company and man. Where care is taken to select men qualified for the work, the most frequent cause for turnover disappears.

Applicants for employment are first interviewed by Joseph D. Crafton, who has long held the position of employment superintendent of the company and has the faculty of being able to judge very accurately from the manner in which a new man talks and carries himself whether he has the makings in him of a good and steady trainman. Mr. Crafton's practice, when a man applies for a job on the road, is to let him do most of word and listening to him with a great deal of sympathy.

PRELIMINARY APPLICATION BLANKS

This interview being satisfactory, the new man is asked to make out the preliminary application blank, shown in the first form. If the answers to the questions on this blank meet the requirements, the applicant goes to the company's medical director to receive a physical examination. This calls for a test of the sight and color perception of right and left eye and the hearing of each ear by watch and voice, as well as the condition of lungs, heart, spine, etc. The applicant is also asked as to the extent of his use of alcoholic beverages and tobacco. The blank carries front and back diagrams of the human form upon which any peculiar characteristics or marks of the applicant can be indicated by the examiner. This blank is signed by both the applicant and the medical director, and then it is returned to the superintendent of employment.

If the applicant has passed successfully all tests up to this point, he receives a printed copy of the specifications for uniform, and also a more extended form of application blank, on which he enters his full name, date and place of birth, physical characteristics, address, length of time a resident of St. Louis, number of dependent relatives, previous occupation, and name of previous employers. A statement on this blank warns the applicant that $50 in cash will be needed by him for the purchase of his uniform and for living expenses before he begins to earn any wages. The employment blank also carries the following printed agreement, with place for affidavit by a notary public.

> *In consideration* of being permitted to make application for employment by Rolla Wells, receiver of the United Railways Company, I hereby agree with Rolla Wells, receiver of the United Railways Company (hereinafter called "employer")
>
> To deposit with said employer the sum of $5 as a surety fund for the faithful performance of my duty.
>
> To work under instruction on and during trial period, without pay, for such time as said employer may deem necessary.
>
> That if I am discharged, or leave said employer's service voluntarily at any time during or after said trial period, I shall have no claim against said employer for services rendered or expenses incurred by me during said trial period.
>
> That wages are to be paid only for such time as I am engaged in operating or running a car for said employer, or in actually doing such other work as may be assigned by said employer computed at the current rates shown on the employer's printed schedules or bulletins.
>
> That these wages are satisfactory to me, and, if I am employed by the said employer, to work contentedly and faithfully.
>
> That I will make no charge, claim or demand against said employer for the time spent in reporting for duty at the request of said employer or any foreman or agent thereof, or waiting after so reporting before actually beginning work.
>
> I hereby warrant the truthfulness of the above statements, and certify that I can read and write the English language and that I personally filled out this application, and enter into the following:
>
> [Read every word of this carefully as you will be held to a faithful performance of the conditions set forth.]

Further Agreement

> In case I am employed by Rolla Wells, receiver of the United Railways Company of St. Louis, as a motorman I .... hereby agree that I will abstain from the use of intoxicating liquors, and will at all times be strictly temperate; that I will faithfully observe all the rules and regulations governing employees which the management may from time to time establish, and willingly perform all duties assigned me; that any wages earned by, or owing me, shall not be due and payable until the regular pay day of the said employer. When my employment with said employer ceases, I will at once return to him all badges or other property of said employer in my possession, or pay for the same at a price fixed by the said employer.
>
> And I further agree that I will at once return to said employer any badges or other property of said employer, or any property I may have received from any other source arising out of my connection with said employer after I have been discharged, or my employment in any way shall cease, and agree that 25 cents per day can be deducted from

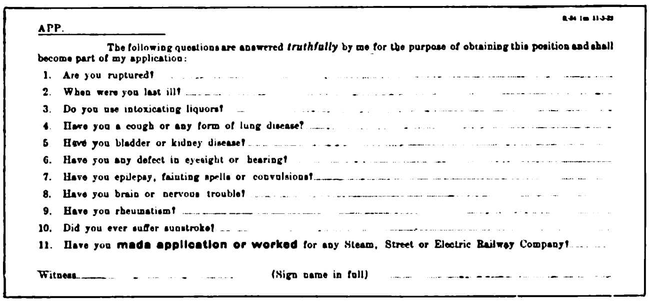
my pay due me for each and every day that I fail to return same, as liquidated damages for such failure.

And I further agree that any wages due from said employer when my employment under this contract shall terminate shall be retained by said employer until said property is by me delivered to said employer.

I am informed as to the character of the work for which I am an applicant, its conditions and requirements, and rate of wages, and I am in earnest in my desire to enter and remain in said employer's service, and as evidence that I am not trifling with the question or uselessly consuming the time of the employer's officials in considering my application, I agree that if I voluntarily leave the employer's service within ninety days after the date of my employment the company shall retain as liquidated damages the five dollars ($5) deposited by me upon entering the company's service.

I have made truthful answer to every question in my application; as a guarantee of which I hereby agree that if at any time it develops that any written answer I have made is untrue or if said employer should find my references or my past record not entirely satisfactory I will accept discharge from the employer's service without protest.

I promise to deal honestly with said employer, and if at any time in the performance of my duty of motorman I fail to use my utmost endeavor to have a fare deposited in the box or to get a proper ticket or transfer or other authorized form of transportation from each passenger boarding car, or if I in any manner become possessed of a fare and do not deposit same in the box, or in any manner prevent the company coming into possession of its rightful fares, I agree to accept discharge without protest.



8-84 1m 11-3-23

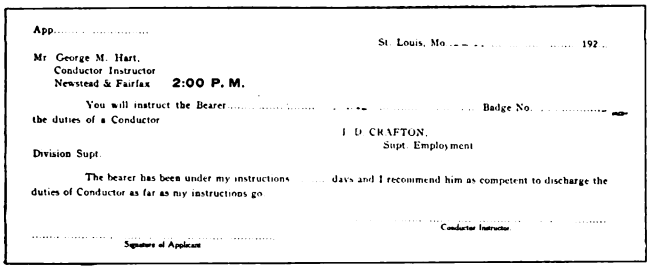
APP. ________

The following questions are answered *truthfully* by me for the purpose of obtaining this position and shall become part of my application:

1. Are you ruptured? ________
2. When were you last ill? ________
3. Do you use intoxicating liquors? ________
4. Have you a cough or any form of lung disease? ________
5. Have you bladder or kidney disease? ________
6. Have you any defect in eyesight or hearing? ________
7. Have you epilepsy, fainting spells or convulsions? ________
8. Have you brain or nervous trouble? ________
9. Have you rheumatism? ________
10. Did you ever suffer sunstroke? ________
11. Have you **made application or worked** for any Steam, Street or Electric Railway Company? ________

Witness ________ (Sign name in full) ________

Preliminary Application Form



App. ....

St. Louis, Mo .... 192..

Mr George M. Hart,
Conductor Instructor
Newstead & Fairfax **2:00 P. M.**

You will instruct the Bearer .... Badge No. .... the duties of a Conductor

J. D. CRAFTON,
Supt. Employment

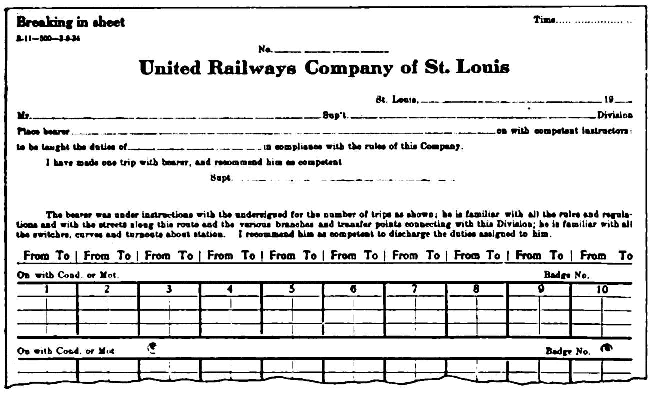
Division Supt.

The bearer has been under my instructions ..... days and I recommend him as competent to discharge the duties of Conductor as far as my instructions go

.... Conductor Instructor.

.... Signature of Applicant

Authorization for Instruction



Breaking in sheet

8-11—500—2-8-24

Time........

No. ________

United Railways Company of St. Louis

St. Louis, ________ 19__

Mr. ________ Sup't. ________ Division

Place bearer ________ on with competent instructors:

to be taught the duties of ________ in compliance with the rules of this Company.

I have made one trip with bearer, and recommend him as competent

Supt. ________

The bearer was under instructions with the undersigned for the number of trips as shown; he is familiar with all the rules and regulations and with the streets along this route and the various branches and transfer points connecting with this Division; he is familiar with all the switches, curves and turnouts about station. I recommend him as competent to discharge the duties assigned to him.

From To	From To	From To	From To	From To	From To	From To	From To	From To	From To

On with Cond. or Mot. Badge No.

1	2	3	4	5	6	7	8	9	10

On with Cond. or Mot. Badge No.

Breaking-In Sheet

To provide myself with a standard uniform in accordance with the rules and regulations of said employer before assignment to duty.

CAUTION

Statements made by you and references given in your application are fully investigated. False statements render you liable to a fine or imprisonment under the Penal Law.

I have read all of the above, I understand it, and sign knowingly and voluntarily.

Two other signatures are required of the new man. One relates to his wages during the breaking-in period and appears on the application blank. It reads as follows:

I agree to break in as motorman on my own time without any remuneration from Rolla Wells, receiver of the United Railways Company of St. Louis. If I finish the breaking-in period, said receiver is to pay me $15 for the breaking-in period (not less than fifteen days), provided I remain in his service ninety days or longer; said payment to be made after I have been in his service thirty days and passed all the requirements. But, if I am discharged or resign, before I have been in his service ninety days, or for any reason fail to remain in his service ninety days, the $15 advanced me shall be taken from any money due me at the time I leave his service. (*Experienced men do not receive any money for breaking in, neither do men who have been a conductor or motorman, in changing from one position to the other.*)

The other agreement relates to the use of intoxicating liquor. Every employee has to sign an abstinence pledge reading as follows:

I, ..., hereby promise that, in consideration of being retained in the service of the United Railways Company, I will, whilst I remain in its service, totally abstain from the use of all intoxicating liquor, both whilst on duty and off, nor will I visit or frequent saloons or gambling places, and I further stipulate that if I violate this agreement, I will accept discharge without notice and will forfeit to the company all wages due me or money in the custody of the company at the time of discharge.

This pledge is subscribed and sworn to before a notary public.

On the day that the new employee files his final application, he also receives his badge. As employee transportation is entirely on badge, the new employee agrees to use it only in accordance with the regulations of the company, to deposit a dollar as security for its proper use and care, and to return it when employment ends or when requested to do so. In case it is not so returned, the employee agrees to pay the company for each day the badge is retained the sum of 50 cents as liquidated damages. For office employees the deposit required for a badge is $2 instead of $1. Two card records are kept of all badges issued, one under the name of the employee and the other under the number of the badge.

After this application for employment has been accepted by the company and the applicant has purchased his uniform, the company's photographer takes two photographs of him for the company's files. One of these photographs shows him with his cap on and one without the cap. The applicant is then assigned to some depot.

FORMS USED DURING INSTRUCTION

When he goes to his depot, the new employee, if a conductor, carries with him a blank like the second one reproduced in which the superintendent of employment authorizes him to receive instruction. A blank very similar to the one illustrated, but addressed to the motorman instructor, is used for applicants for the position of motorman. As will be noticed, the blank carries space for the signatures of both employee and instructor when the new man has become competent to operate a car so far as that particular instruction goes. During this period of instruction, the company keeps a record of the names of the instructors for each new man on what is called a "breaking-in" sheet. The upper part of one of these sheets is reproduced. In addition to the names of the instructors and the time they spent with each man this blank contains, at the bottom, space for the signatures of the two supervisors and the superintendent in charge, the name of the depot to which the man is assigned and the name of the foreman. When considered by these officials to be competent, the man is told to report to the employment office for his final instructions.

At this time he brings his filled-out "breaking-in sheet," which is stamped with the date and the number of days that he has been breaking in on the road. He then receives his "ready for work sheet," illustrated, in which he acknowledges the receipt of his badge, ticket punch and pocket book, all of which he agrees to surrender on leaving the employ of the company or pay for them at a definite price. This form also serves as authority to the division superintendent to put the new man at work. At this same time the new man signs and dates another card, known as his "signature reference card," which goes to the general timekeeper, who keeps these cards on file for reference as to signatures. At the same time he receives a card explaining that every day of the year the name and number of hours work by each of the conductors and motormen employed reach the accounting department to be entered on the payroll. To avoid errors in crediting this time, experience has shown that observation of the following rules is essential:

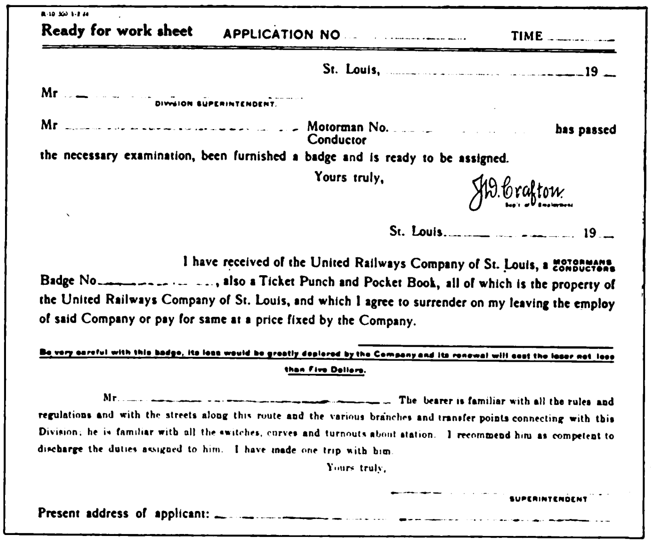
1. That the signature be made the same in every instance.
2. That the name be plainly and legibly written.
3. That the pencil be used rather heavily, making the signature plain and black.
4. That the signature bear either the usual two initials, first name in full with middle initial or, when the person has no middle initial, the first name in full, though usual abbreviations, such as Geo., Jno., etc., may be used, if desired.

Before motormen are sent to the depots to which they are assigned, they go back to the motorman and instructor for final instructions, but conductors go immediately to their depots.

During their breaking-in period both conductors and motormen are taught the proper way to fill out an accident report. The company uses two forms of accident reports, one to cover collisions with vehicles, persons or cars, the other all other kinds of accidents. The instructions at the top of the blank say:

> Conductors and motormen are required to make written report of all accidents, disturbances or occurrences out of the ordinary. Collisions, accidents, persons falling on the car, falling getting on or off, falling approaching the car or after they have safely left the car, fights, quarrels, disputes as to fares, transfers or change, injuries from any cause, even though the persons may say they are not hurt; report it all; do not try the case and conclude that a report is unnecessary; that is the duty of our attorneys after reading your report. Give names and addresses of all injured persons and witnesses. Take pains in making report; write plainly, conductor and motorman both signing same report.

Before they start in, each employee receives a rule book, for which he signs a receipt and agrees to return on request or when he leaves the service; a map of the city of St. Louis, showing the tracks of the company and those of connecting electric railways; an up-to-date list of the numbers of lost or stolen badges, so that these badges can be taken in if they are presented for transportation, and a witness slip book. He also receives three envelopes addressed to the superintendent of employment, which he is asked to send to three different persons for letters of reference, to be mailed back direct to the superintendent of employment. Conductors also receive a witness slip book and punch and motormen a small book of instructions on the use of the Economy meter. The company also has a blank form of letter used to send to references.



R-10 300 1-2-24

Ready for work sheet APPLICATION NO .... TIME ....

St. Louis, ... 19 ..

Mr ....
DIVISION SUPERINTENDENT.

Mr .... Motorman No. / Conductor .... has passed the necessary examination, been furnished a badge and is ready to be assigned.

Yours truly,
J.W. Crafton
Sup't of Employment

St. Louis .... 19 ..

I have received of the United Railways Company of St. Louis, a MOTORMANS / CONDUCTORS Badge No ...., also a Ticket Punch and Pocket Book, all of which is the property of the United Railways Company of St. Louis, and which I agree to surrender on my leaving the employ of said Company or pay for same at a price fixed by the Company.

Be very careful with this badge, its loss would be greatly deplored by the Company and its renewal will cost the loser not less than Five Dollars.

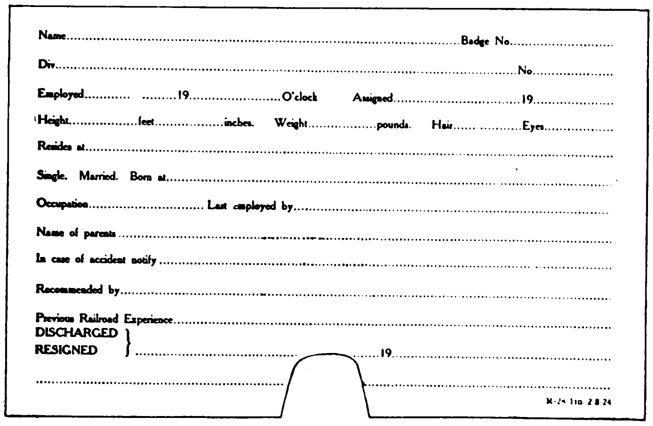
Mr .... The bearer is familiar with all the rules and regulations and with the streets along this route and the various branches and transfer points connecting with this Division; he is familiar with all the switches, curves and turnouts about station. I recommend him as competent to discharge the duties assigned to him. I have made one trip with him.

Yours truly,

.... SUPERINTENDENT

Present address of applicant: ....

Ready for Work Sheet



Name .... Badge No ....
Div .... No ....
Employed .... 19 .... O'clock Assigned .... 19 ....
Height .... feet .... inches. Weight .... pounds. Hair .... Eyes ....
Resides at ....
Single. Married. Born at ....
Occupation .... Last employed by ....
Name of parents ....
In case of accident notify ....
Recommended by ....
Previous Railroad Experience ....
DISCHARGED / RESIGNED } .... 19 ....
....
M-24 1m 2-8-24

Card Used for Motormen's Record

All of these forms, when filled out and returned to the employment and record department, are filed in a special envelope, known as the application envelope, with appropriate filing data on the face of the envelope.

Records After Engagement

The company keeps a card list of all employees in the general form of that illustrated on this page. The one shown is on manila stock and is for motormen. A similar card on blue stock is used for the records of conductors. Supplementary cards, somewhat smaller and of the same colors, which can be clipped to these cards, are employed to record any changes in the wages per hour paid to the individual employees.

No wages are paid to new employees for their time during their breaking-in period unless they remain in the service for 90 days. In that case, conductors receive $10 for the last ten days and motormen $15 for their last fifteen days of breaking in. When these payments become due, they are made on a special form of check on which the application number, badge number, date of employment and name of employee are given, with a space on which the employee receipts for the payment.

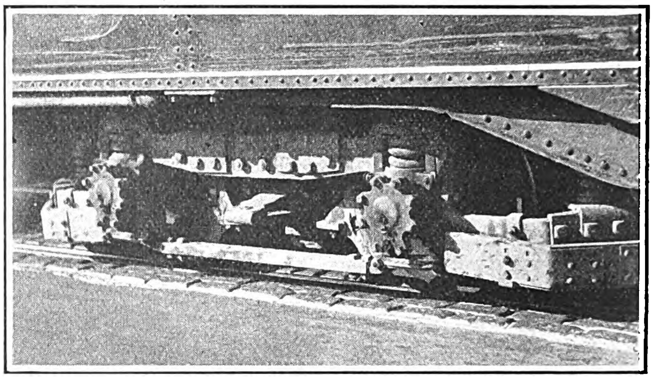
WHEN AN EMPLOYEE LEAVES

When a conductor or motorman leaves the service or is suspended, the superintendent or foreman in his division forwards to the employment and record office a statement on a blank provided for that purpose, giving the reason for his discharge, resignation or suspension, the date of his employment and his application number, badge number and future address. On receipt of this information, the employment office immediately notifies the claim department, sending at the same time a record of all accidents in which that particular conductor or motorman was concerned, so that if the claim department needs his testimony in any case, a deposition can be taken from him before he leaves.

After a conductor or motorman has left the service, his records are transferred from a "live" to a "dead" file, but they are retained intact for possible use.

Boston Transit Problems Explained in Radio Interview

AN INTERVIEW with Edward Dana, general manager of the Boston Elevated Railway, Boston, Mass., in which many questions of popular interest regarding that system were answered and broadcasted, took place on the evening of Oct. 24 at station WEEI of the Edison Electric Illuminating Company of Boston. Mr. Dana has given a number of radio talks in times past on the Boston transit situation. Mr. Dana asked and answered questions on traffic, mileage, employees, revenue, safety in operation, motor bus operation, electrification, etc. He concluded his talk by narratine the most humorous story that has come to his attention in the long life of his service on the Boston "L."



Hyatt Roller Bearings Are Mounted in Totally Inclosed Journal Boxes Arranged to Be as Nearly Oiltight as Possible

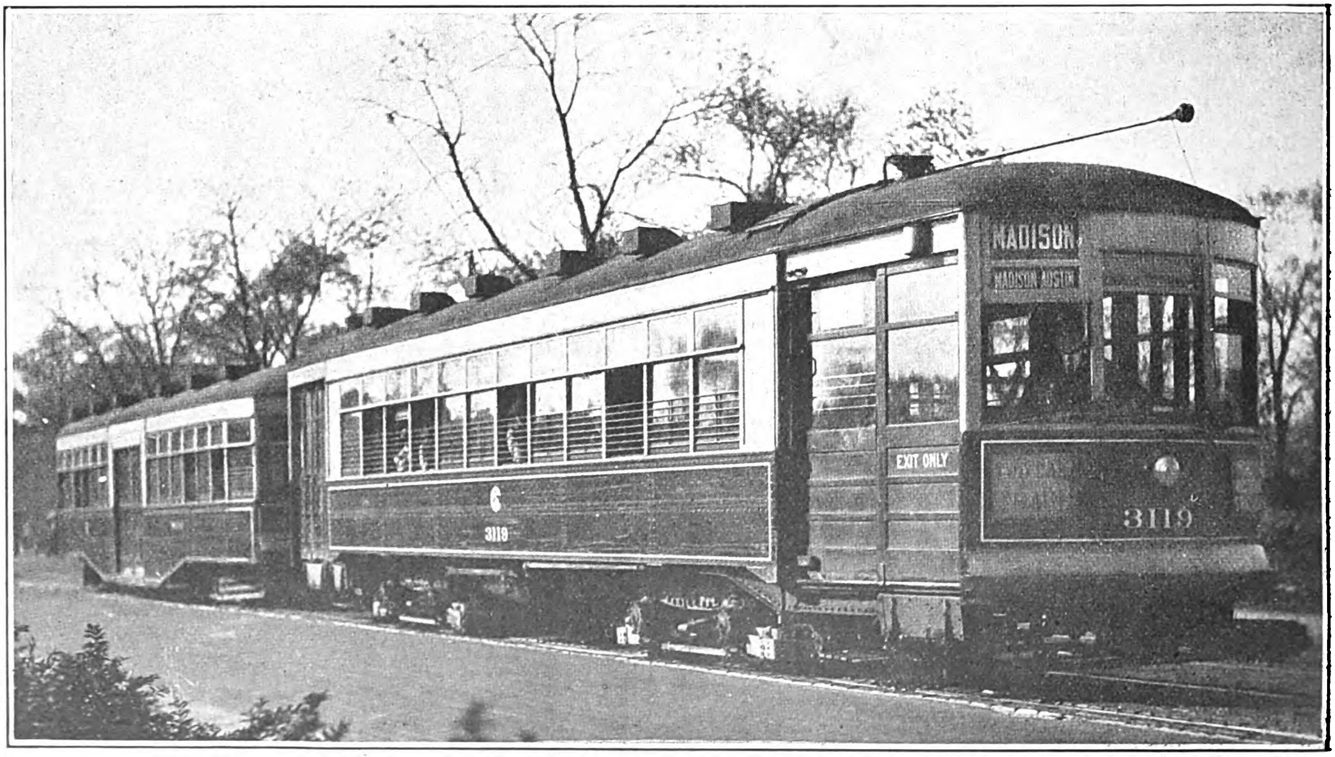
Chicago Surface Lines Trying Roller Bearings

A SAMPLE train of the Chicago Surface Lines consisting of a motor and trail car unit operating on the Madison Street line has been equipped for experimental purposes with Hyatt roller bearings on all journals of both motor car and trailer.

This installation has been made to obtain data on the effect of these bearings on the power consumption, and also to determine by actual operation over an extended period of time the way in which this type of bearing will stand up under the operating and maintenance conditions encountered.

A hardened steel sleeve is pressed on each journal to take the wear of the rollers, and the front covers of the boxes are tightly bolted in place to make the boxes as nearly oiltight as possible.

As the installation has been in service for only a few weeks, no definite data on the relative power consumption on this train as compared with standard babbitt-lined journal bearings is as yet available. However, in these few weeks of operation, no difficulty has been experienced.



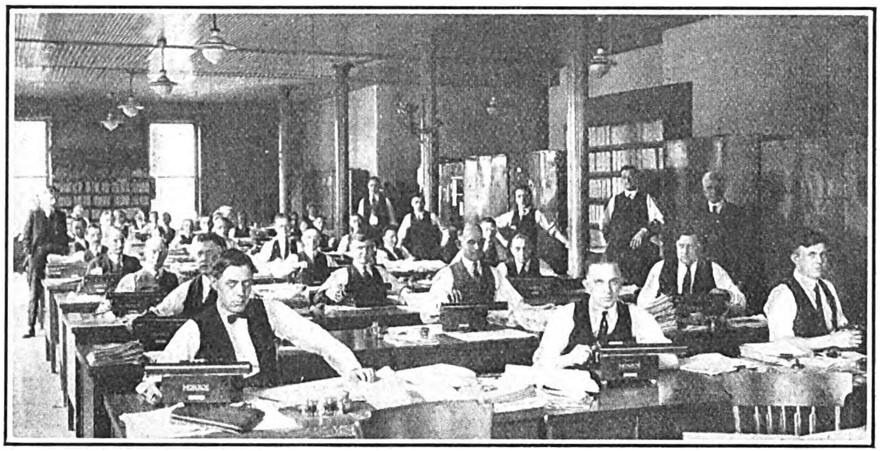
Roller Bearings Are Being Tried Out on the Journals of This Two-Car Train Operated on the Madison Street Line, One of the Heaviest of the Chicago Surface Lines

Applications of Modern Methods in Accounting Practice

By W. L. Davis

Auditor Lehigh Valley Transit Company, Allentown, Pa.

In This Concluding Installment of This Series on Present-Day Electric Railway Accounting Practice, the Principal Topics Discussed Are Budgets, Fixed Capital Records, Daily and Weekly Reports and the Use of Machines in Accounting Offices



A Typical Modern Railway Accounting Office, Showing Extreme Use of Tabulating Machines

THE executives of any electric railway company should be furnished with operating and construction budgets, either annually or at specific periods. These budgets should include not only the estimated income and expense for the particular period covered, but also the construction work considered necessary or desirable during the same period, the net return after operating expenses, fixed charges and dividends being supplemented by such new money as might be required for the company's construction program.

While the budget may be compiled by the accounting department, it is obvious that the basic figures used be furnished by operating engineers and others familiar with the physical requirements of the company, this information being supplemented by a study of economic conditions to the extent that earnings may be forecasted to a comparatively accurate degree and increases or decreases to operating expenses may be anticipated to some extent.

In the preparation of the budget, the income account should receive attention before the amount of new money is determined. In order to do this it will be necessary to study current conditions and determine the increases or decreases in the earnings as compared with the prior year, taking into consideration any economic conditions which may affect the return. If the earnings are compared from day to day and month to month the percentage of comparison arrived at may be applied to the earnings of the year just passed and figures for the coming year forecasted accordingly.

Operating expenses should be reviewed in detail and present average costs applied to the operating and maintenance schedule as determined for the coming year by the operating department. This should also take into consideration economic conditions. The schedule of operation and maintenance work should of course be compiled on a tentative basis for comparison with the income as forecasted and changes made accordingly before the budget is finally prepared and furnished to the various departments. The operating expense budget should be compiled in such a way that each department head will get the benefit of the estimated cost for his department as he should compare the estimates with the actual costs from time to time as they are incurred. The Operating Expense Budget should also contain the necessary figures on general expenses and taxes. These figures can usually be determined by the accounting department to a fairly accurate degree.

In connection with the operating expenses, there should also be included any contemplated expenditures for increasing the amount of material on hand for operating purposes, with particular reference to fuel stock. Fixed charges are easily determined and may be included by the accounting department as required. Dividends should be included in the budget only after the company's policy is determined.

Construction expenditures should be included after the cost of the various jobs has been determined by the department heads responsible. It might be well to compare the contemplated construction expenditures with the result of the estimated income account before the budget is finally prepared, as it might be necessary to eliminate some of the items, particularly if conditions are such as to render new financing difficult.

After the construction expenditures are finally determined upon, the amount of new money required should be computed and reflected in the budget either as cash to be raised from the sale of bonds or as an item subject to short term financing. This latter subdivision of course depends to some extent upon the class of construction work contemplated and the subdivision of the final accounting between capital and non-capital expenditures.

The preparation of the budget as described above cannot be handled with any degree of satisfaction unless the records of the company are drawn up in such a way that

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EDITORS' NOTE.—The previous installments of this article appeared in the issues of this paper for Sept. 27 and Oct. 4.

the revenue accounts and details of charges to operating expenses are readily available. Proper comparisons cannot be made between the actual transactions of the prior year and the contemplated operations of the coming year unless the factors entering into both are easily comparable with each other.

It would appear that there is a responsibility on the part of the head of the accounting department to prepare his daily records in such a way that this information can be had, and toward this end it is recommended that the daily transactions be recorded in self-analyzing form as far as possible.' This information should be available to the operating and construction engineers who are responsible for the preparation of the basic figures for the budget.

It is obvious that the conditions in our industry are such that it would be somewhat difficult for a department head to live up to the letter of his budget and at the same time take care of unforeseen requirements as they come up, and accordingly, it will often be necessary to prepare revisions of the budget and supplements thereto. These should be prepared along the same lines as the budget itself and should cover the same period.

It will also be advantageous for the company to prepare at different intervals a statement of estimated cash receipts and requirements for a stated period ahead. These estimates, of course, contain the same elements as the budget, but as the budget is necessarily based upon figures which contain a certain number of accrued accounts and other similar transactions not representing actual cash receipts and disbursements, the budget and cash requirements statement can hardly be expected to parallel each other in all respects.

The statement of cash receipts and requirements should reflect the months in which the receipts may be expected and payments made, together with the dates at which temporary loans are to be made during the year. In order to prepare this statement accurately it will be necessary to review the items set up in the annual budget with a view toward eliminating from the cash statement any items representing large quantities of material to be issued from stores and similar items which must be charged to the operating and construction accounts for which no cash need be spent during the particular period. This statement should also be reviewed from time to time and changed in accordance with current conditions.

FIXED CAPITAL RECORDS

One of the comparatively recent developments in the electric railway industry is the fixed capital record, or perpetual inventory of property. This is not strictly an accounting department function, but the preparation and handling of a record of this kind is dependent to a great extent upon the records kept by the accounting department, both past and present.

A fixed capital record should include all of the various property units, and should be based upon a plant inventory compiled as of a specific date. This basic inventory is supplemented by additions covering new property and withdrawals covering units withdrawn from service for one reason or another. After costs are applied thereto and recognized elements of intangible costs are added, the fixed capital record may be used as a property valuation.

The preparation of the physical data and the application of intangibles are usually handled under engineering supervision, but it is often necessary to refer to the records of the accounting department to secure cost data of various kinds. This work has resulted in revealing numerous defects in the accounting records of former years, and although the present-day auditor cannot do much to correct the mistakes and inaccuracies in old records he should profit by such omissions and handle his current work in such a way that construction costs may be determined to a reasonably accurate degree.

In handling construction costs, the best results can be attained by using the work order method. A separate work order is assigned to each construction job and charges are made accordingly during the process of the work. Each work order should be reviewed by the accounting department in advance in order that proper distribution of the costs by accounts may be determined. The daily and monthly charges to the work orders should also be distributed as to accounts as the costs are incurred.

Overhead charges should be determined and applied monthly wherever possible. After the work is completed, the cost thereof should be analyzed as to labor, material, and other elements, and the complete analysis subjected to a check with the physical conditions. After the costs are subjected to the physical check, results of the work order can be included both in the general ledger and fixed capital record with the assurance that the entries in both records contain the same elements.

Property retirements can be recorded very readily if the company maintains a fixed capital record, as the description of the retired property as set forth in the fixed capital records may be supplemented by estimated costs of installation.

The fixed capital record can also be used in determining divisional investments and operating costs and will be found valuable in other ways. The initial cost of such a record is quite heavy, but if accurate construction accounts are kept, it will not be difficult to keep it up to date, thereby affording a basis for a valuation at any time.

DAILY AND WEEKLY REPORTS

It is very important that the executive department be advised of current conditions as reflected by the accounting department records, but the requirements of the various companies are so widely different from each other that no two managements will expect exactly the same kind of information along these lines.

The accounting records of any company can be arranged in such a way that they could, if necessary, be closed daily, but as this would entail considerable expense and require a large organization it is hardly necessary to consider it at this time. However, it will not be difficult for the accounting department to furnish daily information to the executive covering certain functions of the property. Most electric railways account for their receipts on the daily basis and it is a comparatively easy matter for the accounting department to prepare a summary of such receipts from the original records.

These daily reports should be made divisional in form and show the day's earnings on each division as compared with the corresponding day of the prior year, tabulating increases and decreases on each line, with percentages if desired. This report might also show the corresponding figures for the month to date, which can easily be compiled in cumulative form from day to day.

In this connection it might be said parenthetically that the figures for the previous year may be tabulated in advance.

It might be of interest to the operating executive if this daily report would show not only earnings, but car mileage and car hours on the various lines from day to day during the month, thereby avoiding the delay in receiving the complete operating report, as the final report must necessarily be delayed for some time after the month's accounts are closed. This information might also be supplemented by tabulations showing the various operating costs per car mile and car hour if such information is considered necessary. This report can be made to include as many daily figures as the executives may need, and if the required figures are prepared and tabulated daily as a part of the routine it will not present any serious difficulties to the accounting department.

Daily reports of cash should also be prepared for the information of the treasury department and other officials who may be interested. These reports can also be compiled on a daily basis without much difficulty if the routine is established accordingly.

USE OF MACHINES IN MODERN OFFICES

It would be manifestly difficult for any auditor responsible for the efficient handling of an up-to-date accounting organization to attempt to get along without some of the up-to-date machines designated to reduce work and promote accuracy. We are all more or less familiar with some of these machines, but in an article reviewing the requirements of the present day accounting department it will not be amiss to compare some of the work now being done with what had been done prior to the development of this apparatus.

Almost any one knowing anything at all about office routine understands the operation of the adding machine, but it has only been during the past twenty years that these machines have been used to any great extent. In former days it was necessary to prepare trial balances and monthly reports by hand and add them mentally, but if the 1924 office were to be handled strictly on that basis it would be almost impossible to handle the current detail requirements without a substantial increase in the payroll, which would be entirely out of line with our present ideas of what this kind of expense should be.

Adding machines, both listing and non-listing, have a large field of usefulness and if properly handled will enable the accounting department to save many times the interest on the investment in the course of a few years, but on the other hand if they are not properly used they can become a burden to the organization. While it undoubtedly promotes accuracy to use these adding machines for as many different purposes as possible, on the other hand their use should not be encouraged to such an extent that the ordinary employee cannot handle the simplest kind of addition without them. The requirements of the department should be studied and machines used wherever practicable, but there are numerous small self-checking computations which properly trained clerks can handle mentally.

The routine work in the accounting department is such that computation of averages, percentages, and proration schedules are required almost continuously, and it would be manifestly difficult for any office management to handle the requirements without the use of some one of the numerous machines designed to handle problems in multiplication and division. There have been substantial developments along these lines during the past twenty years and the initial investment on these machines and the expense in carrying them are almost negligible in comparison with the benefits derived from their use. However, the use of these machines can also be developed to such an extent that the office employees are practically helpless without them, and while it is somewhat difficult to avoid this situation and still rereceive the benefit of the use of these machines, the auditor should watch the conditions carefully and see that the mental capabilities of his employees do not become neglected.

The development and use of the typewriter during the past twenty-five or thirty years has also brought with it a number of new inventions designed to take care of the preparation of numerous copies of reports, schedules, analyses, contracts and other tabulations and documents of every description. These inventions have enabled the modern office to turn out reports with twenty-five, fifty and one hundred copies, which would have been almost impossible under conditions that existed a generation ago.

The present requirements of the accounting department include the preparation of numerous daily, monthly and other periodical reports on financial conditions, income, details of revenue, details of expenses and the like, and as these statements usually show both red and black figures it was necessary to develop some kind of operation wherein the two could be handled at the same time. In this direction the recent inventions of the duplicating machine companies have been almost invaluable. It is now possible to insert in the typewriter a ribbon with two colors of heavy ink on it and tabulate a statement showing both red and black figures with one operation. This sheet can then be used in connection with a duplicating machine and as many copies prepared as would be required under ordinary conditions. These machines, however, are subject to some limitations, as it is not possible to procure more than one hundred legible copies at one operation and often conditions are such that only half that number can be had. In order to take care of this difficulty, a stencil machine may be used in connection with which the typist can prepare a master stencil from which copies can be run off almost indefinitely. In connection with this operation, however, it is rather difficult to insert red and black figures on the same tabulation without performing considerable additional work.

COMPUTING AND TABULATING MACHINES

The detail work in the large electric railway office is such that the computing and tabulating machines can also be used to advantage, especially in preparing revenue and traffic statistics and similar information where the bulk of the work is such that the assorting and assembling of such figures by hand would entail a prohibitive cost. The man in charge of this work should keep in touch with his requirements to such an extent that he can recommend the installation of these machines when economies can be effected.

During recent years the preparation of freight waybills has undergone a considerable change. In former times these waybills were made by hand and copies made by means of old-fashioned copy book and press, but later this work, to a great extent, was superseded by the use of machines from which numerous copies could be prepared at the same time either by hand or by machine process similar to that of the typewriter.

The work in connection with counting daily cash receipts and ticket collections has also been facilitated during recent years by the invention of ticket counting and coin counting machines. By the use of these machines the accounting department has not only reduced the time required in handling this detail work but has also developed the checking of conductors' returns to a more accurate degree than was possible in the past.

There are numerous other machines of different kinds which the modern accounting department can use, and it will be of considerable advantage to those in charge of the accounting departments of the various companies to keep in touch with these inventions and see that their companies get the benefit of them as soon as possible, with due consideration for the usefulness of the machine to the particular organization and the return on the investment to the purchaser.

In conclusion it might be said that the man at the head of the accounting department of the modern electric railway should build up an organization and an accounting system that will enable him to handle present-day requirements promptly, satisfactorily and economically, and at the same time give him enough time away from routine and special requirements that he can develop his own capabilities and study the present and future requirements of his position.

Educational Program in Boston

Boston Elevated Railway Announces Five Series of Departmental Group Conferences for Employees, with Other Advanced Courses — Arrangement with Massachusetts Department of Education Effected

THE program of the educational courses to be open during the season of 1924-1925 to employees of the Boston Elevated Railway are announced in a circular just issued by Edward Dana, general manager. Altogether there are four series of group conferences for male employees, conducted respectively in the transportation, rolling stock, maintenance and power departments, and a series of conferences for the women employees, for the purpose of informing them as to some of the general problems of the railway. In each case, the conferences begin with a half-hour talk on some specific topic by a well qualified speaker, followed by a discussion occupying not more than 1 hour.

In addition to these group conferences, there will be a few general meetings during the season, at which the general manager, his representative, or an outside invited speaker will give a perspective view of some of the larger aspects of electric railway operation. A third branch of the educational work on the Boston Elevated is an arrangement with the Massachusetts Department of Education, Extension Division, by which certain courses in applied mathematics, practical electricity, and dynamo electric machinery will be open to employees if a sufficient number enroll. All these meetings begin early in November.

Most of the group conferences will be held in the rooms of the instruction school which has been fitted up at the Sullivan Square station, but some of the conferences of the rolling stock group will be held at different points in the Everett shops.

A brief summary of the scope of the topics to be pursued by the various departmental groups follows:

The maintenance group, John B. Flaherty, chairman, will hold 19 conferences, taking up such widely varied topics as track, signals, stores, equipment, accident prevention, relation of maintenance department to state, city, and town officials and to labor organizations, etc. No fee is charged for this group.

The power group, Joseph A. Howard, chairman, takes up the operation and maintenance of the steam equipment with special reference to combustion, and the operation and maintenance of the electrical equipment, including the substations and distribution. If sufficient enrollment is secured in this group, arrangements may be made with the State Department of Education, Extension Division, to furnish the instruction in the course. A nominal fee will be charged for this instruction, but it will be refunded by the trustees to all who complete the course to the satisfaction of the Department of Education.

The rolling stock group, John Lindall, chairman, will hold 20 conferences on such topics as car construction, car body repairs, trucks and truck maintenance, railway motors, control equipment, air brakes, shop practice, and buses. No fee is charged in this group.

The transportation group, E. A. Kelley, chairman, will hold 20 conferences on such topics as accident prevention and reports, relations with employees, treatment of passengers, carhouses and stations, the bus and its place in transportation, power saving, fare collection on cars, traffic surveys and time-tables and handling street traffic. No fee is charged in this group.

The women's group, Miss E. E. Mullen, chairman, will have 12 informal talks by experts if there is sufficient enrollment. The topics were selected by a committee of women employees and include accounting and auditing, accident prevention, collection and registration of fares, economical operation of cars, relations with employees, maintenance of track, snow fighting, public relations, and financial features of electric railroading. No fee is charged in this group.

Buying Coal for Employees of a Small Railway

A SIMPLE method of buying coal for employees and distributing it to them has been followed for several years by the Beech Grove Traction Company, Indianapolis, Ind. Coal is purchased by the railway in carload lots. The car is placed on a convenient siding and the employees send and get the coal, paying the cost of haulage themselves. The company is paid for the coal on the installment plan.

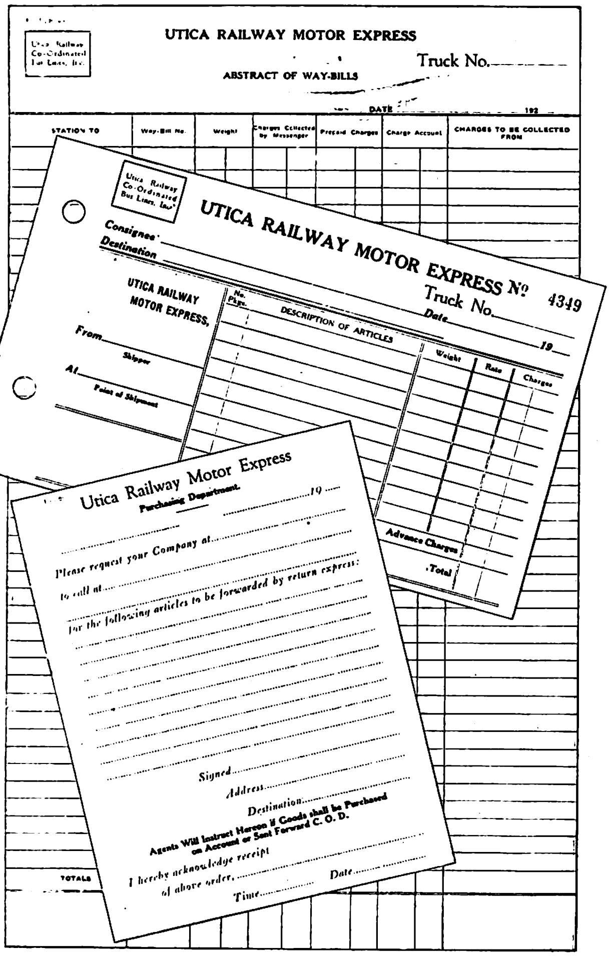
Trucks Used by Railway for Local Freight Haulage

The New York State Railways, Utica Lines, Has Inaugurated a Trucking Service in Addition to Its Regular Electric Express and Freight Service

By F. W. Watts

General Express Agent New York State Railways, Utica Lines

SOME time ago the New York State Railways, Utica Lines, found that the freight and express department was steadily losing business to various unorganized motor truck competitors. In spite of the irregular service furnished by these competitors, their fluctuating rates, and the irresponsible method of operation, the merchants and wholesalers of the district were diverting more and more of their business from the railway to the trucks. It was felt by the management, therefore, that the institution of a financially responsible line, with regular service, reasonable and fixed rates and proper equipment for all year operation would recapture the business and provide a new source of revenue for the railway.



Utica Railway Co-Ordinated Bus Lines, Inc.

UTICA RAILWAY MOTOR EXPRESS

Truck No.

ABSTRACT OF WAY-BILLS

DATE 192

STATION TO	Way-Bill No.	Weight	Charges Collected by Messenger	Prepaid Charges	Charge Account	CHARGES TO BE COLLECTED FROM

TOTALS

Utica Railway Co-Ordinated Bus Lines, Inc.

UTICA RAILWAY MOTOR EXPRESS Nº 4349

Consignee

Destination

Truck No.

Date 19

UTICA RAILWAY MOTOR EXPRESS,

From

Shipper

At

Point of Shipment

No. Pkgs.	DESCRIPTION OF ARTICLES	Weight	Rate	Charges
	Advance Charges			
	Total			

Utica Railway Motor Express

Purchasing Department.

19

Please request your Company at

to call at

for the following articles to be forwarded by return express:

Signed

Address

Destination

Agents Will Instruct Hereon if Goods shall be Purchased on Account or Sent Forward C. O. D.

I hereby acknowledge receipt of above order,

Date

Time

These Simple Forms Have Reduced to a Minimum the Amount of Clerical Work Necessary

With this end in view a trucking service was inaugurated, operating from Utica as the center, and serving the towns of Rome, Frankfort, Ilion, Mohawk, Herkimer, Little Falls and Dolgeville. The equipment used consists of two 3½-ton White trucks and two 2-ton White trucks with special covered bodies. The type of vehicle used is shown in an accompanying illustration. The trucks operate within an area outside the city, handling the express business as well as special truckload lots of fruit, vegetables and manufacturing material. The cars continue to handle the long distance and heavy freight.

At the very outset it was discovered that the problem was not only one of transportation, but also one of salesmanship. Business could be secured in the face of the existing intense competition only by a picked personnel. A crew of two men was placed on each truck, to drive, load, and unload and also to secure business. This arrangement has resulted in a considerable saving of time in loading and unloading, and in a gratifying increase in traffic on account of the success of the crews as business getters.

MOTOR EXPRESS
UTICA RAILWAYS MOTOR EXPRESS
5

New York State Railways Does Local Express Business with Trucks of This Type

For example, when delivering goods to a dealer in a small town from a wholesaler in the city, the crew carries order forms and makes it a point to inquire if the dealer wishes to order anything from his wholesaler the next day. In case he does, the order is taken by the driver, presented to the wholesaler the same afternoon, and the goods are delivered by the driver to the dealer the next morning. Trucks call daily on every dealer and wholesale shipper in the district. These truck calls are in addition to the constant canvassing which is done by the general express agent and by his assistants.

Claims for loss or damage are less with the trucks than they have been with the company's electric cars. This is due largely to the fact that the truckmen have an eye on the load all the time, thus preventing loss by theft or mishandling. Moreover, the chance of damage in transit is reduced by the fact that the material is handled only twice—once in loading and once in unloading—instead of several times, as might be the case if it were transferred from the truck to an electric car, and then from the car to the truck again for delivery. The fact that the goods proceed in an almost direct line from the shipper to the consignee has reduced to a minimum the time required, and has also eliminated the expense of operating freight terminals. While the rates secured are not as high as those paid for shipments by railway, the cost of operation for doing this type of business is considerably less than it would be by electric car. Combined with a reduction in the overhead expense and damage claims, this has made the motor truck operation a profitable adjunct to the company.

Association News & Discussions

Lay Your Money on the Counter*

The Way to Tell the Railway Story Is to Buy Space in the Advertising Section of the Newspaper, Not to Beg Space in the News Columns

By W. P. Strandborg
Publicity Manager Portland Electric Power Company

WE ARE confronted with a strange situation in our present-day affairs. The two greatest constructive forces shaping the social, political and economical destinies of our American people are the public utilities and the public press. And yet as monumental institutions of progress they understand very little about each other.

A mighty change has been coming over the public utility industry of late and it is one of the most hopeful signs for the future. Only a few years ago the public utility men of the country believed that there was only one department of the newspaper business which was of any concern of theirs. That was the news columns. By all odds the most valuable part of the newspaper is the one which the average utility of ten years ago thought it was perfectly proper to raid whenever it wanted to tell some message to the public. Utilities sincerely and honestly believed that they had a right to full and free access to the news columns for every kind of utterance, no matter whether it had legitimate news value or was of the most malicious type of propaganda.

There are still quite a number of utility men in the United States who hold the same pitiful misconception of what a newspaper's duty is to its readers with reference to the selection of material that is to go into its news columns. I have no more patience with a newspaper which will accept and publish free of charge in its news columns, without weighing it scrupulously in the balance of public interest, material offered for publication by a utility, than I have with the public utility company which tries to sneak such stuff into the papers. In cases of that kind, the newspaper man and the utility man are equally discreditable to their respective businesses.

For a number of years a small group of the younger generation of utility men has been striving valiantly to hurl forever into the limbo of forgotten things the pernicious press agent and free propagandist. We regard him as an anachronism and an unmitigated evil, and I am happy to say that we can report substantial progress in all sections of the country. We started so late, however, and have had so much ground to cover that up to the present time we have hardly been able to more than scratch the surface. We are pledged to work with our managers and executives in the public utility industry to the end that we may convince them that the best policy is to place the copy on the counter with the cash in the business office downstairs. If we want to have any dealings with the city editor and his staff upstairs, we should carefully search our pockets to see that they are not contaminated with any typewritten copy for the news columns.

We honestly hope that the day will come when we can have the daily newspapers of the United States coming to us and asking us for news, and so far as possible to keep ourselves free from even offering a suggestion to a newspaper as to what might or might not constitute a news story relating to any of our activities, policies or business affairs.

Progressive Policy Adopted by Utility Companies

We hope that we may enlarge, so that it will cover the entire country, a policy which has been recently adopted by some of the larger and more progressive public utilities in dealing with the editorial and news departments of the daily press. We believe that every public utility company in the country, large or small, should have a man within the organization who has some knowledge of the newspaper business. This man should make it a point to become thoroughly conversant with every phase of his company's activities in the community. Then he should make it a point to visit frequently, perhaps once or twice a week—or oftener if necessary—the city editor, the reporter who handles the industrial beat, and the editorial writer who comments on industrial matters.

This representative of the public utility should sit down and tell the city editor or the reporter or the editorial writer, or all three of them, just exactly what is going on in his company, what it is doing, what plans it has for future expansion, what it is doing in the way of making its service more adequate and satisfactory. So far as he possibly can, he should add to the mental equipment of these three newspaper men a groundwork of information about his company that will be of value when any real item of interest "breaks." The utility company can never give a newspaper too much information about its business. The representative of the utility company who calls upon the newspaper should be a man of absolute integrity and reliability and he should be permitted to discuss the affairs of his company with the utmost frankness.

This utility man, who is generally dignified by the title of "publicity man," should supplement these visits to the newspapers by keeping closely in contact with everything that goes on in his company that might develop into something which his judgment and experience tells him has news value. He should then telephone the city editors if they think the matter in question has any news value. He should also offer to prepare that material in news form if the city editor thinks it is worth printing, or he should tell the story to a reporter in case it is a matter which can be handled over the phone.

The awakening which has come to the public utility industry is not limited alone to a change in the method of dealing with the new staffs of the press, but carries with it a growing realization that sound business principles demand that the dealings between the utility company and the newspaper must be be largely confined to the business office and more specifically to the advertising manager of the newspaper. Nowadays the more the utility company turns its back on the city editor, the more it faces eyes front to the advertising department, the more sure the utility will be of accomplishing one of its major objectives, namely, the creation and establishment of better public relations. That is why the Public Utilities Advertising Association is advocating so strongly the putting of cash with our copy on the counter.

A high standard is maintained in public utility advertising copy. A survey of the entire public utility field in the United States through the national vigilance committee of the Associated Advertising Clubs and the forty Better Business Bureaus operating in our most important metropolitan districts shows that in the past 12 years, since the "Truth in Advertising" movement was inaugurated, there has not been found a single piece of questionable electric railway advertising copy. Moreover, in the rare instances where the Better Business Bureaus have suggested to other utilities that a change in their copy would conform more closely to the standards set up, these companies have always and without question made the suggested changes. Indeed, a number of the Better Business Bureaus managers have said that if other advertising was as clean as that of the public utilities, they would have to look for another job.

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*Abstract of a paper presented at the meeting of the Inland Daily Press Association, Chicago, Ill., Oct. 14, 1924.

To Advance Railway Interests

Purpose of the Ohio-Pennsylvania-West Virginia Organization Is to Develop Passenger and Freight Traffic

MEETINGS have been held at the offices of the Steubenville, East Liverpool & Beaver Valley Traction Company at East Liverpool, Ohio, and a constitution and by-laws have been prepared for the Tri-State Electric Transportation Association. These will be presented at a meeting for permanent organization purposes. H. O. Allison, commercial manager of the Beaver Valley Traction Company, New Brighton, Pa., who sponsored the organization, is temporary chairman.

The by-laws were prepared as the work of a special committee composed of C. M. Marsh, superintendent of the Wheeling Traction Company, Wheeling, W. Va.; J. Howard Maxwell, president of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio; Frank E. Wert, director of public relations of the Pennsylvania - Ohio Electric Company, Youngstown, Ohio; F. B. Lawrence, general manager of the Newell Electric Railway, Newell, W. Va., and E. O. Shyrock, general manager of the Youngstown & Suburban Railway, Youngstown, Ohio.

The constitution stated that the purposes of the organization were the cooperation of the members in the development of the use of electric railways for passenger transportation and freight traffic; the dissemination of information about the service rendered and the economy and convenience of electric railway travel.

If the plans materialize close to 1,800 miles of street railway property will be represented in the association. In the Ohio section buses are being operated quite extensively and the question of admission of such concerns was paramount when the selection of a name was considered. It was held that the association was primarily and fundamentally for the purpose of advancing the interests of electric railways, and that while there was no objection to the admission of railways operating buses and the consideration of them in the transportation need, yet the door was closed to the independent operator of buses.

The committee in charge of the organization work will recommend, among other things, that a booklet be prepared descriptive of the territory and containing a map showing the electric railway lines, time-tables and fares. This would be a source of information for the public placed in public places such as hotels, restaurants, etc. The committee believes that time-tables, advertising cards and the like that are purely local to individual lines can be put out at the expense of the company issuing them. These should be distributed and available at ticket offices, hotels and other points throughout the entire territory. The committee believes that special attention should be given to the investigation and bringing about of a connecting interurban service, and to the interchange of ticket rates and freight haulage for the various companies. It also will recommend a coordination of effort and policy in standards required and in training of employees so that they may be conversant with the particular railway facilities in their territory.

Job Analysis Promotes Safety*

Accidents Can Be Prevented by Study of Hazards—By a Similar Process, Courtesy Can Be Taught

By JOHN J. CONNORS
Safety Supervisor Nashville Railway & Light Company

THE greatest cause of industrial accidents is carelessness. Statistics show that 90 per cent of all accidents could be prevented by the exercise of greater care. After mechanical safety devices have been provided and unsafe conditions are corrected, thereby eliminating the 10 per cent of accidents attributable to these factors, the safety supervisor must direct his efforts toward the elimination of carelessness.

With this objective in mind, the writer early in the year 1923 adopted the job analysis method in investigating the causes of such accidents. Carelessness was thoroughly analyzed. Discussion developed that a man does careless things because of contributing causes such as lack of sleep, worry, grief, anger, hatred, malice, envy, and false estimate of values.

A lineman in climbing a pole, as he nears the top, must negotiate his body through two sets of wires. The secondary or low-voltage set are 18 in. below the primary or high-tension set. For some reason, he passes the harmless set of wires without recognizing this fact and comes in contact with the high-voltage wires and is killed. What is the cause of this accident? Did the lineman enjoy a full period of refreshing sleep the night previous? Was his mind free from worry, grief or other disturbing factors? In his estimation, was doing the job in the least possible time more important than his personal safety?

The accompanying table is an example of the way the hazards of the lineman's job can be analyzed. The hazards of operating a street car can be analyzed in a similar way.

This method of reasoning may be applied also to improve the quality of service, by specifying the things that trainmen should do, and should not do. A small number of additional fares per day may change a deficit into a profit. With this in mind we organized in April of the present year a group of 25 motormen and conductors in what we termed a "salesmanship class." We listed on the blackboard a few factors that were pertinent to salesmanship. The group decided that courtesy was the most important factor, and therefore, this was analyzed. To date, 175 men have completed this analysis, spending one-half day on the company's time for a few days. Using the case method, in which actual situations arising in the daily work of street railway motormen and conductors were mentioned, a thorough analysis of courtesy in dealing with the public was developed, similar in a general way to the safety analysis of the lineman's job.

SAFETY ANALYSIS OF OVERHEAD LINE WORK

Job	Operations	Hazards
Setting poles	Raising small end	Pole turning.
	Placing deadman	Deadman slipping and pole falling.
	Placing pikes	Pike slipping.
	Rocking up	Deadman improperly set.
	Raising pole with pikes	Pole turning and pikes slipping.
	Changing pikes and ground	Pikes slipping.
	Lining up	Pikes slipping.
	Tamping	Danger of knocking pikes out.
Stripping pole	Climbing	Tacks in pole. Knots in pole. Pole rotten. Safety belt in wrong position. Pole giving way.
	Transferring primaries	Defective rubber gloves. Touching other wires. Touching ground.
	Taking off crossarm	Dropping crossarm.
	Loosening guys	Guys coming in contact with other wires.

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*Abstract of a paper at an extra session of the National Safety Congress, Louisville, Ky., Oct. 2, 1924.

Many Types of Locomotives at the Berlin Railroad Exposition

CONSIDERABLE space at the railroad exposition at Seddin, near Berlin, which opened on Sept. 24 and continued until Oct. 19, was devoted to electric locomotives and motor cars for rapid transit service. The exhibitors of electric locomotives included the German State Railways and all of the principal German builders. Single-phase equipment predominated. Storage-battery locomotives and motor cars for the Berlin rapid transit system and various tramways were also shown. This exposition was held under the auspices of the Verein Deutscher Ingenieure.

One of the most novel exhibits was a 2,000-hp. standard-gage turbine locomotive, with water condenser, exhibited by the Krupp interests. To provide for operation backward, an auxiliary turbine, revolving in the opposite direction to the main turbine, was used. The turbines were geared to the driving wheels. A number of locomotives with Diesel engines were also shown. One of these, of the 1-E type with electric drive and a drawbar pull of 55,000 lb., is for use in Russia.

Progress in Anti-Friction Bearings*

Excellent Results Are Quoted on Reduction of Armature Trouble, Increased Interval Between Lubrications and 10 to 22 per Cent Power Saving

By KARL PFORTE
Manager Hagen Street Railways, Hagen, Germany

THE reports made from time to time on the use of anti-friction bearings by electric railways indicate their increasing use as well as continuous improvement by the manufacturers. These reports all tend to indicate that roller bearings are more adaptable to street railway conditions than ball bearings. Some users of ball bearings, for example, reported that breakage compelled them to return to ordinary bearings.

The questionnaire upon which the deductions in this report are based was answered in the spring of 1923, inasmuch as the report was intended for the convention of September, 1923. As the latter was postponed to September, 1924, it will be understood that the data are more than a year old and that the actual use of anti-friction bearings is more extensive than the report discloses.

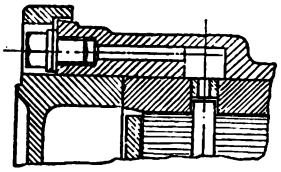
Thirty-seven operators with 20,931 motors reported that 1,107 or 5.3 per cent were equipped with roller bearings, 534 motors or 2.6 per cent with ball bearings and 28 motors or 0.14 per cent with one roller (pinion end) and one ball bearing (commutator end) each. In short, 8 per cent of the motors were equipped with anti-friction bearings. Only two motors had motor axle bearings. These are of the Jaeger roller type and have been in use on the Hagen Street Railway for two years. In October, 1923, the same maker also equipped two motors for the Zürich Street Railways. The makers of the different bearings and quantity delivered follow:

	Roller Bearings	Ball Bearings
G. & J. Jaeger, Elberfeld	746	....
Norma Company, Stuttgart-Cannstadt	225	2
S. K. F. Norma, Berlin	98	186
Fichtel & Sachs, Schweinfurt	22	104
Fries & Höpflinger, Schweinfurt	14	...
Allgemeine Elektricitäts Gesellschaft, Berlin	4	4
Wälzlager-und Maschinenfabrik, Stuttgart	2	...
Kugellagerwerke J. Schmid-Roost, Oerlikon	....	160
Swiss	...	14
Deutsche Waffen-und Munitionsfabrik, Berlin	....	8
Karl Klass, Nürtingen	....	6
Unknown	24	50
Totals	1135	534

Among the users are Berlin, 390 motors; Hamburg Elevated, 154; Hagen, 134, and Cologne, 154. Most of the existing installations are of the arbitrary dimensions developed by individual makers, but since the July, 1923, Zürich international conference on standardization the possibility is offered of achieving a certain degree of interchangeability.

The roller bearings are almost always lubricated with grease exclusively, but ball bearings frequently receive oil. The period between grease lubrications averages four months, but between oil lubrications only one month on the average mileage of 4,150 km. (2,580 miles) a month. Some operators report a performance of 45,000 km. (27,900 miles) between lubrication.

Plain bearings averaged per motor per annum a lubricant consumption of 43 kg. (94.6 lb.) compared with 5.8 kg. (12.76 lb.) for anti-friction bearings. The roller bearings averaged 5.7 kg. (12.54 lb.) and the ball bearings, 6 kg. (13.2 lb.) These results mean an appreciable saving in both lubricants and labor.



Method Used in Hagen for Lubricating Roller Bearings Through Screw-Sealed Housing

LIFE OF PLAIN AND ANTI-FRICTION BEARINGS

An inquiry into the rate of wear of ordinary bearings showed that the average waste of metal per motor per annum on 35 properties was 8.2 kg. (17 lb.). The rate of wear, of course, is dependent upon the proportion of tin, an expensive ingredient. Thus the Hagen system with a tin base of only 40 per cent showed a wear of 3.2 kg. (7.04 lb.) per motor per annum, whereas in Zürich with an 80 per cent base, the wear was only 0.7 kg. (1.54 lb.). It is possible that the high cost of good tin-base bearings has encouraged the purchase of anti-friction bearings, which, at least, have no such high upkeep costs for relining, lubrication and labor.

Replies in regard to the longevity of anti-friction bearings showed the greatest diversity. A general deduction here would be unfair in view of the fact that the answers are a year and a half old. Some individual records do show long life. The Heidelberg Street Railways has had Jaeger roller bearings since April 15, 1911, Elberfeld has had the same make for 10 to 15 years, and the Barmen Mountain Railway has been using them since pre-war days. These records indicate that the higher first cost of anti-friction bearings is equalized in a fraction of their lifetime.

Some of the troubles reported with motor bearings are obviously the result of avoidable weakness in construction where the trouble is not due to insufficient strength for the load. In the case of anti-friction journal bearings, the faults may be due to such outside causes as bad track. Defects appear as failure of packing and breaks or other damage of raceways, balls, rollers and cages. However, the reports show that the later designs are much freer from these troubles.

The replies also indicated the great protection which anti-friction bearings afford against armatures going down on the pole pieces. On motors equipped with plain bearings, it was necessary to rewind 7.5 per cent of the armatures per annum compared with 0.5 per cent on one property and none at all on the others. This is clear proof of the value of anti-friction bearings in reducing crippled cars and so avoiding the loss of revenue mileage.

The Coblentz Street Railway reported that the use of anti-friction bearings had made possible a 10 per cent reduction in the shop personnel. Other railways also reported a saving in labor. Further advantages named were: Easier starting, less strain on motors, less heating and the exact centering of armatures to insure constant air gap and reduction of latter to 2 mm. if desired.

The many advantages of well-built anti-friction bearings should not only lead operators to replace plain bearings in existing motors, but also induce the manufacturers to use such bearings as standard.

ANTI-FRICTION BEARINGS FOR JOURNALS

Of 32 properties operating 9,004 motor cars, 34 have roller bearings and 224 have ball bearings. Of 7,527 trailers, 110 were equipped with roller bearings and 436 with ball bearings. The total number of anti-friction vehicles was therefore 804 or 4.7 per cent of all cars. It will be noted that the trailers were equipped in the proportion of 7.3 per cent; and the motor cars, 2.9 per cent. The bearings were furnished by the makers.

CARS EQUIPPED WITH ANTI-FRICTION JOURNAL BEARINGS

	Roller Bearings		Ball Bearings	
	Motor	Trailer	Motor	Trailer
G. & J. Jaeger, Elberfeld	19	21	....	....
Fichtel & Sachs, Schweinfurt	3	....	4	4
Moffett-Rollenlagergesellschaft, Cologne	1	71	....	....
Nordiska Kugellager, Gothenburg	1	1	....	....
Wämag	1	....	....	..
Norma Company, Stuttgart-Cannstadt	....	10	....	1
Wälzlager-und Maschinenfabrik, Stuttgart	....	5	....	...
S. K. F. Norma, Berlin	....	2	1	25
Ed. Weiler, Berlin-Heinersdorf	....		105	223
J. Schmid-Roost, Oerlikon	....	....	94	156
Deutsche Waffen-und Munitionsfabrik, Berlin	....	....	6	2
Ludwig Loewe, Berlin	....	....	1	...
Karl Klass, Nürtingen	....	....		20
Schuchardt & Schütte, Berlin	....	....	....	1
Unknown	9	....	13	4
Totals	34	110	224	436

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*Abstract of a paper before the Internationaler Strassenbahn and Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Among the principal users are: Berlin, 222 trailers and 101 motor cars; Zürich, 77 trailers and 87 motor cars; Dresden, 39 trailers and Dortmund, 30 trailers. As with motor bearings, it is expected that standardization will limit the number of types and permit interchangeability.

The lubrication averages show seven-month periods for grease against two-month periods for oil. The average performance per car is given as 3,700 km. (2,294 miles) per month. On the Hagen system, lubricant is delivered to the journal without removing a lid. This is accomplished by forcing the grease through an upper housing ordinarily sealed with a screw. The grease passes through a channel, as shown in the accompanying drawing, whence it bears directly on the two sets of rollers.

The average annual requirement of lubricant for a plain journal is given as 8 kg. (17.6 lb.) as against only 1.5 kg. (3.3 lb.) for an anti-friction bearing. Therefore, a car with anti-friction journals will give five times the mileage between lubrications obtainable with plain bearings.

As regards wear of plain bearings, the replies show almost no use of tin, as might be expected. On the other hand, long life is being obtained from bronze shells. The anti-friction journals are already showing instances of 10 years life or more, both in the ball-bearing and roller designs. Many of the defects are due either to pioneer designs or to some entirely outside cause like track.

10 TO 20 PER CENT ENERGY SAVING

Although few operators have made tests of relative energy consumption, one would not be far wrong in crediting anti-friction journals with a saving of at least 10 per cent. The Malmö Street Railway made the following interesting tests along this line:

A route 3.3 km. (2.04 miles) with very few curves was selected for tests at constant voltage of the power requirements for trailers fitted with plain and S.K.F. ball bearings respectively. The ball-bearing trailer weighed 6,750 kg. (14,650 lb.) and the plain-bearing trailer, 5,810 kg. (12,782 lb.). The test comprised non-stop operation, but no account was taken of the energy used for turning at the ends.

The ball-bearing trailer required an average of 21.5 kw. per ton-kilometer compared with 27.5 kw. per ton-kilometer for the plain-bearing trailer, a saving of 22 per cent with ball bearings new. As the number of stops and curves increases, the saving would become relatively less, say 15 per cent.

Tests were also made for a month with motor cars over routes with few curves, easy grades and long intervals between stops. In this case, the saving was approximately 10 per cent.

One management reported that although anti-friction bearings ran easier than plain bearings on tangents, it appeared that they ran less easily on curves. Dortmund and Göteborg asserted that the anti-friction bearings required more power than plain bearings, but this would not occur with properly designed bearings. The fundamental thing is to purchase bearings of high quality if the advantages of anti-friction bearings named are to be realized. On the writer's property, Hagen, 15 motor cars now on order will have Jaeger roller bearings on the armatures, motor axles and journals.

Annual Mileage Output per Platform Man*

Comparative Figures for Car Speeds, Hours of Labor and Extra Allowances Such as Days Off, Sick Leave and Vacations Are Given and Their Effects on Efficiency of the Individual Are Discussed

By K. NORREGAARD
Manager Copenhagen Street Railways, Copenhagen, Denmark

PLATFORM wages are one of the dominant factors in the cost of operation. There are two ways to attain a saving in this great item—the first is to pay lower wages; the second, to increase the output per man. The latter method is the subject of this paper.

To probe the subject to the very bottom, we ought to be able to determine how many passengers are served per man per annum, but this would require detail study of fares, car-kilometers operated, ratio of seats offered to seats used, density of traffic per kilometer, speed, working conditions, etc. As the data for such an investigation are not at hand, the present study will be confined to a few of the more important factors outside the question of density and earnings per kilometer.

The mileage per man per annum will depend chiefly on these considerations: (1) Average schedule speed; (2) number of men per car; (3) number of workdays per annum; (4) average number of hours per diem; (5) relation of platform to non-platform time.

HIGHER SPEEDS MEAN HIGHER EARNINGS

The factor of speed is of great importance, not only in the direct relationship between wages and speed but also on account of the greater earning power of faster cars. The increasing competition of the automobile is an added spur.

Speed is affected by the state of the track, by density of street traffic, by trailer and one-man car operation, by the passenger interchange facilities on the car, by the degree of crowding, by the distance between stops, by the location of convenient or safe boarding platforms, by the discipline of the public in boarding and leaving cars, by the character of the control and braking equipment, etc. As to speed, the replies from 65 railways summarize as follows:

Number of Railways	Km. per Hour	Miles per Hour
3	11.0—11.5	6.82—7.13
2	11.5—12.0	7.13--7.44
11	12.0—12.5	7.44—7.75
12	12.5—13.0	7.75—8.06
6	13.0—13.5	8.06—8.37
4	13.5—14.0	8.37—8.68
7	14.0—14.5	8.68—8.99
3	14.5—15.0	8.99—9.30
17	over 15	over 9.30

The lowest schedule speed reported was 11 km. (6.82 miles) an hour; the highest, 30 km. (18.6 miles) an hour. The average speed for all roads was 14.8 km. (9.18 miles) an hour. If, however, we omit the 17 roads whose schedule speed exceeded 15 km. (9.3 miles) an hour, the average declines to 13 km. (8.06 miles) an hour. The great spread in speeds is due to the fact that the statistics include cross-country lines with more or less of their track on private right-of-way, hence the higher figures must be regarded with caution.

PLATFORM ATTENDANCE—NUMBER OF WORKING DAYS

The success of many a railway will depend upon its ability to use such economies as trailers and one-man cars. In the present study, however, we are interested only in the actual miles per man regardless of the number of men per car or train.

The platform man has a number of idle days in the year due to days off, sick leave and vacation. Minor additions are due to instruction periods, misses, etc. The interval between scheduled days off varies from 4 to 16 days, but the average of 67 roads is found to be 52 days a year or every seventh day.

Sick-leave practice is also diverse. A few railways grant full pay for sick leave up to two years, while others do so only for a few days. Some begin with full pay and cut later to 60-80 per cent thereof, and still others show a range of 6 days to 1 year's payment at 10 to 90 per cent of full pay. In general, however, an employee of 3 months' to 1 year's standing will average two-thirds pay for 6 weeks, three-quarters pay for 13 weeks if he has served 1 to 3 years and four-fifths pay for 26 weeks if he has served 3 years or more. A few roads do not pay for sick leave at all.

In reply to the query as to how many days a year are lost because of sick leave, the answers were as follows:

Number of Railways	Average Days per Man
3	4 to 6
15	7 to 9
14	10 to 12
10	13 to 15
2	16 to 18
6	19 to 21
1	22 days
1	28 days
18	gave no data

The number of days lost through sick leave on half of the properties ranged from 10 to 15 days, and the average throughout was 12 days. These figures are not absolutely accurate, as it is possible that some managements included as "sick leave" periods that would have been "scheduled days off" had the employee been well.

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*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Vacations also show a great range of practice. German street railways tend to base vacations on length of service, the vacation periods consequently ranging from 4 days to 4 weeks. Other railways make the employee's age the chief factor. The Scandinavian and Dutch roads tend to the practice of a fixed period like one or two weeks. A few roads grant no vacation allowance.

The average vacation period on 26 roads is found to be 15 days, the range being from 10 to 18 days. In these figures, also, there is the possibility that some roads have figured into the vacation period the "scheduled days off," but this is not of consequence so long as the managements do not confuse the unpaid "scheduled days off" with the paid "sick-leave" and "vacation" periods.

On assembling the three chief causes of idle time, we find something like this—52 scheduled days off, 12 sick-leave days with pay and 15 vacation days with pay, 4 days for schooling, misses, etc. The total is 82 days, leaving but 283 effective working days out of 365, per man.

AVERAGE APPARENT AND EFFECTIVE WORKING DAY

Of the 68 roads which furnished data, 53 or 77.9 per cent have an 8-hour day. Five roads (7.4 per cent) have a shorter day and 10 roads (14.7 per cent) a longer day. Four of the five roads referred to have an average only a few minutes under 8 hours, but one has a workday of but 7 hours 26 minutes. Likewise part of the 10 longer-time roads exceed 8 hours by only 10 or 15 minutes. In the instances of a 9-hour day, there is compensation through getting every fourth day off, while the property which attains the maximum of 9 hours 47 minutes does so because it has a 2-hour meal relief as part of the workday.

Of course, not all of the so-called working time is effective platform time. First, there are layovers at the terminals, some of which are demanded by the schedule layout and others which are granted for relief. These latter allowances were made long before the 8-hour day, but when the latter was introduced the managements did not or could not take advantage of this change to cut down non-schedule layovers.

As 22 roads did not answer the question on layovers at all, it is possible that they do not grant any. However, the 45 which did show an average layover period of 45 minutes a day.

Meal relief usually ranges from 20 to 25 minutes and counts as part of the workday.

Signing on and off, preparation of reports and the like, on 49 properties are counted as part of the workday; on 19 they are not. The average time on the 49 which pay is 14 minutes a day.

Deadheading time to and from the reporting point usually amounts to but a few minutes and appears to be paid for only on five properties. In one case the men are paid for the time required to draw their pay.

The average effective working time of 63 roads is found to be 439 minutes, or 7 hours 19 minutes.

On comparing the schedule speeds and the effective working time of the platform men, it is found that the average performance per man per annum is 26,860 km. (16,653 miles). This figure requires modification because some operators included as platform personnel men who were assigned to other transportation duties. As these non-platform men amounted to about 3.5 per cent of the total, the actual performance is 3.5 per cent better, or 27,800 km. (17,236 miles).

As previously noted, many of these railways are of cross-country or interurban character. If, then, the properties showing more than 30,000 km. (18,600 miles) per annum per man are omitted, this leaves the street railways which appear to average 21,880 km. (13,566 miles). After certain other deductions, an average of 21,000 km. (13,020 miles) is obtained.

With 283 effective working days averaging 7 hours 19 minutes, an annual total of 2,070 hours is arrived at. If the service was devoted entirely to car movement at 14.8 km. (9.18 miles) an hour, the average of all classes of roads would be 30,600 km. (18,972 miles), but actually it is only 27,800 km. (17,236 miles), a difference of 9 per cent. Part of this difference is due to layover time required by the schedule and part through payments made to men on the extra list.

Current-Checking Means for Cars, Carhouses and Shops*

Methods of Economizing Current Analyzed from Replies of 86 Railways—Personal Supervision Without Mechanical Devices Favored in Berlin and Hamburg—Roads Using Instruments Obtain Savings

By WILHELM PFORR
Manager Berlin Street Railways,
Berlin, Germany

ALMOST all electric railways may be said to use more current than necessary, and the current so wasted is generally used destructively. Wastage is least on routes with long free runs, long intervals between stops and appreciable grades. Wastage is most on routes with short intervals between stops and with close headways and interference from foreign vehicles. Power saving on the latter type of railway, which includes all large cities, is an absolute necessity.

Eighty-six managements replied to a questionnaire in which they were asked to explain their ways of economizing current. Of these, 17 make no effort to save power, 26 use current-checking devices and 43 depend upon power inspectors.

Most of the railways which make no attempt to regulate current consumption belong to the free-running group already mentioned, and it is not believed that it would pay them to inaugurate such regulation. This leaves 80 per cent as the proportion of railways which carry on some form of supervision, with 50 per cent using power inspectors and 30 per cent using instruments. Of the latter class, 10 undertakings use power-on clocks, 10 use watt-hour meters, 4 use ampere-hour meters and 2 use the Wolff acceleration meter.

All users of the first three devices report a saving in energy. The Wolff acceleration meter has not been in use long enough to yield sufficient experience, but it is believed that its chief value is in protecting the electrical equipment against overload rather than in the direct saving of current. Undoubtedly, there is a saving from the use of the various devices, chiefly because the motormen believe that they are under surveillance, yet the use of such devices is not recommended by the writer, at least on large city systems, for the following reasons: (1) The appreciable expense of record-keeping personnel; (2) the maintenance cost of the instruments; (3) overloads occur oftener because the instruments tend to encourage high rates of acceleration and to discourage the series running which is so valuable in congested areas; (4) false comparisons, which are drawn frequently, cause dissatisfaction among the motormen.

For these reasons, personal supervision is preferred to the use of instruments—a practice successful today both at Berlin and Hamburg. There is no extra cost because the same men who serve as motormen-instructors, to the number of one or two per 100 motormen, are used as power inspectors. The success of the method depends largely upon selecting truly skillful men. Aside from this, the motormen should receive power-saving rewards which will be sufficiently high to interest them. It is essential that the bogey of energy consumption for each route and type of car operated should be carefully determined.

It is also desirable to tally the use of current in the carhouses and shops, since this may run from 5 to 10 per cent of the total energy. Watt-hour meters are recommended for all such situations and also for service cars. A separate meter should be used for the circuits employed in car shifting, in lighting and in shop tool operation. The results, as at Berlin, have been excellent, in stimulating competition between different stations in respect to saving power. The meters are read monthly and compared with the month immediately preceding and with the same month a year before. Supervision of traction current consumption on the basis of units per car-kilometer run is conducted on a day-to-day plan, so that the effect of loading, weather conditions, etc., may be figured and appropriate steps taken to correct apparent waste.

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*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Utility Commissioners' Convention in Phoenix, Ariz., Nov. 11

PERILS of railroad grade crossings, the proper method of regulating motor vehicle transportation, rates and service of railroads and public utilities, valuation of railroads, uniform laws for regulating commissions and proposed amendments to the federal transportation act of 1920, are among the subjects scheduled for discussion at the thirty-sixth annual convention of the National Association of Railroad and Utilities Commissioners, which will meet in Phoenix, Ariz., beginning Nov. 11 and will last four days.

As one feature it is expected that an address will be delivered by Secretary of Commerce Hoover. There will also be addresses by at least one member of the Interstate Commerce Commission and several state commissioners; by former presidents of the association, including Carl D. Jackson of New York City; Walter A. Shaw of Chicago and Charles E. Elmquist of St. Paul. There will also be addresses by representatives of the railroads, gas, electric light and power and telephone companies.

Pennsylvania Association Annual Meeting

THE annual meeting of the Pennsylvania Street Railway Association will be held at the Penn-Harris Hotel, Harrisburg, Dec. 5.

An effort is being made to have a symposium on traffic problems led by Harland Bartholomew of St. Louis and attended by directors of public safety and chiefs of police from the various cities in Pennsylvania. Other topics to be considered are bus operation and the economy of buying equipment repair parts direct from the manufacturer or making them in the railway shops.

At the evening dinner addresses will be made by prominent men in and out of the industry.

Central Traffic Association Meeting

THE next regular meeting of the Central Electric Traffic Association will be held at the Waldorf Hotel, Toledo, Ohio, Nov 19 and 20.

The morning session on Nov. 19, beginning at 9 o'clock, Eastern time, will be in the nature of a round-table discussion, at which time matters of general association interest and particularly items to be dealt with by committees will be considered.

The afternoon session and the session on Nov. 20, will be devoted to reports of committees and other business.

Iowa Midyear Meeting at Des Moines, Nov. 13-14

ANNOUNCEMENT is made that the midyear operating meeting of the Iowa Electric Railway Association will be held at Des Moines, Nov. 13 and 14. The following program has been arranged:

Thursday morning session:

Paper, "Track Construction and Maintenance," by N. W. Freund, Davenport.

Paper, "The automatic Substation—Its Care and Maintenance," by D. H. Nail, Des Moines.

Paper, "Bus Maintenance," by W. G. Lamb, Waterloo.

Following the morning session, a luncheon will be given through the courtesy of the Des Moines City Railway. In the afternoon there will be inspection trips over the properties of the Des Moines City Railway and Des Moines & Central Iowa Railroad. A banquet will be given in the evening at the Fort Des Moines Hotel.

Friday morning session:

Paper, subject to be selected by a manufacturer's representative.

Paper, "Maintenance of Equipment," by T. E. Wood, Omaha, Neb.

Paper, "Lubrication of Railway Motors," by C. Bethel, Westinghouse Electric & Manufacturing Company.

General discussion and election of convention committee.

American Association News

Committee of One Hundred

THE executive committee of the Committee of One Hundred held a meeting at the Railroad Club Oct. 28. Those present were Gen. Guy E. Tripp, chairman; H. R. Hayes, secretary and treasurer; J. N. Shannahan, S. M. Curwen, P. H. Gadsden, T. N. McCarter, Randal Morgan, F. H. Sisson, L. S. Storrs, H. L. Stuart, F. R. Coates, E. C. Faber for Barron Collier, Morris Buck for J. H. McGraw, J. W. Welsh and Labert St. Clair.

The work of the committee since its inception in 1917 was reviewed and a report of the finances was given. A general discussion ensued as to the best means of furthering publicity and dissemination of facts and statistics for electric railways, which has been done by the advertising section of the American Association in connection with the Committee of One Hundred. A general appreciation of the work being done by Mr. St. Clair as director of the advertising section was expressed.

Comment on Foreign Report at Executive Committee Meeting

AT THE meeting of the executive committee of the American Association held at Atlantic City, on Oct. 6, a vote of thanks was passed for the work of the committee on foreign operation, consisting of J. W. Welsh, chairman; H. A. Johnson and Harry L. Brown. This was mentioned briefly in the issue of this paper for Oct. 11, page 603. In introducing the motion, J. H. Hanna, vice-president the Capital Traction Company, Washington, D. C., addressed President Budd as follows:

"Before we adjourn I would like on my own personal account to say a word of appreciation for the work of this foreign committee. I want particularly to say it now because the idea originated in your mind and you and Mr. McGraw are really responsible for it.

"I believe that the investigation and the report as rendered is about as useful a thing along the same lines you have been talking as anything I have ever seen. This bus problem is being thrown up to us all the time—the question of the bus superseding the trolley car. The great argument that these people bring forth is the fact that the bus handles the city transportation in London and other cities. I think that most of us generally have known the answer to that, but we have not had the facts. This report gives us the facts and in as clear and concise a manner as it could do. I don't know of anything that has been of more value to us in meeting that particular problem when it is brought up.

"If it is in order I would like to move a vote of thanks to that committee for the splendid work it has done."

The motion was seconded and carried.

Metropolitan Section Meeting Scheduled for Nov. 7

A MEETING of the Metropolitan Section of the American Electric Railway Association will be held at the Engineering Societies' Building, 33 West 39th Street, New York City, Friday, Nov. 7, at 8 p.m. The outstanding event on the program will be a talk by E. F. Wickwire, chairman of the committee on co-operation with manufacturers, his subject being "Friendlyizing the Public." Music will be furnished by the Interborough quartet and a moving picture called "The Straphangers," loaned for the occasion by the Transit Commission, will be shown. In addition to the other business of the meeting, section membership pins will be distributed.

Motor Bus Information Desired by Accountants' Committee

THE committee appointed by the American Electric Railway Accountants' Association at the recent convention at Atlantic City to draft a classification for motor bus operations is desirous of obtaining information of current practice among operating companies.

The request has been made by M. W. Glover, General Auditor West Penn Railways, Pittsburgh, Pa., chairman of the committee on bus accounting, that all companies operating motor buses forward to him a copy of the classification now in use covering motor bus operation, in order that the committee may have full information regarding all classifications now in use. Information regarding statistics which are used in connection with motor bus operations will also be appreciated.

Maintenance of Equipment

Convenient Buggy for Long Bars

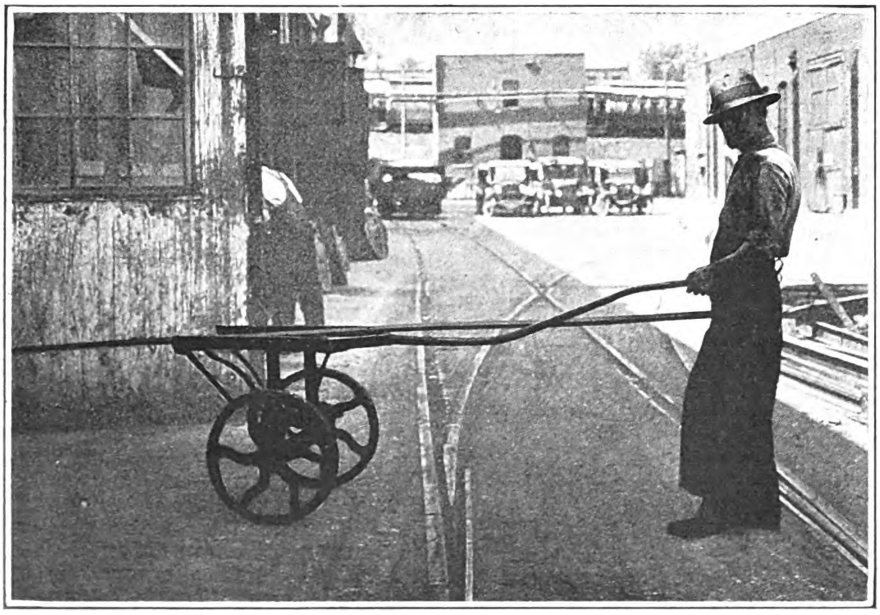
By J. L. Rogers

Forge Shop Foreman Kansas City Railways

FREQUENTLY it is necessary to handle long bars of steel or wrought iron from stock to the forge shop, or from furnaces to hammers within the shop. Such bars are usually too heavy to be lifted by hand without excessive labor and fatigue. For handling this class of material, the simple two-wheeled buggy shown in the illustration below has proved an efficient time and labor-saving device, even though the Kansas City Railways shop is well equipped with hoists and cranes.

As shown in the illustration, the frame is made up of steel angles, riveted together. The top is made up with a number of cross-pieces that help to reinforce the framework and form a support for carrying the material. The carriage is mounted on two cast-iron wheels large enough that it may be readily moved over tracks or similar obstructions. The two top side angles are brought together and welded to the long handle. This enables the workman to manipulate the buggy with one hand while steadying the piece being transported with the other.

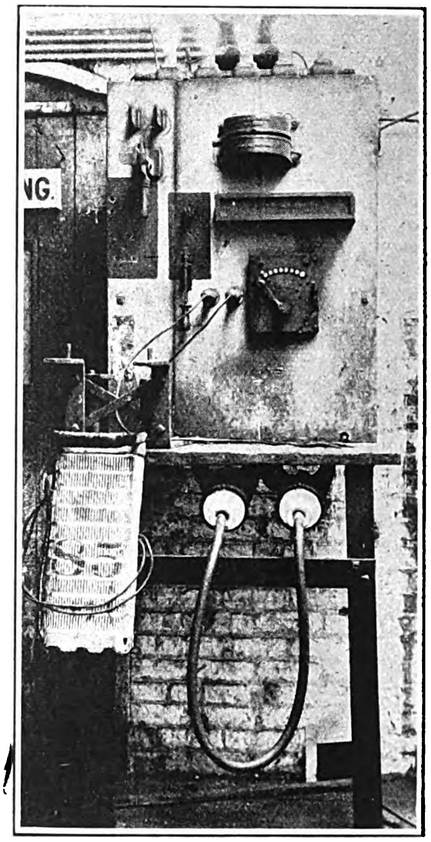
This buggy was designed of such a height that material can be pulled from the furnaces directly onto it, or can be pushed from the buggy to the bed of a steam or air hammer without lifting.



This Two-Wheeled Buggy Has Been Found Useful for Handling Long Bar Material About the Forge Shop of the Kansas City Railways

Testing Control Jumpers

TRAIN control jumpers are tested in the Wheaton Shops of the Chicago, Aurora & Elgin Railroad by passing a current of approximately 1½ amp. through each strand and noting the continuity of the circuit by means of a small indicator lamp mounted in an annunciator box. The jumper to be tested is placed in receptacles mounted under the bench of the testing board. A 600-volt series circuit is passed through each of the conductors in turn by means of a selector switch. This was originally a motor starting switch with handle and contact points, but has been wired up for this special use. In series with each of the small conductors is a small indicator lamp located in an annunciator box and a five-lamp bank which furnishes the load to the 600-volt d.c. circuit. By moving the handle from one point to another, the various conductors in the jumper cable may be tested. Moving the jumper around while it is attached will disclose any breaks in the cable, as the small annunciator light and the lamp bank will flicker.



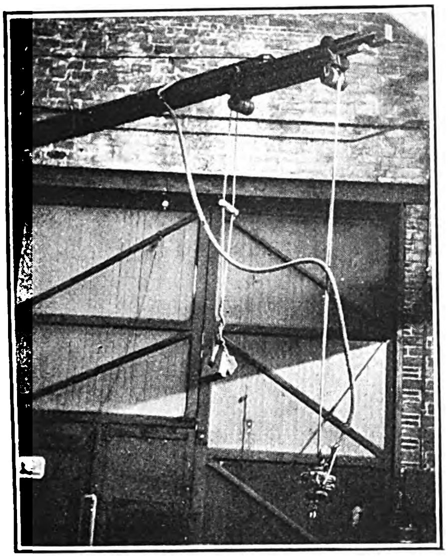
Control Line Jumpers Are Tested by Means of High-Voltage Series Circuit with Lamp Bank Acting as Load and Indicator Lamp in Series

Mounted on the same test board is a bracket for holding motorman's portable heaters, which are tested by means of the same lamp bank and series circuit.

Increasing Usefulness of Air Drill

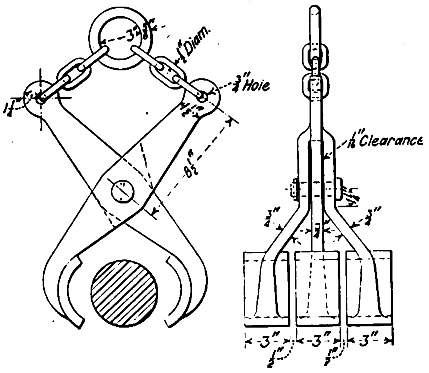
IN THE mill room of the Illinois Traction System shop at Decatur use is made of an overhead suspended air drill for drilling heavy timbers such as sills and bumpers. To facilitate the handling of the drill and air hose, they have been suspended from a carriage which travels on a swinging telfer arm. The carriage is approximately 3 ft. long and has a pulley suspended under each end. Over these pulleys two ropes are carried, at the ends of which is the air drill and at the other the counter-balancing weight.

The carriage has four wheels similar to those used in hanging sliding doors. A rail on each side of the telfer arm supports the wheels and carriage. This device has greatly increased the accessibility of the drill. The arm is 12 ft. long, thus making the drill available over the area of a half circle of that radius.


Suspending Air Drill from Traveling Carriage on Swinging Telfer Arm Increases Its Radius of Activity

Convenient Tongs for Lifting Wheels

A CONVENIENT form of tongs or shackles for lifting wheels when mounted with axles is in use in the new Hillcrest shops of the Toronto Transportation Commission, Toronto, Canada. The tongs, which resemble somewhat a pair of ice tongs, are of forged steel, with lips shaped to fit a 4½-in. diameter axle.



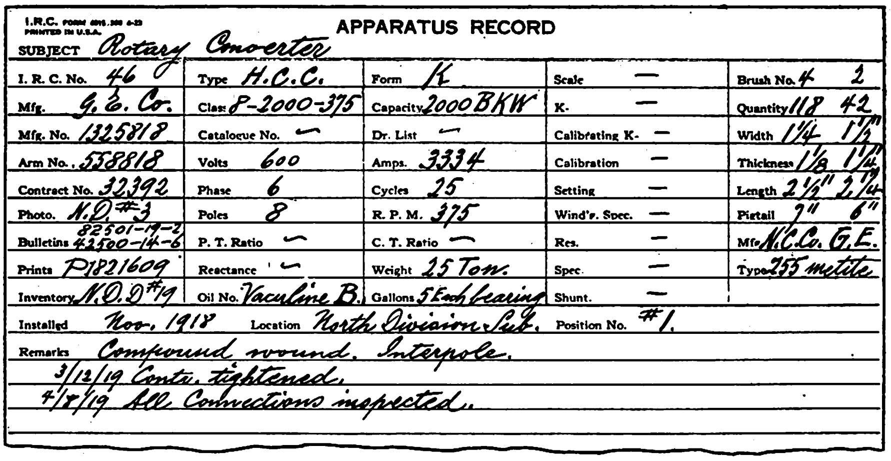
Lifting Shackle for Pair of Wheels and Axle

One jaw has two lips, while the other has a single one, so that the balance is the same. A short section of chain on each side connects with a 3-in. ring, so that when placed on an axle and with the crane hook in the ring, the shackle will grasp the axle automatically with no danger of its dropping while being transported by the crane. This design was worked out under the supervision of W. R. McRae, superintendent of rolling stock.

Record Card for Power Equipment

A COMPLETE record of all power equipment is kept by the International Railway, Buffalo, N. Y., on 5-in. x 8-in. cards. A special form was devised for the purpose which is both an index card for files of photographs, bulletins, blueprints, inventory records, etc., as well as an operating record card. Under the various subheads the file number of any data pertaining to the particular piece of equipment is entered.

The card is designed so that one form can be used for various types of equipment, any subhead not applying to it being crossed off. Under remarks, dates when oil was changed or filtered, commutators or rings turned, failures of any kind, painting, etc., are entered. This is continued to the reverse side of card.


I.R.C. FORM 4015.300 4-23
PRINTED IN U.S.A.

APPARATUS RECORD

SUBJECT Rotary Cmoerter

I. R. C. No. 46	Type H.C.C.	Form K	Scale —	Brush No. 4 2
Mfg. G. E. Co.	Class 8-2000-375	Capacity 2000 BKW	K- —	Quantity 118 42
Mfg. No. 1325818	Catalogue No. —	Dr. List —	Calibrating K- —	Width 1¼ 1½"
Arm No. 558818	Volts 600	Amps. 3334	Calibration —	Thickness 1⅛ 1¼"
Contract No. 32392	Phase 6	Cycles 25	Setting —	Length 2½" 2¼
Photo. N.D. #3	Poles 8	R. P. M. 375	Wind'g. Spec. —	Pigtail 7" 6"
Bulletins 82501-19-2 42500-14-6	P. T. Ratio —	C. T. Ratio —	Res. —	Mfr. N.C.Co. G.E.
Prints P1821609	Reactance —	Weight 25 Ton.	Spec. —	Type 255 metite
Inventory N.D.D #19	Oil No. Vaculine B.	Gallons 5 Each bearing	Shunt. —	

Installed Nov. 1918 Location North Division Sub. Position No. #1.

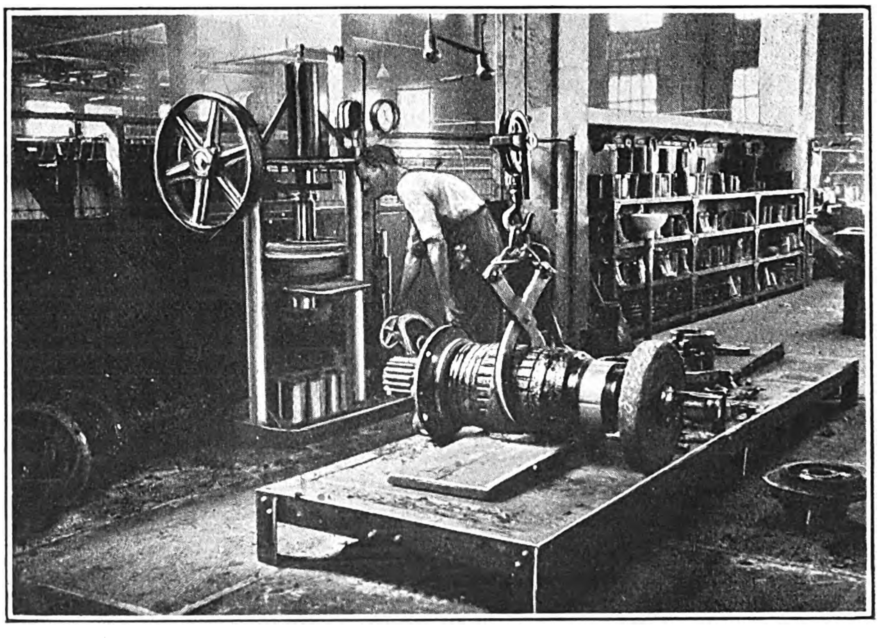
Remarks Compound wound. Interpole.
3/12/19 Contr. tightened.
4/8/19 All Connections inspected.

Record Card for Power Apparatus

A Convenient Arrangement for Changing Bearings

ONE section of the armature room in the Snelling Avenue shops of the Twin City Rapid Transit Company is set aside and is conveniently arranged for making armature bearing changes.

At one side of this section of the shop is located the bearing press, which is a McCall Machine Works 15-ton hydraulic unit. This machine is comparatively small in size and is set up at one side of the bearing section, where it occupies the minimum amount of room and at the same time is very conveniently located relative


Overhead Hoist, Work Bench, Hydraulic Press and Storage Bins Are Conveniently Arranged for Making Bearing Changes

to the work bench and the storage bins. These storage bins allow bearings to be sorted and kept off the floor with a minimum amount of moving around on the part of the workmen. A low, substantial bench raises the armatures to a convenient height.

An electric overhead hoist is arranged so that it serves this entire section of the shop and facilitates the work of handling the armatures from storage racks to the work bench, etc. The general arrangement of the equipment for making bearing changes is shown in the accompanying illustration.

New Equipment Available

Stainless Steel for Third Rail Terminal Bolts

With the phosphor bronze and mild steel bolts used by electric railways for connecting terminals to third rails, some difficulities in removal have been found. In case of accident, when it is necessary to unscrew the bolt the threads are sometimes found fixed in the rail due to corrosion, so that considerable trouble and delay take place in removing them. With a view to overcoming this trouble, bolts made from stainless steel have been furnished to the electric railways in London by Thomas Firth & Sons, Ltd., Sheffield, England.

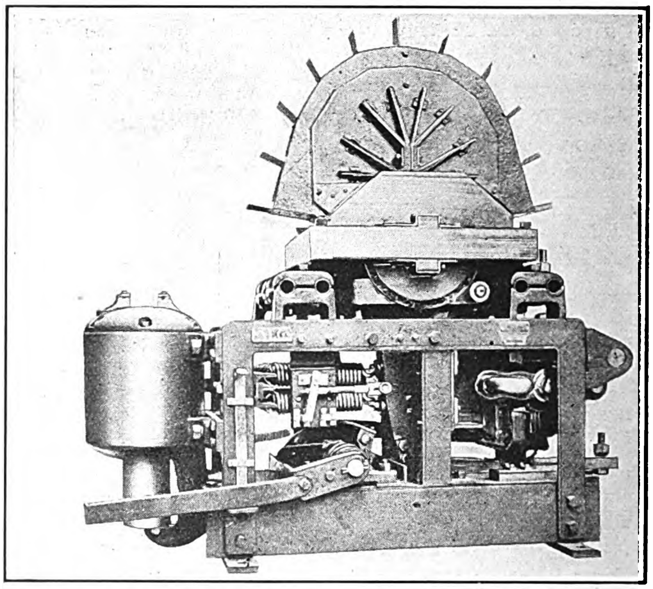
The bolts are used to secure the plate carrying the cable, which conveys the current from one length of the third rail to the next. Two bolts go to each plate, and the current cable is joined to these plates by means of a gunmetal holder. The bolt is threaded through the rail, and the nut is screwed up on the outer side. Threading is used in order to have a firm contact between the rail and the bolt, since the bolt is really a conductor of current. Where gun metal or mild steel bolts are used for this service it has been found that in removing the bolts, the heads are usually twisted off, which necessitates having to tap out the remaining portion.

In the sample stainless steel bolts put in service in London approximately two years ago, satisfactory results have been obtained. Although these are coated on the outside with accumulations of rust from the rail and soot from the atmosphere, this is readily cleaned off with a wire brush, and when unscrewed the bolt threads show bright surfaces.

Welding Electrode for Cast Iron

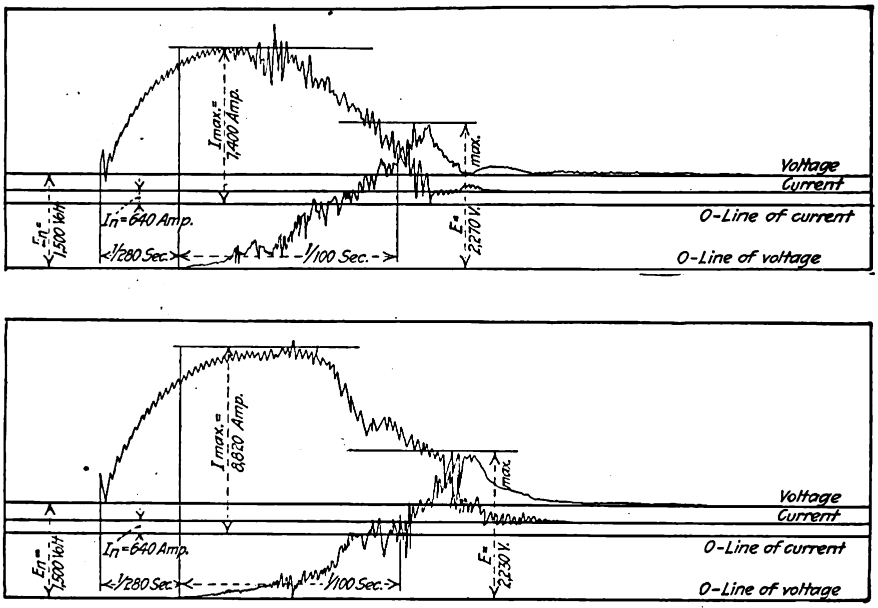
A welding electrode which is recommended particularly for welding cast and galvanized iron has been brought out by the General Electric Company, Schenectady, N. Y. It consists of a central metallic core surrounded by a layer of flux outside of which is a metallic sheath. The flux is thus protected from dissipation, and improved welding results. Since there is no loss of flux in transit and during welding, the correct amount is furnished the arc. On account of its stability, the arc is easy to "strike" and to "hold." Heat is concentrated at the point where it is needed and so hastens the rate of melting. The electrode can be used with alternating or direct current.

German High-Speed Circuit Breaker


A.E.G. High-Speed Circuit Breaker for Javanese State Railways

A new high-speed circuit breaker, which in one-sixtieth of a second will extinguish an arc rising to 9,000 amp. on 1,500-volt railway circuits, has just been manufactured by the Allgemeine Elektricitäts Gesellschaft in Berlin for the State Railways of Java. The breaker contains no specially radical features but is a development and refinement of the regular A.E.G. high-speed breaker. The accompanying illustration shows the particular breaker in question. Two oscilligrams show short-circuit tests made on this breaker.

The breaker operates to open the main circuit, but it is shunted by a resistance which, with the normal 1,500-volt circuit, will draw 640 amp. A second breaker operation then opens the circuit in another place. The breaker is a part of an order for the Javanese State Railways being furnished by the Allgemeine Elektricitäts Gesellschaft.



Oscillograms of Two Short-Circuit Tests on High-Speed Circuit Breaker

The News of the Industry

Traffic Plan Suggested

Engineers Recommend More Street Space and the Elimination of Parking

During the past eight years ownership and use of motor vehicles in Detroit, Mich., and vicinity has increased twelve times faster than the population. This is one of the conclusions contained in a report of the survey of downtown traffic made by Daniel L. Turner and John P. Hallihan, engineers of the Rapid Transit Commission, of which Sidney D. Waldon is chairman. The report was recently submitted by the commission to acting Mayor John C. Lodge.

Their conclusion shows that at the present time 93 per cent of the total vehicular traffic passing in and out of the business district during the 12 hours consists of motor cars; only about 7 per cent are street cars, horse-drawn vehicles and other miscellaneous types. This motor car traffic is 7½ times what it was 8 years ago.

They concluded that at all times during the day there are approximately 10,000 to 12,000 vehicles moving through the business district. The experts believe that by-pass traffic routes should be developed around the business district in order to relieve the district of the large amount of through traffic now traversing it to no useful business purpose. It was their finding that during rush hours individual automobiles carrying only 25 per cent of all passengers homeward bound utilize, roughly, 91 per cent of the traffic capacity of the streets available for passenger transportation, thereby congesting the streets and delaying 75 per cent of the passengers using the street cars and buses. They claim that the conditions attending safe movement in a congested city street do not permit attaining more than about 50 per cent of the theoretical capacity and that the traffic arteries through the business district of Detroit are rapidly approaching the saturation point. To meet these rapidly increasing traffic requirements they recommend additional street space up to the practical economic limit in order that both individual and collective traffic may be adequately accommodated and that until such relief can be attained, and afterwards to the extent that it can be furnished, collective traffic facilities should be improved, and should be given preference over individual passenger traffic during the rush.

On the subject of parking, the rapid transit engineers agreed that parking should be prohibited on street car streets and motor bus routes and other vehicles on other thoroughfares during rush hour. Parking should also be prohibited along street car and motor bus routes by segregating commercial traffic from passenger traffic during rush hours and providing special routes for such traffic and finally along street car, bus and individual motor car routes, by requiring all crossing traffic to cross at designated cross streets a number of blocks apart instead of at every crossing street, thereby reducing cross interferences, increasing the safe speed and consequently accelerating the traffic movement for both individual and collective traffic.

Bus Issues in New York Deferred

At the regular meeting of the Board of Estimate, New York City, held on Oct. 31 the matter of the bus franchises was put over until the next meeting of the Board. It had already been put over from the meeting Oct. 29, when Mayor Hylan said that he would grant no franchises to the Third Avenue Railway unless it first surrendered its trolley franchises on 42d Street, 125th Street and some other streets. The suggestion of Comptroller Craig that the city could operate buses itself by invoking the home rule law was referred by the board to the committee of the whole and to the Corporation Counsel. Reference was made in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 25 to the bus plan of the New York Railways. At the meeting of the Board of Estimate on Oct. 21 a letter was read from the receiver of the New York Railways to the effect that the company was prepared to accept a bus franchise on terms generally consistent with the report made to the Estimate Board by the Board of Transportation under date of Oct. 14, 1924. The letter stated further that the company was prepared if such borough bus franchise were granted to discuss at once the fair terms for replacement of about 46 miles of existing trolley track in Manhattan with buses.

Seek Injunction Against Bus Line in Kansas City

The receivers for the Kansas City Railways, Kansas City, Mo., have filed a petition for injunction in the federal court against the operators of an inter-city bus line to prevent its operating on the streets of Kansas City. The petition recites ordinances in both Kansas Cities, enacted some years ago to control "jitney" traffic, and which specifically bar jitneys from streets having street car tracks. The receivers, however, do not restrict their appeal to the grounds of these ordinances, outlining many other substantial reasons for prohibition of bus line operation under present conditions, without licenses, without payment of adequate or any remuneration to the cities for use of pavements, without protection to the public, with hazards to the street railways and other property.

Traction Message Discussed

Hearings on Chicago's Transportation Issues Consider Insull, Blair and Busby Plans

Mayor Dever's determination to get a comprehensive transportation plan on the February primary ballots in Chicago became increasingly evident in the first week of the public hearings of the city council committee on local transportation, taking up the Mayor's recent traction message.

At the opening session, held on Oct. 27, and a subsequent one on Oct. 30, Alderman Schwartz, chairman of the committee and the Mayor's spokesman, exhibited a desire to brush aside the Insull subway proposal and learn the temper of the other aldermen on the Busby offer, a letter submitted by Leonard A. Busby, president of the South Side street car lines, proposing in effect to sell those lines to the city separately from the unified Chicago Surface Lines system.

Herein, Alderman Schwartz indicated, Mayor Dever hopes to find a wedge to get at the Surface Lines and force them to his terms by a threat to buy the south side lines, though the Busby terms were identical with those from the Surface Lines as a whole which the Mayor declared to be "impossible." Alderman Kostner, a committee member, the first openly to dispute the Mayor's conclusions, declared it would be impossible ever to buy a segment of the lines and that such a threat would be useless.

Forced by Alderman Kostner to make revelations regarding the secret bankers' purchase conferences of last summer, Alderman Schwartz disclosed for the first time just how close to a sale of Surface Lines and the Mayor came. In fact, only a matter of bookkeeping prevented the consummation of the deal. The city, he said, was willing to pay $162,000,000, the capital account of the surface lines, if the company transferred to the city its depreciation, liability and certain other cumulative funds, amounting to upward of $20,000,000. At the Surface Lines offices it was said that the Mayor's system of bookkeeping transfer would have deprived the surface lines certificate holders of anything from the sale.

The Insull plan, agreeing to build $23,000,000 worth of elevated lines into districts now unserved by rapid transportation if the city uses its $40,000,000 traction fund to build a downtown subway for elevated trains, was declared by Alderman Schwartz to be a "palliative" and no real cure for the situation.

The prospects of financing a half-billion dollar transit plant was taken up. The certificates which the city proposes to trade for the elevated and surface lines stock in the event of purchase were explained from the bankers' viewpoint by Alderman Schwartz. He said that the bankers say they may sell around 94 to start but they will go up.

He said the city would pay $162,000,000 to the surface lines, $90,000,000 to the elevated and spend $217,000,000 in the first of the three construction periods for new lines. The first period of construction calls for the subway.

The Blair unification plan, a merger of elevated, surface and subway transportation into either a private or municipal corporation proposed by Henry A. Blair, president of the surface lines, will be touched upon at hearings to be held after the election.

Seeks Operating Rights on Chicago Streets

A request for franchises from the Chicago Motor Coach Company, which has confined its operation heretofore chiefly to boulevards and parks, has been submitted to the city of Chicago providing for routes on city streets largely serving territory now exclusively held by the Surface Lines. The proposal offers the city the right to purchase nearly all the lines not included in its present boulevard system.

The coach company operates on grants from the park boards which are separate taxing bodies with powers quite different from those possessed by the city. Although disclaiming any right of the city to tax or regulate bus operation, the company recognizes the potentialities of a suit now pending between the two, and suggests that such time and expense be saved.

The coach company arranged terms satisfactory to the park boards to cover the wear on their boulevards, and now proposes to pay the city 2 per cent of its gross annual receipts from the mileage operating on the city streets, less any future taxes or fees imposed by the city on the company.

Streets are divided into lists A and B. The first is said to cover streets needed mostly for terminal turns for the boulevard lines, and a 20-year franchise for these is requested. For list B there are alternative proposals: a 20-year franchise with purchase right on three years' notice in writing, or a 10-year franchise, renewable for five years, with a purchase right on one year notice in writing at any time after the franchises have run six years.

"It is possible for the city, within a reasonable time under this plan, to enter into the business of bus or motor coach transportation as to the streets included in list B without being required to pay anything other than a fair valuation for the equipment in use on the thoroughfares covered," said James J. Condon, counsel for the motor coach company.

When the company recently began sending its buses over city streets the corporation counsel on advice of the Mayor threatened to arrest the drivers for using the city streets without a license. The company instituted suit for an injunction, which is still pending. In its proposal it now specifies that any franchises shall state that neither side surrender any of its contentions but that at the expiration of the grants the status quo be preserved.

Bus Ordinance Proposed

St. Louis Buses Would Pay 12 per Cent of Gross Receipts—Maximum Fare 10 Cents

A proposed ordinance providing for rigid regulation by the city of bus operation in St. Louis, Mo., was presented to the Board of Aldermen by the chairman of the legislative committee. It provides for co-ordination of the buses and street cars and has been attacked by Richard W. Meade, president and general manager of the People's Motorbus Company, now operating extensively in the city, as a sure way of preventing the people from obtaining the sort of service his company offers. The measure was prepared by C. E. Smith, consulting engineer for the city. He and E. R. Kinsey, president of the Board of Public Service, opposed bus permits recently granted to the People's Motorbus Company giving that company the right to operate their buses over 43 miles of additional streets.

Salient features of the new bill are: Payment by bus companies of 12 per cent of their gross receipts annually to the city as the aggregate of an operating tax, licenses and all other city taxes, approval by the Board of Aldermen as well as of the Board of Public Service of bus route permit, strict regulation of service and transfers from all bus lines to street cars and between all bus companies.

The present bus ordinance provides for payment of 3 per cent of the gross receipts to the city and for an annual license fee of $25 per bus.

The transfer plan is subject to approval by the State Public Service Commission. No extra fare for a transfer from a bus to the street cars will be permitted, and the bill provides: "The fare collected for each transfer ride shall be apportioned between the two portions of the ride as may be agreed to by those who furnish the rides, subject to the approval or order of lawful agencies having jurisdiction."

Another provision of the new bill is that the maximum fare of 10 cents shall be reduced if the operating income shall yield more than a reasonable return on the bone fide investment in physical property after all expenses have been paid, and that no allowance shall be made in computing investment for promotion, good will, going value or permits.

An important provision says: "It is the express purpose of the city to grant revocable permits for operation of buses to supplement street railway service, and not to duplicate or compete with such service."

Another portion of the bill declares that no permits shall be granted to a company whose principal place of business is not located in the city of St. Louis and whose property to be used in the business is taxable in some other city. The headquarters of the People's Motorbus Company are located at 585 Adelaide Avenue, University City, Mo.

The proposed ordinance provides, further, that the existing bus companies must comply with its provisions immediately if they wish to preserve the permits granted by the Board of Public Service. No permits shall be for exclusive use of any streets. This feature may become the matter for much litigation as the People's Motorbus Company contends that the permits granted it by the Board of Public Service are exclusive and constitute perpetual franchises.

Investigation Completed—International Rejects Contributions

Representatives of the Interstate Commerce Commission and the New York State Public Service Commission have closed their joint investigation into the cause of the fatal accident on the Buffalo-Niagara Falls high-speed line at Ellicott Creek crossing Oct. 19. Four passengers were killed and upward of 450 others were injured in the rear-end collision between two three-car high-speed line interurban trains. Many are still in hospitals in Buffalo, Tonawanda and North Tonawanda with arms and legs off. Most of the passengers were from Philadelphia. They had through tickets over the Pennsylvania and International railroads.

B. C. Craig and Clyde Waldo conducted the investigation for the Interstate Commerce Commission. Representatives of both commissions refused to indicate what their reports would be, but it was intimated in the newspapers that one of the recommendations will be the installation of an electric automatic block signal system on the Buffalo-Niagara Falls high-speed line. It was stated that the cars operate under very close headway when traffic is heavy and the need for such signal system was said to have been disclosed by the investigators.

Conflicting statements were made by witnesses regarding the action of the motorman who ran the second of the wrecked trains. Several witnesses are reported to have testified that he left his post and rushed back into the first car of the second section with his hands over his head. Other witnesses are reported to have testified the motorman stuck to his post. The motorman is in a Buffalo hospital in a critical condition. The investigation was held behind closed doors and it was not revealed whether or not flagmen from the stalled first section went back to signal the onrushing second section.

President Herbert G. Tulley of the International Railway rejeeted a proposal made by members of the I. R. C. Co-operative Association of employees to contribute one day's pay to the company to aid in the settlement of the damage claims. Several petitions have been circulated among the employees offering to raise a fund for the company and hundreds of employees signed.

The International Railway offered to pay the expenses of friends and relative of injured passengers from Philadelphia to Buffalo and North Tonawanda hospitals in instances where friends and relatives were too poor to pay their own expenses. Many took advantage of this opportunity to come to Buffalo to visit the injured passengers. One of the passengers who died of injuries sustained in the collision was buried in Tonadanda by the International Railway.

Weekly Pass in Oklahoma City

An unlimited number of rides may be taken by passengers on the lines of the Oklahoma Railway, Oklahoma City, who purchase a weekly pass for $1.25. The Oklahoma Corporation Commission has approved an application of the railway for permission to issue these passes as a means of increasing patronage and revenues of the company. The 8-cent fare, or two fares for 15 cents, still remains in force. The company began issuing these passes on Sunday, Oct. 26. They are good for only one passenger a trip, but are transferable. Company officials state that the passes will be more economical than the regular fare if street car patrons ride frequently.

A short trial under the recent increased fare showed that revenues of the company were only slightly increased and that patronage had fallen off as compared with the same period last year. John W. Shartel, president of the company, hopes, through the weekly pass system, to increase the number of riders and at the same time benefit people who desire to use street cars frequently. Reference to the recent fare increase was made in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 11.

Cleveland Wage Question to Go to Higher Court

Members of the street car men's union in Cleveland, Ohio, voted to appeal the decision of the Common Pleas Court, which recently ordered a rearbitration of the union's demand for a wage increase for platform employees of the Cleveland Railway. The vote of the union to carry its case to a higher court was announced as being 1,976 for the appeal and 427 against. The decision of the union to appeal the case to a higher court and not to submit to a rearbitration until the higher court has ruled on the decision of the Common Pleas Court means that the Cleveland Railway will also likely appeal that part of the decision which held that the closed shop agreement between the company and union was binding upon the company. A decision by the company on this question is expected shortly.

The Common Pleas Court nullified the first arbitration, which granted the men an increase of 12 cents an hour, on the ground of fraud. The court held that the supposedly neutral member of the arbitration board which sat last May was biased and prejudiced in favor of the union and against the Cleveland Railway.

Bus Service in Buffalo Scheduled

Bus service in Buffalo is scheduled to start on the Delaware Avenue line Nov. 2, it was announced by R. H. Horton, vice-president of the International Bus Corporation, a subsidiary of the International Railway. The Public Service Commission granted the necessary permit to the new bus company after the City Council had voted four to one to approve the franchises on the Delaware Avenue and East-West Delavan Avenue lines. Initial service is to start with 10 double-deck buses of the Fifth Avenue type between the Terrace and Delaware Park on Delaware Avenue. As soon as additional buses are received, the International Bus Corporation will extend the service to the Buffalo-Kenmore city line, and later service will be started on the Delavan Avenue line between Niagara Street and Bailey Avenue.

A 10-cent fare will be charged on the bus lines with free transfers to connecting trolley lines. Trolley passengers receiving transfers to connecting bus lines will be charged 3 cents extra, the trolley fare being 7 cents or four tokens for 25 cents.

With buses in service on Delaware and Delavan Avenues, the International Bus Corporation will give bus service on three routes in Buffalo. The Bailey Avenue bus line has been in successful operation since last spring. The company will spend $282,000 for new single and double deck buses.

Compromise Proposals Offered in Cincinnati

Settlement of Cincinnati's traction problem appears more likely since alternative compromise proposals respecting street paving and the guarantee clause in the proposed new franchise have been submitted by representatives of the Cincinnati Traction Company and Cincinnati Street Railway Company on one side and the city of Cincinnati, Ohio, on the other. The Mayor's traction committee will meet shortly after the election to be informed of the status of the negotiations for agreement on a new franchise. The city has been insisting that the operating company shall pay one-half the cost of repairs of the streets between the rails and 18 in. to each side. Representatives of the traction and railway companies have felt that it was too heavy a burden to place on the operating company and eventually on the car riders, since fares are the only revenue.

In the matter of the guarantee clause the company representatives have said they would sacrifice, if necessary, one-sixth of the dividend of 6 per cent on the capitalization in the effort to keep for three years initial the fare at 7½ cents or less, provided a rise in fare was not caused by an increase in wages. This was not acceptable to the city representatives. Suggested compromises states that the wages clause in the 7½-cent fare guarantee be eliminated in consideration of a modification to be made in the paving clause. Alternative proposals for a modification of the paving clause include the operating company assuming one-half the cost of repairs on streets improved during or since 1920 and the company being charged with not to exceed $25,000 in any one year for street repair.

A statement has been drawn up setting forth conditions prevailing now and for some time past and what is expected to result if a new franchise is granted; in brief, that lower fares and better service should and would supplant high fares and the present service. There would also be the substitution of one company for several.

Sunday Pass in Pittsburgh

The Pittsburgh Railways, Pittsburgh, Pa., started the sale on Oct. 26 of a Sunday street car pass for a two months trial period which will permit of an unlimited number of rides within the first fare zone, or that area covered ordinarily by a one-token ride from the center of the city. The pass sells for 25 cents and from it any number of rides may be had. The special Sunday transfer now in use covers the same area and will not be withdrawn, but will be available for those who do not make use of the new Sunday pass.

The Sunday pass is an outgrowth of the weekly pass which the Pittsburgh Railways recently installed in Washington and McKeesport. The user on Sunday will have the same privilege for riding as is enjoyed by residents of those two communities during the week. No transfers are issued on the passes and they are not good on night cars or on interurban cars.

Under the slogan "Ride all day Sunday for 25 cents," the Pittsburgh Railways, through its commercial department, advertised its scheme broadly. The transportation department got out a special circular addressed to trainmen explaining to them how the passes would be supplied to the men on Friday of each week and that each man would be charged with ten of these passes bound in a pad. With the proceeds from the sale of these the men were to purchase additional passes, if necessary.

For the first Sunday, Oct. 26, approximately 20,000 of the 25-cent passes were sold. It is said that the 17,500 originally printed for use on that day were exhausted before noon, and 9,500 of the ones that had been printed for the following Sunday were restamped and rushed to the various carhouses to meet the demands of the patrons. William H. Boyce, commercial manager of the railways, said that the sale exceeded the company's expectations; that while the token fare receipts fell off about 40,000 during the day, travel was heavier than on the previous Sunday. According to a check-up, each buyer of a pass used the ticket for about 5 rides.

In its announcement of the installation of the pass the commercial department of the company stated that the success of the pass in the next ten Sundays would determine its adoption for future use. This is another proof of the company's efforts to improve service.

Alleged Fraud in Seattle

Events in connection with the purchase of the Seattle Municipal Railway System, Seattle, Wash., and later probing of that transaction were testified to before the City Council's department efficiency investigating committee on Oct. 21 and Oct. 22. Witnesses went into detail in accusing prominent officials connected with the railway interests and the city of trickery, bribery, conspiracy and double dealing in their efforts to have the $15,000,000 purchase contract of the street railway lines rescinded. The Seattle papers characterized the story as a sordid one and the evidence as sensational.

News Notes

Will Seek Bus Charter.—The Lehigh Valley Transit Company, Allentown, Pa., will apply on Nov. 17 for a charter for the Lehigh Valley Transportation Company, a subsidiary, for permission to operate a bus line in Northampton, Bucks and Montgomery Counties.

Buses Barred.—The Interstate Public Service Company, New Albany, Ind., has won its fight for elimination of bus competition. It has refused to relay tracks in connection with the rebuilding of Charlestown Avenue from Silver to Vincennes Street, alleging that it preferred giving up the franchise to going to the expense of rebuilding the trackage, in face of the bus competition, which was making the line unprofitable. Efforts to pass an ordinance to eliminate bus competition failed at first. The Indiana Public Service Commission was asked to take a hand and force the company, but the commission had no power in the matter. Later an ordinance was passed barring buses on Main, Market, Spring, Vincennes, State and Pearl Streets and on intersecting streets within a distance of 300 ft. in any direction from street railway lines.

Franchise Rights Bought. — The Northern Ohio Traction & Light Company, Akron, Ohio, has purchased the franchise rights of the Cleveland-Akron Bus Company for $500,000, according to dispatches from Kansas City. This purchase was referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 18 in connection with the rejection by the City Commissioners of Kansas City, Kan., of the petition of the H. H. Moore Company to buy the bus line, already operated by P. H. Kennedy. The Akron purchase price does not include bus equipment. Bus rates between the two cities recently have been raised to $1.40 for a one-way trip, while the traction fare is only $1.

Will Sell Token Carriers.—To facilitate the handling of passengers and as an insurance against the loss of tokens the Philadelphia Rapid Transit Company's conductors will sell token carriers. The plan is for the passengers to give the conductor $1 for which they will get the current ride and the nickeled carrier containing twelve 7½-cent tokens, making thirteen rides and the carrier. The carrier is about the shape of a small pocket knife, with three spring-protected openings to accommodate four tokens each.

Working Out Bus-Railway Problem.—Marlboro, Mass., city officials are endeavoring to work out an arrangement so that bus lines and trolleys, even though the former are privately owned, can operate to the mutual satisfaction of both. A conference was brought about as a result of a letter sent to the Mayor of Marlboro by General Manager Henry C. Page of the Worcester Consolidated Street Railway protesting against the bus line between Marlboro and Westboro taking on passengers along the line of the street railway on the West Main Street in Marlboro. Manager Page explained to the city officials that the bus activities were affecting the business of the railway, and if it could not get the full benefit of the passenger traffic along its line it would be unable to continue operation in Marlboro.

Council Meets, but Takes No Action.—The City Council of Omaha, Neb., closed its recent conference, at which the Mayor and Commissioners were present, without formal action on the request of the Omaha & Council Bluffs Street Railway to be relieved of its occupation tax and paving requirement. The Council will meet again to take formal action and prepare an answer to the question of the street railway. The alternative for the traction company, if Mayor Dahlman's recommendation prevails in declining to lift occupation tax and paving requirement for 1925, will be to apply to the Nebraska Railway Commission for an increase in street railway fare. General Manager Leussler stated that total revenue passengers of the Omaha lines during the first eight months of this year were 1,811,143 fewer than in the corresponding period of last year. The ultimatum of the railway submitted to the City Council of Omaha on Sept. 17 was reviewed in the ELECTRIC RAILWAY JOURNAL of Oct. 4.

Awaits Company's Decision.—Union employees of the Rochester, Lockport & Buffalo Electric Railway, Rochester, N. Y., are demanding an increase of 4 cents an hour, from 53 to 57 cents, for trainmen, with proportionate increases for all other employees. The demand has been before a board of arbitration since last May. On Oct. 9 the board announced that it could reach no agreement with the two factions and was dissolved. Following the failure of arbitration, the men renewed their direct demand on the company and a conference followed, after which it was announced that General Manager Foster had taken the demands of the men under advisement and would announce his decision shortly. This action postponed a threatened tie-up.

Studies New Type of Car.—The Wisconsin Railroad Commission is making an investigation of a new type of one-man car, which calls for exit of passengers at the rear door. One of the commission's engineers has been sent to Washington, D. C., where two such cars have been placed in operation for experimental purposes. It is said that if the engineer's report is favorable it is likely that the commission will ask the Wisconsin electric railway companies to provide their new one-man cars with the rear-exit device.

Proposed Fare Increase Suspended.—The Board of Public Utility Commissioners of New Jersey issued an order on Oct. 21 suspending until Jan. 22, 1925, the proposed increase in fares on the Shore Fast Line and the Atlantic City & Suburban Railway, the two trolley systems operating between Atlantic City and points on the mainland. Both railways contend that they are not earning a fair profit on their investments.

Will Protest Fare Petition.—S. V. Stewart, city attorney, was instructed formally by the Helena, Mont., City Council recently to protest the action of the Helena Light & Railway Company, which seeks authority from the State Railroad and Public Service Commission to raise its fare and to avoid payment of royalty alleged to be due the city under the original franchise. The royalty, which formerly amounted to some $7,000 a year, according to city officials, has not been paid for about four years. Litigation in this connection has been pending for a long time.

Abandoned Line to Be Revived.—The North Hornell division of the Hornell Traction Company, Hornell, N. Y., which was abandoned last summer because the company was unable to operate the line at a profit, will be revived by the traction company under a ruling of the Public Service Commission. After a hearing held by Commissioner VanNamee, the company was granted an order to restore service temporarily, and this will be done at once. It is proposed to operate one-man cars on the line by the Hornell Traction Company.

May End Franchise.—As the result of a resolution sponsored at the recent meeting of the City Council of Windsor, Ont., Windsor is likely to terminate the present franchise of the Windsor, Essex & Lake Shore Railway, Kingsville. It will probably insist upon the road operating under a 5-year franchise in the future. Alderman Howell, who introduced the resolution, claimed the city was deriving no income under the present franchise, issued in 1906. The city solicitor will be asked to make a ruling in the matter.

Allowed to Operate One-Man Cars.—The Railroad Commission of Wisconsin has granted permission to the Northern States Power Company, Eau Claire, to operate one-man cars on its interurban line between Eau Claire and Chippewa Falls, Wis. The provision is made that two-men crews must be used when heavy traffic is anticipated as during the times of fairs and conventions.

Will Reopen Stations. — Following protests from residents of the affected sections, the Philadelphia Rapid Transit Company will reopen the northbound Frankford elevated stations at Berks Street, Church Street and Torresdale Avenue, closed some three weeks ago because of their poor patronage. In its Oct. 27 issue of "Service Talks," the company points out that in 1923, to pay operating costs and city rental, the average carload per trip on the "L" should have been 86 passengers, but the actual records show that there were only 56. The car-riding population of Frankford has increased but slightly since 1922 and this increase has been largely drawn from other sections of the city served by the Philadelphia Rapid Transit lines. The company now operates almost as many street cars to the Frankford district as it did before the elevated line was built. In spite of the new high-speed service, the company states, the public demands the same street car service.

Foreign News

The First Electrification of the French P.L.M. Railway

The first electrification project of the Paris - Lyons - Mediterranean Railway, will go into effect on the international line between Culoz and Modane, en route for Italy via the Mont Cenis tunnel. There are grades as high as 3 per cent, and sharp curves. With the heavy international traffic of passengers and freight this will be the most severe try-out of long-distance electrified trains possible in France.

The railway will purchase power for this section from the Paul Girod electric steel plant, a privately owned and operated plant, which was erected during the war and planned on lines which would enable it to supply an almost unlimited amount of excess current to meet any possible needs in these parts. This plant now has in operation seven separate hydro-electric stations.

Trackless Trolleys for Ipswich and Darlington, England

Substitution of trackless trolleys for tramways has been decided upon by the Ipswich Town Council. An experimental trackless trolley route was very satisfactory. While traffic in Ipswich is not heavy, some of the streets are so narrow that there is not sufficient space between the track and the curb for other traffic.

Darlington Town Council has also definitely decided to substitute trackless trolleys for their tramways.

Parliamentary powers will be necessary in both cases.

Station Improvements in London

Trafalgar Square station of the Baker Street & Waterloo Railway, London, England, is being completely reconstructed. Pedestrian subways will be constructed to provide safe crossings at one of the most dangerous points in London where several main thoroughfares converge at Charing Cross. The underground railways will make a large contribution toward the cost of these subways.

In 1906, when this station was opened, it was used by less than 1,000,000 passengers. In 1923 there were 5,500,000. Four lifts formerly in use will be replaced by escalators, increasing the passenger-carrying accommodation and allowing enlargement of the booking hall. The escalator tunnel will be 90 ft. long by 22 ft. 4 in. in diameter and will have to be cut through an existing subway.

To speed up reconstruction of Oxford Circus station, work is being carried on night and day. The escalator shaft, 100 ft. long by 17 ft. in diameter, is constructed at an angle of 30 deg. The bottom end joins a chamber which rests on the westbound tunnel of the Central London Railway. The top of this tunnel had to be cut away and roofed with steel girders to take the weight of the new chamber. In order to roof over the top of the escalator shaft, which is only 4 ft. below the street surface level, and to construct the adjoining section of the new station, a network of gas, water and hydraulic power mains and high-tension electric cables had to be removed and relaid in different positions. Some of the mains are of 21, 24 and 30-in. diameter.

New Tramway Track to Be Constructed in Edinburgh

More than a mile of tramway track is to be constructed by the Edinburgh Town Council at an estimated cost of £29,400. At present 16 of the 24 routes of the Edinburgh system operate through Princes Street, which means a car every 15 seconds in each direction during the busy periods of the day. The new track is to be constructed on George Street, a short distance north of Princes Street, and it is expected that the new track will greatly accelerate traffic.

Construction of two suburban extensions aggregating about 2 miles in length, at an estimated cost of £47,460, has also been recommended by R. S. Pilcher, general manager of the tramways.

Zürich Shows Higher Receipts

The annual report of the Zürich Municipal Railway shows an increase during 1923, as compared with 1922, of 2,195,646 passengers, or about 4½ per cent. The line was extended last year about 2½ km., and the length of track in the street now is 85.047 km., and 7.872 km. in carhouses and shops. In 1923 the system had 241 motor cars and 87 trailers. The principal operating statistics follow:

	1923	1922
Car-kilometers	11,550,356	11,400,343
Car-miles	7,218,972	7,125,214
Passengers carried	48,469,502	46,273,856
	Francs	Francs
Passenger operating rev.	11,774,656	11,577,076
Receipts per passenger	0.243	0.250
Rev. from other sources	205,231	197,732
Gross rev. per km. of track	275,706	287,896

Paris Subway Power Contracts Revised

The Paris Metropolitan subway has had, ever since its inception, a contract for a portion of its electric power with the Société d'Electricité de Paris. The price was based on production costs at the central station owned by the Metropolitan Company. This station being out of date, the cost of current is admittedly higher than it should be. For this reason the Société d'Electricité, with its modern equipment, has been profiting from an arrangement which was clearly to the detriment of the subway company.

A new agreement just made will assure the subway company current from the electric company on an entirely new basis which will result in a reduced price to the municipality of Paris, which now owns the subway. The agreement is retroactive from Jan. 1, 1924. The subway company agrees to spend the saving on the current it takes from the Société d'Electricité in renewing the equipment of its own plant. The new arrangement extends until 1955.

Saving through Electric Operation.—Electrification of the main line railways of Great Britain would mean a saving in locomotive costs of £21,000,000 a year, was stated by Lieut.-Col. E. O'Brien, electrical engineer of the London, Midland & Scottish Railway, at a meeting of the Institution of Locomotive Engineers. He said this saving would result because the electric locomotive is capable of double the mileage of the steam locomotive and the cost of repairs is from one-third to one-seventh that of steam engines.

Glasgow Officials Confer on Traffic Problem.—In reply to the suggestion that the tramway routes in Glasgow, Scotland, be discontinued in the congested area and buses be used to connect the different tramway routes, a report was prepared by James Dalrymple, tramway manager. In the report he expressed the opinion that this should not be done until the results on congestion of the two new bridges erected over the River Clyde can be ascertained. These are expected to relieve congestion in a large measure. The joint committees of magistrates and the tramway department, at a meeting on Oct. 8, decided to adopt this recommendation.

Buses Confined to Tramway Lines in Aberdeen, Scotland.—That the tramway company was not entitled to operate motor buses beyond the limits of the tramway system was the decision in a suit brought in the Aberdeen Sheriff Court against the Aberdeen Suburban Tramways. This company was operating a number of buses, running far out into the country. Such operation was held to be illegal, as Parliament only gave them power to build, work and maintain their tramway undertaking.

Owl Cars in Liverpool Unprofitable.—All-night tramway service on the municipal lines of Liverpool, England, has proved so unprofitable that it is to be discontinued. Statistics furnished by the manager showed that on most trips there were no passengers or only one or two. All-night cars are operated in only a few towns in Great Britain and only by the municipalities.

Tramway Funds Used to Relieve Tax Burden.—£12,000 of an income tax rebate of £18,000 was transferred from the tramways department to the relief of local taxes by the Cardiff, England, Town Council. This action was taken in spite of the fact that the chairman of the Tramways committee advised the Council that the tramways department required about £145,000 for improvements, £45,000 for purchase of 25 additional cars and £100,000 for various other tramway and bus requirements.

Financial and Corporate

Award Increased

Privy Council Adds $838,500 to Arbitration Price of Toronto Railway —City Cost Placed at $13,650,000

The city of Toronto will have to pay the Toronto Railway a sum of approximately $300,000 in excess of the amount awarded by the arbitrators, is the substance of the recently announced decision of the judicial committee of the Privy Council at London, England, in the Toronto Railway arbitration dispute. The appeal of the city was to decide what amount the city should pay the Toronto Railway for its property. The judgment forces the city of Toronto to pay $11,483,500 for the Toronto Railway, an increase of $838,500 over the amount as it stood before the appeal went to London, and an increase of $295,000 over the original award. In addition, the city will very likely have to pay interest at 5 per cent from Sept. 1, 1921, the date of taking over the railway.

CITY MUST TAKE OVER MAIN OFFICE

The final cost of the property to the city, including the award proper, the interest and city's costs will approximate $13,650,000. The Privy Council added the sum of $140,000 for the steam plant, $338,500 for batteries, $65,000 for the Sherbourne property, $170,000 for the head office building and $125,000 for the share of the cost of Don Bridge and Avenue Road subway. This made the total award, excluding interest, $11,483,500.

The judgment states that the city should take over and pay for the company's main office, and that the city should reimburse the company for the amount it was taxed on the Avenue Road subway and Don Bridge up to the date of taking over the railway plant. The properties which the company contended the city should pay for and which the city rejected totaled in value, according to the arbitrators' award, $543,500.

The Privy Council entered into the history of the arbitration and referred especially to two points raised in support of the city's appeal. First, the city contended that while in valuing certain property, particularly the rolling stock, buildings and tracks, the arbitrators had proceeded on the theory that in every case the cost of reproduction, less depreciation, must be taken, no such method should have been applied in the present case. The proper course, it had been urged on behalf of the city, was first to consider whether, having regard to the size, suitability of location and other factors, a reasonable person would reproduce these assets as part of the Toronto Railway Company's system in 1921, and if not to value them on the basis of what they would bring at a sale or in case that were impossible on a scrap basis. In the opinion of the Privy Council, this argument was wrong, the arbitrators being justified in taking reproduction cost less depreciation as a reasonable guide in valuing track and rolling stock. But it was made clear that by no means were reproduction cost, less depreciation, adopted as the only and sufficient test of value.

It was also contended on behalf of the city that the theory of reproduction at current prices could not be applied at a time when, with abnormal prices actually being present, no reasonable man would reproduce the parts. The Privy Council agreed with the arbitrators in holding that they were under no obligation to proceed on any such imaginary basis. The judgment said that at the time the valuation was made the arbitrators said prices had become fairly stabilized and in determining the actual value at that time they were entitled to have regard to prices then generally current.

On the cross-appeal of the company, the judgment disagreed with the Canadian Supreme Court concerning the arbitrators' jurisdiction regarding the valuation of certain items. It was impossible for them, the judgment says, to fix a sum without incidentally determining what items were to be included.

The judgment said that the value of the items allowed by the arbitrators, amounting to $543,500, should be restored to the award. As to the particular items ruled out by the arbitrators and which were in question in the cross-appeal, the above-mentioned money considerations were added. The cost of both appeals will have to be borne by the respective parties, according to the judicial committee.

INTEREST ISSUE TO GO TO OTHER COURTS

Disappointment was felt on the question of interest not being cleared up by the Privy Council. It is figured that the company will be granted this by the local courts, but it may again be the means of opening a lengthy discussion. The council agreed with the view taken by the appeal court that the general rule under which a purchaser who takes possession is charged with interest on the purchase price from that time until it is paid was well established, and had on many occasions been applied to compulsory purchases, but stated that the matter lay outside of arbitration for its enforcement.

The decision reviewed by the Privy Council was rendered on Jan. 31, 1923 by a majority of three members of the Toronto Railway board of arbitration in the long-drawn valuation case valuing the system at $12,000,000. The sessions had been held on 158 days and evidence taken totaled 5,000,000 words. Sir Adam Beck, the minority member, filed a brief dissenting report saying that he was unable to concur in the conclusion as to the method which should be adopted in ascertaining the value of the railway plant and equipment, and also dissenting from the statement of the majority as to certain of the property which the railway claimed should be valued as property required for the operation of the railway. Among the prominent engineers engaged in the case for the company were Hagenah & Ericson of Chicago, A. L. Drum of Chicago and M. E. Cooley of Ann Arbor, Mich. Jackson & Moreland of Boston were in charge of the case for the city, assisted by Prof. A. S. Richey of Worcester, Mass., who valued the rolling stock. Following the appeal of the city to the first divisions court against the amount and the subsequent reduction by $543,500 the city announced its dissatisfaction again and in the fall of last year announced its intention of appealing to the Privy Council.

Since the decision of the Privy Council Toronto Railway shares have advanced to 108, an increase of 4 points. When the arbitration began the stock was sold at 70½ and after the decision was announced it went up to 94½.

It was reported after the announcement of the award that the City of Toronto will soon float an $8,000,000 loan to finance the purchase of the Toronto Railway. It was stated in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 11 that a loan of about $7,000,000 was expected, to be on a competitive basis.

New Plan of Settlement for Suburban in St. Louis

Members of the bondholders' committee of the Suburban System of the United Railways, St. Louis, Mo., have stated that a new plan of settlement for them in the reorganization has been submitted. While the details of the new plan for the Suburban has not been revealed, it is said to provide for payment in full at par and interest of the $2,000,000 consolidated first mortgage Suburban bonds, while the $4,500,000 Suburban 5s would be extended under an agreement whereby $1,000,000 of the bonds would be retired in ten years at the rate of $100,000 annually and at the end of ten years the balance of the issue would be retired at par and accrued interest. The bonds would be first lien against the Suburban properties, but would not be guaranteed by the new company.

Judge Faris in the United States District Court on Oct. 25 declined to dismiss the suit of the Suburban bondholders for a separate receivership for that property and granted the request of the city of St. Louis to be permitted to intervene in the Suburban suit. He then continued further hearing of the case until Nov. 8.

Sam B. Jeffries, counsel for the Suburban interests, at the hearing asked Judge Faris not to make any further rulings in the United Railways case. Judge Faris said he would postpone further action on the petition to consolidate all of the United Railways cases which had been set for Oct. 25.

Files Abandonment Intention.—The New York & Long Island Traction Company has filed a certificate in the office of the Secretary of State declaring its intention to abandon a portion of its line at Ozone Park and on Rockaway Road, Long Island.

Portsmouth Property Cannot Share Traffic

If a proposed bus line in Portsmouth, N. H., is permitted to operate, the discontinuance of the Portsmouth Electric Railway is very likely. This was brought out at the hearing before the Public Service Commission by counsel for the Boston & Maine Railroad, owner of the Portsmouth Electric Railway on the petition of Joseph Cavarette to operate a bus line in the city of Portsmouth and between Portsmouth and Rye Center, paralleling and competing with the lines of the Portsmouth Electric Railway.

The attorney presented figures to show that the number of passengers using the cars had decreased nearly 50 per cent from 1916 to 1923, while the cost of operation in the same period, even with great economy, had increased 50 per cent, and although passenger fares in the same period increased 89 per cent, passenger revenues diminished 3 per cent, so that the operating expense per car-mile in 1923 was more than 35 cents, while the operating revenue per car-mile was only 27½ cents. He stated further that the great increase in the number of people using automobiles made it improbable that the electric line could ever be made to pay its operating expenses.

Revision of the Richey Wage Index

The Street Railway Wage Index which is compiled monthly by Albert S. Richey will be revised in succeeding issues of this paper by a change in the weighting employed in its construction. Heretofore, the index has been weighted in accordance with the number of passenger cars operated by the various companies. In the revision, the weighting is in accordance with the number of trainmen (conductors, motormen and one-man car operators) employed by the various companies. The revised index will represent more correctly the trend of electric railway trainmen's wages, although the change is but slight, as will be noted in the following table, where the former and revised wage index numbers are shown in parallel columns for 1923 and 1924 to date:

	1923		1924	
	Former	Revised	Former	Revised
January	207.4	207.1	218.9	217.4
February	207.3	207.1	219.0	217.4
March	207.3	206.8	219.0	217.5
April	207.3	207.0	219.1	217.7
May	208.2	209.0	219.3	217.8
June	209.6	212.6	220.4	220.0
July	211.8	213.5	221.4	220.0
August	213.7	216.2	221.4	220.0
September	214.7	216.4	221.4	220.1
October	217.5	216.4	221.9	220.6
November	218.2	216.4		
December	218.2	216.4		

The wage index, as revised in succeeding issues, represents, on the base of 1923 = 100, the trend of maximum hourly wages of street and interurban railway platform men of about 100 of the largest companies in the United States, weighted according to the number of men so employed. It is a part of the "Conspectus of Indexes" issued monthly by Mr. Richey, and published regularly in the Corporate and Finance Section of the fourth issue each month of the ELECTRIC RAILWAY JOURNAL.

Purchase Negotiations Started.—Dispatches to Toronto from New Orleans, La., state that negotiations for the purchase of the South New Orleans Railway & Light Company have been opened up with financial interests in New Orleans and New York. The price is understood to be in excess of $800,000. The line, the successor to the South New Orleans Light & Traction Company, is 6.5 miles long and connects Algiers and Gretna. E. W. Burgis is president and general manager. It is said that an agreement to take over the property will be executed as speedily as possible.

Allowed to Destroy Cars.—Permission was granted recently to the Trenton & Mercer County Traction Corporation by the New Jersey Board of Public Utility Commissioners to abandon four of its double-truck and nine single-truck passenger cars and to charge against the company's depreciation fund $55,000 less any salvage which may be secured in the destruction of the cars.

Wants to Abandon Line.—The Mauch Chunk & Lehighton Transit Corporation, Mauch Chunk, Pa., has asked permission to abandon its service between Flagstaff and Lehighton, Pa., a 12½-mile route. The company plans to substitute a bus service.

Action on Security Issue Withheld.—The New Jersey Board of Public Utility Commissioners has withheld action on approval of an issue of securities by the Red Bank & Keyport Railway, to be used as capital stock, until the company has obtained proper franchises to operate through all municipalities on its line. The tracks and other physical property of the applicant were purchased by Herman C. Schlicting from the Jersey Central Traction Company, which the commission authorized to discontinue operations in an order of July 12, 1923. Mr. Schlicting organized the Red Bank & Keyport Railway for the purpose of taking over the old concern's existing property, providing new cars and furnishing street railway transportation over a portion of the lines of the Jersey Central Traction Company in the northern part of Monmouth County. The application dismissed recently was for an approval of certain securities to complete the financing of the new company.

Seeks to Discontinue Line. — The Lykens Valley Railway, Williamstown, Pa., has petitioned the Public Service Commission to discontinue its line between Williamstown and Reinerton via Tower City because it was unable to operate profitably. At the same time an application was received from stockholders of the railway company, organized as the Williams Valley Transportation Company, seeking authority to operate buses as common carriers to replace the trolley service. The Lykens Valley Railway, which is the reorganized Lykens & Williams Valley Street Railway, is 10 miles long. The company owns 7 motor passenger cars, 3 motor service and 1 trail service car.

Hearing on Abandonment Set. — Hearing will be held before Public Service Commissioner Oliver C. Semple at New York Nov. 10 on the petition of the Yonkers Railroad for permission to abandon a portion of its routes and franchises in the city of Yonkers. The routes proposed to be abandoned are the Nepera Park, Elm and Walnut Street, Tuckahoe, Bronx River Road and Central Park Avenue lines.

Hotel on Carhouse Site. — Realty Associates and Bing & Bing, Inc., have sold the old carhouse block front on the east side of Seventh Avenue between Fiftieth and Fifty-first Streets, New York, to William and Julius Manger, owners of the Manger chain of hotels, for a twenty-story hotel building. The site of the new Manger hotel is a part of the old New York Railways carhouse block, 200x800 ft., between Sixth and Seventh Avenues, acquired last August by Realty Associates and Bing & Bing, Inc., from the Broadway & Seventh Avenue Railway.

Preferred Stock Offered to Customers and Employees.—The West Penn Company, Pittsburgh, Pa., through the West Penn Securities Department, Inc., is offering to its customers and employees 7 per cent cumulative preferred stock, at $94 per share. Payment may be made either in cash or on the partial-payment plan. Under this plan from 1 to 100 shares may be subscribed for by an initial payment of $6 a share and a monthly payment of $8 a share.

Names Director. — Benjamin H. Namm has been designated by the New York Transit Commission as a director to represent the public on the board of directors of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. Major Namm's appointment fills the vacancy caused by the resignation of Travis H. Whitney, now vice-president of the corporation.

Seeks to Purchase Railway Stock.—The Niagara, Lockport & Ontario Power Company presented a petition to the New York Public Service Commission on Oct. 27 asking for consent to purchase all of the issued and outstanding capital stock of the Warren & Jamestown Street Railway, which runs between the Borough of Warren, Warren County, Pennsylvania, and the city of Jamestown. The stock of the railroad is owned by the Venango Public Service Corporation of Pennsylvania. The petition states that the company could furnish motive power to the railroad either directly or through its subsidiary, the Western New York Electric Company, and could effect economies by using the existing transmission lines of the railroad for the distribution of electricity for light, heat and power.

Income Increases.—For the first nine months of the present year the Washington Railway & Electric Company, Washington, D. C., had net income of $743,487, while during the same period in 1923 the income was $588,456. Operating revenues declined from $3,726,794 in the period of 1923 to $3,550,968 for the nine months' period of the current year. Expenses also decreased from $3,075,664 in 1923 to $2,840,772 in the nine months of the current year.

Vote to Sell Power Plant.—Directors of the Holyoke Street Railway, Holyoke, Mass., voted unanimously Oct. 28 to sell its power plant on the Connecticut River bank to the Turners Falls Power & Electric Company and make contracts for energy for operating the electric railway system. The sale price is said to be $400,000. The stockholders will meet Nov. 18 to take action on the plan. The reported sale of the power house was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 25.

Orders Properties Sold to Cities.—Municipal ownership of car lines in De Kalb and Sycamore, Ill., is assured by an order entered by Judge Fulton in the De Kalb County Circuit Court authorizing A. D. Mackie, receiver for the De Kalb-Sycamore & Interurban Traction Company, to sell the properties to each city. The line between the two cities will be abandoned, being unprofitable.

Legal Notes

CALIFORNIA.—*Instruction on Last Clear Chance Doctrine.*

Instruction by the court in a "last clear chance" case that the company was liable if the motorman knew or should have known, by facts which would ordinarily come within the observation of an ordinary, reasonably careful man, that the plaintiff was lying on the track, when actually the motorman had his head to one side and was looking over his right shoulder, was held erroneous. (Alcamizi vs. Market Street Railway. 228 Pacific Rep., 410.)

CALIFORNIA. — *Land Conveyed for a Public Highway May Be Used for that Purpose to the Extent that the Convenience and Welfare of the Public May Demand.*

The State Highway Commission of California purchased a strip of land for a public highway and later instructed an interurban railway to relocate its tracks so that they would occupy the strip thus purchased. The seller of the land then brought suit against the railway for the wrongful taking of his property, making several complaints. The court held, however, that where land is conveyed for a public highway, the implication must be that it will be used as the convenience and welfare of the public may demand, and that the kind of use may change as the demand is augmented by the increase of population. An abutting property owner is not entitled to compensation anew for every improvement in the street or type of vehicle used on it or with every change made imperative with such an improvement, especially where, as in this case, the conveyance with knowledge that such a change would probably be made. [Callopy vs. United Railroads of San Francisco, 228 Pacific Rep., 59.]

FEDERAL COURT. — *Powers of City in Contracting the Purchase of Street Railway Limited by Enabling Statute.*

The city of Seattle agreed to take over the railway system in that city on Feb. 10, 1919, free and clear of every incumbrance for the sum of $15,000,000, to be paid in the way specified in the contract and this contract was ratified by the City Council. The actual transfer was not made until March 31, 1919, owing, at least in part, to the suit of a taxpayer to enjoin the sale, but this plea was denied. In the meantime, state, county and municipal taxes, amounting to $401,017, became a lien on the property on March 15. In view of this fact, the company and city agreed that the former would assume one-quarter of these taxes and the latter the remaining three-quarters. The court held, however, that the power of the city in making the purchase was limited by the statute to the plan adopted, which did not provide for payment of any taxes by the city, and that whatever legal rights the company might have against the city on the contract for repayment of taxes do not permit it to impose a lien on the property for this payment. Its payment of the tax, to avoid a sale of other property, did not entitle it to subrogation of the tax lien on the property conveyed. [Puget Sound Power & Light Co. vs. City of Seattle, 300 Federal Rep., 441 and 443 (two cases).]

LOUISIANA.—*Grant of Land on Condition of Construction of Railroad Not Defeated When Railroad Is Discontinued.*

A property owner sold certain land to another on condition that an electric railway should be built alongside the property within 16 months. The road was built, operated continuously for about four years and intermittently for another year, and was then discontinued and the rails taken up. A suit was brought to determine whether the heirs of the original owner had a reversionary interest in the property. The court held that the agreement required the construction of the line, not its operation for any definite length of time, and that the title was valid in spite of the abandonment of the line. [Bush vs. Bolton et al., 100 Southern Rep., 692.]

NEW JERSEY.—*Street Car Lines Asking Protection Against Unjust Competition and Municipal Authorities Giving that Protection Not Liable for Damages Unless Actuated by Improper Motives.*

Two suits for damages were brought by jitney operators on the charge that the defendant railway company conspired with public officials and carried on a campaign of libel, malicious prosecution and conspiracy to destroy the plaintiffs' business. The court pointed out, however, that the railway owed to its stockholders the duty of securing all legal protection against unjust and unlawful competition. It also said that the public authorities are the custodians of the public highways in many respects and must stand for the protection of the rights of the public therein. The public is interested to see that transportation on these highways is efficient, responsible and supplied at the lowest cost. The public authorities are also interested in the protection of the highways against unreasonable use. There was nothing, in the opinion of the court, to indicate that the authorities had improper motives in enforcing the ordinances complained of, and a new trial was denied. [Kelly vs. Morris County Traction Co. et. al., also Seldney vs. same 126 Atlantic Rep., 24.]

OHIO.—*Waiver of Stockholders' Liability for Corporate Debts Valid and Effective as to Stockholders in a Successor Consolidated Company.*

Up to 1903 stockholders in Ohio companies were liable for the debts of the corporation to the extent of their stock and also for an amount equal to the stock held. In 1900 the Southern Ohio Traction Company issued bonds containing a waiver of such individual liability, and in 1902 the company was consolidated with another to constitute a third corporation. In 1916 the company became insolvent, and the bondholders of the Southern Ohio Traction Company brought suit against the stockholders of the consolidated company for their interest and principal. The court held, however, that the waiver was valid and applied also to the stockholders in the successor consolidated company. [Marfield vs. Cincinnati, D. & T. Traction Co., et al., 144 Northeast Rep., 689.]

RHODE ISLAND.—*Status of Attorney for Minor Claimant.*

A claimant, eighteen years old, had an agreement with an attorney to pay him one-third of damages recovered from a railway company but later made a direct settlement with the company, and the attorney sued the railway under the "attorney's lien law." A defense was that contracts with minors are voidable, but the court held that the question whether the attorney had a contract, whether his services were necessary and the value of his services before they were repudiated, should be determined by a jury. (Jacobs vs. United Electric Railways, 125 Atlantic Rep., 286.)

WASHINGTON. — *Overhang of Cars on Curves. Last Clear Chance.*

While a pedestrian is guilty of contributory negligence if he places himself in danger from the overhang of an ordinary street car as it rounds a curve, he is not thus guilty if the car extends over the sidewalk to a much greater extent than an ordinary car. The "last clear chance" doctrine applies where plaintiff's negligence continues up to the time of injury, if the defendant actually sees the peril, or if the plaintiff's negligence has terminated and the defendant did not actually see the peril but by exercise of reasonable care should have seen it. (Leftridge, et al vs. City of Seattle. 228 Pacific Rep., 302.)

Personal Items

Celebrate Subway Birthday

Twentieth Anniversary Commemorated by a Dinner to Honor President Hedley

The New York subway has so passed into the realm of accepted things that it is hard to realize the system is only 20 years old. Yet passengers were carried for the first time on Oct. 27, 1904. Trains began running at 7 p.m. on that day, and up to midnight 111,881 tickets were sold. The proceeds, $5,594.05, were turned over by the Interborough to charity the next day.

These and other facts relating to the early history of the Interborough Rapid Transit Company were recalled on Oct. 27, when a complimentary dinner to honor Frank Hedley, president of the company, and commemorate the twentieth anniversary of the subway was given at the Hotel Commodore. About 600 men prominent in railroad, financial and business circles were present.

Frank Hedley

The fittings of the dining room were appropriate to the railroad aspects of the meeting. The waiters wore the standard caps of Interborough guards. Every table carried a railroad lantern, either red or green, and over the speakers' table was a full-sized front vestibule of a standard car with markers and destination signs. Entrance to the dining room was possible only through one of four standard turnstiles of the Interborough, in which a nickel had to be dropped. Later this nickel was returned with a German 1,000-mark bill inside a souvenir bill case with the statement: "The New York Subways always have returned to every customer more than full value for every nickel received."

In the reception room were shown the spade with which the first dirt was removed for the building of the subway, the pick and crowbar probably used when ground was officially opened, and a silvered spike driven in the early days to commemorate the completion of the subway.

William G. Besler, president Central Railroad of New Jersey, officiated as toastmaster at the dinner, and after the repast August Belmont, long president of the Interborough, told about the early trials of the undertaking and how Mr. Hedley was selected for his job. Mr. Belmont said in part:

> Thirty-four years ago I became interested in the ownership of the Kings County Elevated road, which was subsequently sold to the B. R. T., and while we owned it Mr. Hedley was in our employ. He then went to Chicago and was doing good work out there in rapid transit when we needed him here to run our subways. He has been with the company ever since. Even London, whose transit system needed badly somebody to untangle it, could not induce Mr. Hedley to desert his task of perfecting New York's subway system. On Sept 7 of next year I shall have been fifty years in the financial world as a director of various enterprises. In that length of time one gets to know men. In all my career I have never known a man more devoted to his work than Mr. Hedley. The operation of the subway is his sole work and great ambition. The day will come when New York will realize the debt of gratitude it owes to Frank Hedley.

Dr. J. Duncan Spaeth, professor of English at Princeton University, cited the guest of the evening as one who had been able to transform promise into performance and spoke of the benefit of rapid transit by which workmen were able to have more time at home instead of spending it in transportation. He referred humorously to the crowds during the rush hour, but said that it was the greatest tribute to the popularity of anything that more was wanted than could be given. He referred to Mr. Hedley as coming from a family prominent in past years in transportation and paid a marked tribute to the engineering type of mind because of its ability to control the forces of nature. In his opinion, the greatest need today is a reconciliation and coordination of technical power, financial power and political power.

Neal O'Hara of the editorial staff of the New York *Evening World* gave a humorous talk on "Styles and Turnstiles," and there were recitations and singing, led from the platform of the model car over the speakers' table.

The evening concluded with the presentation of a reel of moving pictures showing Mr. Hedley on his "farm" at Green's Farms in Connecticut, where he gets rest by performing the manifold duties of farm life.

Mr. Hedley said that when the subway was opened many people, even many railway men, doubted the practical possibility of transporting people underground. He said that Mr. Belmont was the real father of subway construction and operation in New York and deserved the largest share of credit for making the subway possible. He also spoke of Mr. Bryan, Mr. Shonts, his own assistants and the loyalty of the employees, which had made the undertaking possible. He said that his work in connection with the subways had been a great pleasure to him. He hoped he had given service to the public. This had been his intention in the past and would be in the future.

President Robert Resigns

Head of Montreal Property Resigns After Fourteen Years to Look After Other Interests

E. A. Robert, president of the Montreal Tramways since 1910, has resigned. When Mr. Robert took office the old franchise of the Montreal Street Railway with the city of Montreal was drawing to a close. It became necessary to draw up a new contract. After prolonged negotiations with the civic and provincial authorities, he finally secured a franchise by which the company was guaranteed a reasonable return on its investment while the development of the system was assured. Under this agreement a Tramways Commission was appointed, to fix the fares so as to give the necessary income to the company and protect the public. At the same time the commission has to decide on the extensions that are necessary and whether or not the demands of the city are commercially practicable. In other words, while the company is still a privately owned one, the system is practically under municipal control, with the important provision that the city practically assumes responsibility for the financial success of the system. This franchise has worked to the satisfaction of both the public and the company and has been one of the models for study by street railways elsewhere that were beset in a similar manner.

E. A. Robert

The growth of the Montreal Tramways system under the presidency of Mr. Robert is shown by the fact that when he assumed control fourteen years ago the company was then operating less than 600 cars, nearly all of which were single-truck cars. Today more than 1,200 of the latest model double-truck cars are in use, including many trailers, while the trackage has been increased 50 per cent. In 1912 the number of passengers carried was 210,000,000, while last year the number was 290,000,000. The gross earnings under Mr. Robert's management increased from around $6,500,000 in 1912 to more than $12,500,000 last year.

In addition Mr. Robert authorized the construction of several new carhouses and installed an emergency steam plant, which has proved of great benefit when there have been temporary dislocations of the regular supply of electric power for operating the cars.

The system is now reaching out to every part of the island of Montreal, and today in many parts of the city improvements are being carried out which were authorized by Mr. Robert previous to his retirement.

Mr. Robert came into prominence in Montreal about 1904 by his application to the Quebec Legislature for a charter to develop a small water power at St. Timothee, near Montreal. This charter he secured after an able and energetic fight. Despite opposition, Mr. Robert was able to finance the project, and he successfully developed the plant, which began to generate power in the latter part of 1911. This was followed by the absorption of several small power companies on the island. He extended his operations in the suburbs of Montreal, and so successful was this undertaking that he was granted rights to enter Montreal proper and thus establish a competitive source of supply.

While Mr. Robert has retired from the traction and power companies he built up, he has not retired from active business life, as his numerous personal interests are sufficient to keep him busy. Furthermore, according to reports he is working on a power proposition which will entail the development of a power plant of at least 200,000 hp., situated within 35 miles of Montreal.

This is only part of the whole story. Moreover, it is only part of the story of his achievement at Montreal. His career was reviewed in the ELECTRIC RAILWAY JOURNAL, issue of April 29, 1922. At that time Mr. Robert had just been elected president of the Quebec Railway, Light, Heat & Power Company in addition to the Montreal post and his other affiliations.

T. F. Mueller, formerly assistant business manager of ELECTRIC RAILWAY JOURNAL and *Bus Transportation*, has been made district manager for the states of Michigan and Indiana, effective Nov. 1, with headquarters in Detroit. Mr. Mueller has been connected with the business department of this paper since January, 1917.

Gen. W. W. Atterbury vice-president of the Pennsylvania Railroad, will become president of the road when President Samuel Rea retires next year. In preparation for this change General Atterbury was moved up on Oct. 29 from his position of vice-president in charge of operation to that of vice-president. It is said among shippers that he knows their business requirements almost as well as he knows the needs of the railroad. He worked himself up from his first job as an apprentice in the Altoona shops of the Pennsylvania Railroad to the president of the American Railway Association in 1916. From August, 1917, to May, 1919, he was director general of transportation of the A. E. F. in France with the rank of Brigadier-General.

Posts of Superintendent of Personnel and of Instruction Filled at Detroit

Two new positions were created on Oct. 1 in the general staff of the transportation division of the Department of Street Railways at Detroit.

Richard Dawson was appointed superintendent of personnel and Herman B. Kirchoff was made superintendent of instruction. Both have been division superintendents for several years. They are directly under E. S. Rider, superintendent of transportation. Their headquarters are at the general offices.

Mr. Dawson will be in charge of matters pertaining to the welfare and conduct of the trainmen. He will relieve Mr. Rider and D. A. Smith, assistant superintendent of transportation, of considerable detail in connection with employees called to the main office as he will sit as chairman of the trial board which hears cases involving the platform men.

Mr. Kirchoff will supervise the work of instruction of new trainmen and of those others who require special instructions.

Of the two men, Mr. Kirchoff has been with the Detroit system the longer. His connection dates back to Sept. 14, 1895, when he started as conductor on the Fourteenth line. Mr. Dawson began as a conductor on the Fourteenth line on July 11, 1899.

Mr. Dawson has been succeeded as division superintendent of the Baker Division by Paul W. Leeson, assistant division superintendent of the Fort Division. B. L. Vail, station master at the Fort carhouse, will succeed Mr. Leeson.

Mr. Kirchoff's position as division superintendent of the Jefferson Division has been filled by promoting Charles Lighthammer, who was assistant division superintendent of that division. John Branigan, service inspector, has been appointed assistant division superintendent in Mr. Lighthammer's place.

Obituary

Henry J. Crowley

Henry J. Crowley, a prominent electrical engineer and general manager of the American Electric Power Company and its successor, the American Railways, since 1899, died Oct. 27 after an illness of two years. Mr. Crowley entered the employ of the Pratt & Whitney Company of Hartford, Conn., following his graduation from high school and served an apprenticeship in mechanical engineering. After completing his apprenticeship, he entered the locomotive shops of the New York, New Haven & Hartford Railroad in Hartford.

Following services with the Schuyler Electric Light Company, he entered the employ of the Thomson-Houston Electric Company and from 1890 to 1893 was manager of the railway department of the company's Southern office at Atlanta, Ga. During this period he was in charge of a number of early electric railway installations, including roads in Atlanta, Macon, Augusta and Savannah, Ga.; Birmingham and Mobile, Ala., and Chattanooga and Memphis, Tenn.

From 1893 to 1899 he was engineer and manager of the General Electric Company's railway department in the Eastern district. During this time he was actively engaged in a number of railway installations, among the more important being Philadelphia, Harrisburgh, Washington, and Richmond. When the American Railways Company was organized in 1899 Mr. Crowley was elected general manager.

Mr. Crowley was a fellow of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers. He was born at Unionville, Conn., 59 years ago.

C. M. Holland

On the eve of the "holing through" of the vehicular tunnel under the Hudson River between New York and Jersey City, Clifford M. Holland, chief engineer, died Oct. 27 at Battle Creek, Mich., where he had gone to recover from a nervous breakdown. He had served the city and the state of New York continuously for 18 years in designing and constructing tunnels for New York city's rapid transit subway system.

Mr. Holland was born in Somerset, Mass., in 1883. After graduation from Harvard University, with both an A.B. and a civil engineering degree in 1906, he went to New York as assistant engineer with the Rapid Transit (later the Public Service) Commission, which was then engaged on the construction of New York's subways. He remained continuously on the city's subway and tunnel work until his appointment in 1919 as chief engineer of the New York-New Jersey Bridge & Tunnel Commission, which was created to construct the great vehicular tunnel under the Hudson.

Among the important New York Subway tunnels to which he was assigned for duty were the Battery-Joraiemon Street tunnel under the East River, the Fourth Avenue subway in Brooklyn, the Whitehall-Montague Street tunnel, the Willoughby-Montague Street tunnel, the Fulton Street subway, the Old Slip-Clark Street tunnel, the Fourteenth Street-North Seventh Street tunnel, and also the Sixtieth Street tunnel.

He took a keen interest in engineering affairs and at the time of his death was a director of the American Society of Civil Engineers and president of the Harvard Engineering Society.

Austin H. Pease, vice-president and assistant treasurer of the Wason Manufacturing Company, Springfield, Mass., died in Springfield Hospital on Oct. 21, after a short illness. He was a son-in-law of the late Henry Pearson, who was president of the company under the old régime and had held the office of vice-president following its absorption by the J. G. Brill Company. After Mr. Pearson's death, about a year ago, Mr. Pease, who had been secretary, was made vice-president. He was 58 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Small Coal Consumption Reflects Business Inactivity

Correspondence reaching Washington shows that there was general surprise in the coal trade and among consumers that the country's stocks should have been 47,000,000 tons on Sept. 1, as shown by the report issued jointly by the United States Geological Survey and the Bureau of the Census. In some quarters there is a disposition to doubt the returns. Those who hesitate to accept the figures in the stock report base their attitude on the fact that production was low during April, May and June—lower than in those months of 1921—yet the stock report shows a reduction of only 15,000,000 tons since Jan. 1 and only 4,000,000 tons since June 1.

The explanation of the apparent contradiction between the production and stock figures is that consumption of coal has been at a low ebb. In fact, it had fallen to a lower point than had been realized.

The stock report presents conclusive evidence that the country has been going through a period of dull business, which almost could be characterized as a depression. In the iron and steel industry, for instance, which affects coal more than do many lighter industries, the depression has been severe. The output of pig iron in July was the lowest in any month since February, 1922. To be specific, production of pig iron in July was 1,785,000 tons. This was barely half the rate of production in July, 1923, when it was 3,678,000 tons. Even the July, 1922, production was 2,403,000 tons.

In the first quarter of the year the output of iron and steel was well up around the level of 1923, a very prosperous year, but beginning in April it began to tumble. In so far as the iron and steel industry is concerned it certainly sunk to depression levels in midsummer. It is now moving upward at an encouraging rate, but has not recovered to the point where its consumption of coal is heavy.

One of the reasons why the present period of sluggishness in business has passed without much comment is that business has been spotty. Building and certain other activities have been brisk, but the heavy industries that are the large consumers of coal have been in the doldrums. They have been conspicuously absent for some time from the coal market.

It is noticeable that the changes in coal stocks since Jan. 1 reflect closely the trend of general business. From Jan. 1 to June 1 the liquidation of stocks went on rapidly, but from June 1 to Sept. 1 it was very slow. The fact that there is a heavy reserve still to liquidate is discouraging to the producers of coal and some are counseling curtailment of production, which has been rising sharply for six weeks. There can be no doubt that this would be good business from the standpoint of the coal operator, but from the consumers' point of view it is regarded apparently as good business to continue to buy coal at present prices so as to maintain the reserve.

The stock report shows that the country's reserve of coal is comfortably large. There is no prospect of a shortage this winter unless something unforeseen should occur. It would not be in the public interest for consumers to be lulled into a false sense of security and allow their stocks to fall below the danger line. There is increasing evidence, however, that American consumers at last have learned that ample reserves above ground constitute the best insurance they can have against high prices.

The appearance of the stock report, carrying with it a great surprise for the entire trade, emphasizes anew the need for distribution statistics that are comparable, at least, with those covering production. That the demand for such figures is becoming more and more insistent is indicated by the great amount of attention given the problem as applied to all commodities at the meeting of the Eastern division of the Chamber of Commerce of the United States in Washington.

Interstate Company Spends $586,500 for Equipment

During the twelve months ended Aug. 1, 1924, the Interstate Public Service Company, Indianapolis, Ind., expended for new equipment the sum of $586,500. Of this amount $83,500 was used for the purchase of 11 buses which have been put into operation between Indianapolis and Franklin. Ten new gondolas were purchased for $20,000. The remaining $483,000 was used for the purchase of new sleeping cars, parlor buffet dining cars, express motor trail cars, stock cars, a locomotive, box and ballast cars. References to these purchases were made in the ELECTRIC RAILWAY JOURNAL, issues of Dec. 22, 1923; June 14, July 12 and Oct. 11, 1924.

Important Extensions at Memphis

The Memphis Street Railway, Memphis, Tenn., has spent approximately $300,000 in new construction work in addition to about $210,000 in improving existing trackage for the growth of the city during the present year. About 5,800 ft. of double track is being laid now for making the connections for the crosstown line. An additional 2,000 ft. of double track is being laid on McLemore Avenue. Another important extension to the system is that of the 5,000 ft. of double track laid along Overton Park Avenue at a cost of approximately $90,000. The company has also constructed about 4,500 ft. of storage track along Front Street. Lead tracks from Main to Front Street were laid for the expeditious handling of cars to and from the storage tracks. This project, completed during the

ELECTRIC RAILWAY MATERIAL PRICES—OCT. 28, 1924

Metals—New York

Copper, electrolytic, cents per lb.	13.55
Lead, cents per lb.	8.65
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.85
Tin, Straits, cents per lb.	52.75
Aluminum, 98 to 99 per cent, cents per lb.	27.10
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b vessel, Hampton Roads	$4.45
Somerset mine run, Boston	2.15
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	1.375
Central, Ill., screenings, Chicago	1.175
Kansas screenings, Kansas City	2.00

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.85
Tie plates (flat type), cents per lb.	2.45
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb.	8.75
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.75
Sheet iron (28 gage), cents per lb.	3.50
Sheet iron, galvanized (28 gage), cents per lb.	4.60
Galvanized barbed wire, cents per lb.	3.45
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal	$1.03
White lead (100 lb. keg), cents per lb.	12.00
Turpentine (bbl. lots), per gal.	$0.87
Car window glass (single strength), first three brackets, A quality, discount*	84.0%
Car window glass (single strength), first three brackets, B quality, discount*	86.0%
Car window glass (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.625
Rubber-covered wire, No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, cents per lb.	17.75

Paving Materials

Paving stone, granite, 4x8x4, f.o.b.	
Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.67
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots f.o.b.	$51.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	2.00
Sand, cu.yd., N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.75
Light copper, cents per lb.	9.25
Heavy brass, cents per lb.	7.00
Zinc, old scrap, cents per lb.	3.875
Light brass, cents per lb.	5.50
Lead, cents per lb. (heavy)	7.50
Steel car axles, Chicago, net ton	$17.25
Cast iron car wheels, Chicago, gross ton	17.75
Rails (short), Chicago, gross ton	18.25
Rails (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	9.25

early part of the past summer, cost approximately $50,000. The loops on both the north and south ends of the Thomas-Florida line cost approximately $11,000, and the extension of the Florida line 1,900 ft. beyond its former terminus cost $7,000. The company also made numerous repairs on the existing tracks.

Rolling Stock

United Railways & Electric Company, Baltimore, Md., has put several additional one-man cars in operation. They are being used on the Preston and Carolina Streets line and probably will gradually replace the cars now in use on this line. The line has been operated with 15 two-man cars with seating capacity for 44 passengers each. Under the plan being worked out these will be replaced by 20 one-man cars with a seating capacity of 40 each.

Track and Line

Philadelphia, Pa.—Bids were opened on Oct. 21 in the office of Director Ehlers for the second section of the Broad Street subway, 8,600 ft. in length. Patrick McGovern of New York submitted the low bid of $13,485,414, and the prices submitted were found to be about the same proportionately as for the section now under construction between Girard Avenue and Clearfield Street, 10,000 ft. in length.

Terrell, Texas.—Surveys have been made and right-of-way for most of the distance obtained for the proposed interurban electric railway that is to be constructed between Terrell and Tyler, about 60 miles. The projected line is being promoted by Morris Mayfield, Terrell, and associates. The route of the line is through a rich agricultural section, including a number of towns that are now remotely situated from railroad transportation. Along the route are some of the largest deposits of lignite coal to be found in Texas.

Public Service Railway, Newark, N. J., has received permission from the Board of Public Utility Commissioners to relocate a portion of its road in Burlington, N. J., to conform to the proposed change in a section of Pearl Street in that city.

Dallas Railway, Dallas, Tex., will extend its Belmont line four blocks over the Dallas-Denison interurban tracks and will lay a passing switch and turning track. The railway will bear half of the expense, which is estimated at about $4,000.

Miami Beach Electric Company, Miami Beach, Fla., will extend the Flagler Street double-track extension to Twelfth Avenue.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has started construction of the extension of the Center Street line, which will cost approximately $100,000. The extension includes 2,440 ft. of double track and 260 ft. of single track. Heat treated cast chrome nickel steel rail, developed and produced under the formula and supervision of the company's engineering department, will be laid.

Market Street Railway, San Francisco, Cal., is reconstructing the track on lower Sutter Street, Third Street and Lincoln Way at a cost of $400,000. This will be followed by the rebuilding of practically the entire San José Avenue line.

Community Traction Company, Toledo, Ohio, has reached an agreement whereby Sylvania Avenue will be paved as soon as possible. The company will install a concrete base into which steel ties will be set.

Buffalo & Erie Railway, Buffalo, N. Y., plans to install an automatic electric block signal system on its line between Buffalo, N. Y., and Erie, Pa.

Pacific Electric Railway, Los Angeles, Cal., has been granted permission to build a short line freight track connecting San Pedro, Wilmington and Long Beach. This is the second step which has been taken recently toward unifying the railroad services of the harbor. Recently the commission granted the Union Pacific System permission to enter the harbor under the consolidated railroad plan. At the intersection of the Union Pacific line and the Pacific Electric tracks an overhead crossing will be built. The expenses will be equally divided. Fourteen street crossings are to be made at grade, the entire expense to be borne by the Pacific Electric. The new line will cost an estimated amount of $163,899.

Power Houses, Shops and Buildings

Memphis Street Railway, Memphis, Tenn., and the Memphis Power & Light Company are having plans prepared for a large reinforced concrete warehouse to be located just north of the present carhouse.

Detroit United Railway, Detroit, Mich., closed down its power houses recently, thereby releasing all of the power house equipment located at Farmington, Monroe, New Baltimore and Rochester, Mich. These four power stations were replaced by 19 1,000-kw. full automatic substations. The company is offering all of these power house equipments for sale. This is in line with the agreement which the company entered into in 1923 with the Consumers Power Company and the Detroit Edison Company for the purchase of all power necessary to operate their 600 miles of city and interurban service.

Trade Notes

Detroit Stoker Company, Detroit, Mich., will show full-sized underfeed stokers in operation at the Mechanical Engineering Power Show, Grand Central Palace, New York City, Dec. 1 to 6, 1924.

Roller-Smith Company, New York, N. Y., announces the appointment of Charles R. Speaker, Evening Star Building, Washington, D. C., as its representative in the District of Columbia. Mr. Speaker will also handle the Roller-Smith Company's government business in the States of Maryland, Virginia, North Carolina and South Carolina.

D. B. Dean, after nearly 25 years service with the J. G. Brill Company, has decided to withdraw from his active duties. With this in view he has resigned as sales manager and director of the G. C. Kuhlman Car Company, to take effect about Nov. 1.

Ohio Brass Company, Mansfield, Ohio, has moved its Philadelphia office from the Witherspoon Building to 1404 Packard Building, Fifteenth and Chestnut Streets.

Nichols-Lintern Company, Cleveland, Ohio, announces the rearrangement of selling territories and appointment of the following sales representatives: A. C. Burleigh, Boston, Mass.; Pharo Engineering Company, Pittsburgh, Pa.; Jameson-Ross Company, Chicago, Ill.; F. F. Bodler, San Francisco, Cal., and A. W. Arlin, Los Angeles, Cal.

New Advertising Literature

Electric Machinery Manufacturing Company, Minneapolis, Minn., has issued bulletin No. 854 describing, with illustrations, synchronous motors for compressors.

General Electric Company, Schenectady, N. Y., has issued a 12-page booklet bearing the designation Y-2019, describing the new type A General Electric welding electrode. Details are given on electrode construction and characteristics. Results of tests on welded cast iron specimens and deposited metal specimens are described, and oscillograms demonstrating arc stability are reproduced. Instructions for use of the electrode are supplied and specifications of the standard sizes given.

The Travelers Insurance Company, Hartford, Conn., has issued a 25-page booklet on the value of group insurance. The pamphlet gives the history of group insurance, some facts about those it serves and enumerates its many rewards. How the field service men on the Travelers Insurance serve the 2,400 corporations and firms on the list of group policyholders is included in the story. The value of group insurance is summarized thus: "Group insurance benefits him who gives and him who receives! You will never cease to be gratified with its adoption."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued special publication 1707, Westinghouse Railroad Data. This pamphlet contains definite information on electrical applications on steam railroads.

Wagner Electric Corporation, St. Louis, Mo., has issued Bulletin No. 140, on power transformers.

Crouse-Hinds Company, Syracuse, N. Y., has issued folder No. 18 on "Imperial Floodlights and Projectors" and folder No. 19 entitled "A New Highway Law."

New York, Saturday, November 8, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 19

Now We Can Go Ahead Confidently

THE election of President Coolidge will be generally acceptable to electric railway men. On several occasions the President has shown his interest in the welfare of the electric railway industry, and while vice-president he was one of the speakers at the 1923 Midyear Meeting in Washington. But it is not only as a personal matter that President Coolidge's success at the polls may be welcomed. The hearty indorsement given to his policies in the election by the country at large shows that the majority of the people are conservative and have not been misled by the radical arguments of recent years.

It should not be forgotten that government ownership and operation of railways and other public utilities was one of the policies advocated by the party which carried but one state at the election on Tuesday. It also must not be forgotten that a most convincing reply to this policy of government ownership was broadcasted from Washington about five weeks before the election by Secretary of Commerce Hoover and published in full at the time in ELECTRIC RAILWAY JOURNAL. It must not be forgotten that the decisive defeat of Mr. La Follette also removes all cause to fear that the United States Supreme Court may be made subservient to the Congress.

Not the least of the good results of the election is the probability that we shall continue to have the services in high office of such men as Hoover and Mellon. This insures another four years of "more business in government and less government in business."

Altogether Mr. Coolidge's election and Mr. La Follette's thorough defeat means that we can go ahead with the business of public service, having full confidence that the rights of property will be inviolate and that honest private operation will not be menaced and strangled by a drive for socialism. The country has spoken unmistakably. It does not want any change in our form of government. It does not want socialism.

More Attention to Tiring Will Save on Re-Tiring

IT SEEMS to be a very general condition now that the purchaser of motor buses gives little if any consideration to the size and type of tires with which the new vehicles are to be equipped. Likewise, the chassis manufacturer is not too particular about what he puts on, in the absence of definite specifications. This leads to much dissatisfaction with the tires and produces high operating costs, for the tire item is one of the principal expenses in motor bus operation.

The manufacturer of tires is particularly interested in this situation, for he realizes that if a wrong size and type of his tires are placed on a bus the user is likely to feel that he had better choose a different make when he has to re-tire. One prominent tire engineer found pleasure at the number of tires of his own make with which buses at the Atlantic City convention were equipped, but was greatly disappointed at the fact that on many of these buses either the wrong size or the wrong type of his tire had been applied.

Tire manufacturers say that they have been unable thus far to arouse sufficient interest in this detail of equipment. This is naturally a condition which accompanies the newness of the use of buses. Tire manufacturers also say that their offers of advice by engineers who have made tire manufacture their life work have not been at all well received by bus operators. The latter have looked upon all such proffers of service as being merely sales schemes. While such an engineering service is, of course, an indirect approach to the later sale of tires, it is difficult to see why railway men should not accept the engineering services of these firms, just as they have learned to rely upon the engineering services of the manufacturers of railway equipment. Perhaps the tire manufacturers must go through a certain period of effort in establishing confidence, but surely the question of getting the proper tires on a bus is a matter of considerable importance.

Street Railway Not Inherently Faulty in New York Situation

WITH the many applicants fighting to obtain franchises for bus operation in New York City, the situation of the street railways is commonly looked upon as hopeless. Perhaps the situation is hopeless—if present politics and present operating methods are to continue. But this is so only if these conditions do continue, and not because of any inherent weakness in the electric rail system as compared to any newer form of transportation now available.

New York City street railway operation, excluding Brooklyn lines, does not represent modern railway practice. The equipment in use is old and inherently slow. Even this old equipment is not operated as well or as rapidly as it could be. With their lackadaisical running and discourtesy, Manhattan trainmen have inspired much adverse criticism of the street car. They have given some cause for the idea prevalent that it is a back number.

A brief analysis on page 806 shows some of the troubles of the street railways in New York. One is that the speed of cars averages only 7.16 m.p.h. In Chicago the street cars are averaging nearly 11 m.p.h. That high figure cannot be attained in Manhattan, but it is believed that 8 to 8.5 m.p.h. would be possible with modern cars designed for rapid loading and unloading and fast acceleration, and manned by well-schooled and disciplined trainmen. This would mean not only a large saving in operating expenses but would attract great numbers of short-haul riders who now make nearly as good time walking. The demand for street car service is certainly not lacking, as is evidenced by the high average car-mile earnings in Manhattan, which are about 70 cents as compared with 45 cents for the country as a whole. In fact, today, as pointed out in the annual report of one of the railways, page 822, the New York surface lines are carrying a larger proportion of the total number of passengers carried on surface, elevated and subway lines than at any time since the subways started. The use of street cars in recent years has increased faster than the use of subway and elevated lines.

Another of the troubles is that the street cars have average receipts of only 3.5 cents per passenger-mile, while the buses, both Fifth Avenue and municipal, get some 5.5 cents per passenger-mile. Were the Manhattan and Bronx railways receiving the same revenue per passenger-mile as the buses, which would be equivalent to an 8-cent fare, their receipts would be increased 57 per cent. Their net earnings would go up from $3,489,000 to $19,800,000. This would give a return of 22 per cent on their valuation after meeting taxes, even under the present low rate of speed, instead of the present actual return of 3.9 per cent.

In other words, if the street railways were to earn only a return of say 8 per cent, the service could be supplied at a revenue per passenger-mile considerably below that of the buses, even under present conditions. With the system thoroughly modernized, the advantage of the railway would be still greater. It might even be possible with the heavy traffic density in New York City that a 5-cent fare would suffice.

These considerations would not seem to indicate any inherent weakness in the street railway.

The present low speed of the cars is of course not entirely the fault of the cars and operating methods. Traffic regulation in New York City is not designed to assist street car movement. Parking regulations and their enforcement are lax. It is not unusual to see automobiles standing in double lines along the curb and forcing all moving vehicles onto the car tracks. Left-hand turns are allowed practically everywhere. Vehicles may turn around in the middle of the block, bringing all other traffic to a standstill. Much time is lost on account of the lack of flexibility of the interlocked traffic signal lights used on main thoroughfares. In short, traffic regulation in New York is probably the worst in any large city in the United States, from the street railway standpoint.

Part of, the remedy for the railway situation is managerial in nature; the remainder is political. If the two interested parties will come honestly to the common purpose of providing good surface transportation for the citizens of New York City, the situation can be solved. The JOURNAL believes there is a way to work it out if progressiveness and co-operation on both sides can be brought about.

The fact that the existing system of surface transportation is not efficient is no reason to replace it by a system which is inherently unsuited to the conditions. The present situation is largely the fault of the public, which for years has allowed the politicians to hamstring the railways upon every occasion. In the interest of good transportation it would be better to increase the efficiency of the street railway system than to allow public clamor to drive these companies into the operation of buses under conditions for which they are not fitted. Above all, it would be a grave mistake to allow a matter of this kind to be decided by fancy or sentiment instead of by cold, hard facts.

There is plenty of field in New York for the bus—to supplement the railways, but not to displace them.

Akron Voters Wisely Approve Fare Increase and New Short-Term Franchise

NEWS deeply significant comes out of Akron, Ohio. At the election in that city on Nov. 4 the voters approved an ordinance under which co-ordinated railway and bus service will be continued. The term of the new franchise is only 4 years, which period, it is expected, will furnish a reliable guide to future normal prices and transportation costs. Neither the company nor the city thought it advisable to enter into a long-term contract at this time. Under the terms of the temporary ordinance which has been in effect since last February, when the company's franchise expired, the company would have had no right to operate after May 1, 1925. It would be idle to speculate upon the consequences which might have followed a rejection of the settlement proposal at the polls. Akron had no such thought. The size of the vote in favor of the new grant proves that.

It is only last February that Akron appeared to be determined to exact its pound of flesh from its railway. Since then, however, the thought of its experience without service has had its effect. Long ago Akron could have had all that is in prospect for it now without the turmoil that attended the suspension of railway and bus service there for a period of thirty days, but Akron was misled, badly misled. It knows that now.

The provisions of the new grant under which the joint bus and railway service will be operated for the next four years give great promise for the future. On the basis of the public inquiry which fixed the "bare" cost of carrying a passenger in 1923 at 5.55 cents, the company is assured a living wage, as the new fare will give a minimum revenue per passenger of 5.88 cents, this coming from the frequent riders who take advantage of the lowest rate of 17 tickets for $1. The city is protected with respect to the conditions under which it can exercise the right to purchase the entire property. And the public is assured adequate service by car and bus at a low rate of fare.

The attitude of the city officials and the public press during the period incident to the campaign in behalf of the new settlement proposal was certainly in striking contrast to the sentiment expressed previous to the withdrawal of service last February. Critics of the Akron company there have been and probably always will be. This is the fate of any public enterprise. But there is no satisfactory answer to the argument of the company itself in behalf of the new grant. In effect, that statement was that it must be apparent to everyone that unless the company does supply good service in the next four years, it cannot hope to have the public good will necessary to continue to operate the system beyond the present contract period.

Supervisory Controlled Substation on Chicago Elevated

New Substation at Junction with North Shore Line Controlled by Power Supervisor in General Offices in Edison Building—2,000-Kw. Machine Has Full Automatic Features—Building Located in Residential Section, Necessitating Artistic Design

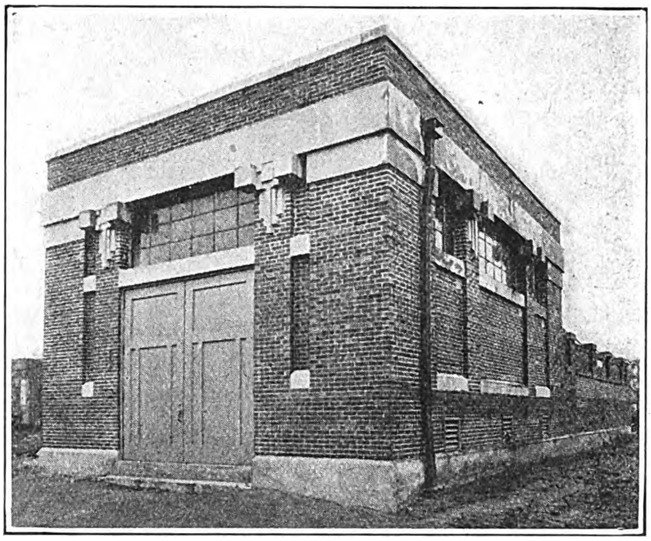
By Dwight L. Smith
Assistant Electrical Engineer Chicago Rapid Transit Company

EXTENSIVE developments in supervisory control led the Chicago Rapid Transit Company to adopt this system in conjunction with its new automatic substation at Central Street, Evanston. This automatic substation is located near Linden Avenue, Wilmette, which is the junction of the Chicago Rapid Transit system with the Chicago, North Shore & Milwaukee Railroad, as well as being the location of a large storage yard. The substation at present includes one 2,000-kw. rotary converter, housed with switchboard and control in a building 25 ft. x 34 ft., and 16 ft. high inside. Oil switches, disconnects, and power and control transformers are located in an adjacent outdoor court. Sufficient ground space is available for the erection of the second building to house an equal additional capacity and for duplicate outdoor equipment. The station is full automatic with all modern protective devices, including two steps of loading limiting resistance for the machine, and has three automatic reclosing feeder panels for the control of two feeder sections for the Chicago Elevated and one for the North Shore Line, as well as a feeder panel for the Evanston Railway.

As the desired location for a station was within the exclusive North Shore residential district, it was located on the property of the Evanston Railway, where the latter already had a carhouse. Even three sides of this location faced directly on properties zoned for residences. On the fourth side, a golf course and a proposed boulevard along the North Shore drainage channel came between the substation and the right-of-way. To make the station fit these surroundings and conditions, the building was constructed of face brick, trimmed with artificial stone, matching the car station building. The outdoor equipment is inclosed on the street side with a neat face brick wall of similar design.

TRANSMITTING THE PURCHASED POWER

The 60-cycle, three-phase, 12,000-volt energy is obtained from the Commonwealth Edison Company at the point where its transmission lines approach the station. It is carried to the station by a No. 00 transmission line built and owned by the Chicago Rapid Transit Company along its right-of-way. Not only was it desirable for the sake of appearance, but since the golf course and boulevard mentioned lay between the station and the railway right-of-way, it was necessary to bring all feeders and the transmission line into the station underground. A 16-duct line was built from a manhole on the right-of-way to a manhole in the street in front of the station. From this latter manhole ducts carry the high-tension cable to the steel structure in the outdoor court, the positive feeders into the switchboard pit and the negative feeders directly into the machine pit. The telephone cable, containing the telephone and supervisory control lines, also comes through this duct line.


Central Street Automatic Substation of the Chicago Rapid Transit Company, in Which the Supervisory Equipment Is Installed

At the right-of-way, laterals extend from the manhole up a structure built between two poles 10 ft. apart. The cables extend up these laterals to disconnect switches at the top and thence to the various feeders and the transmission line. A grounding switch is mounted in the high-tension line at this point. All switches are locked and are available only from a platform 25 ft. high mounted between the two poles. The negative feeders run directly from the manhole on the right-of-way to the track rails.

The high-tension cable terminates in a pothead mounted on a steel structure in the outdoor court of the substation. This structure serves as a support for the disconnect switches, fused disconnects for the operating transformer and the choke coils. The type KO-36 oil circuit breaker is mounted next to this structure, with the current transformers between the oil circuit breaker and the power transformers. The latter are 700-kva. each, oil insulated and self-cooling. All transformers have 12,000-33,000-volt primary windings, and the transmission line and all high-tension wiring is insulated for the higher voltage. The outdoor apparatus is elevated on steel structures of sufficient height to place all live parts more than 10 ft. above the concrete floor of the court. The entire court is inclosed by a wire fence.

Inside the building the switchboard occupies the end of the building near the court, with the load-limiting resistances on the floor level behind the switchboard.

The contactors, high-speed circuit breakers and field rheostat are mounted on a structure above the switchboard. Slate runways are in front and behind the contactors and breakers. The converter is at the other end of the building near one side, leaving room beside it for the telephone booth, air compressor, steel workbench and steel lockers for tools, spare parts and supplies.

Connections from the low-tension side of the transformers are made by paper-insulated, lead-covered cables, which come into the station through wall bushings, thence down ducts leading directly to the converter pit and the pit in the rear of the starting panel. The d.c. connections from the rotary to the switchboard are made in a similar manner. Vertical legs from the starting panel and the a.c. rings on the machine are made with copper bus to which the cables are attached in the pits. A pit 26 in. wide and 24 in. deep runs the entire length of the switchboard in its rear and serves as a handhole for terminating these cables as well as all control wiring conduits, and as a runway for all control wiring. The pit has a removable slate cover, thus all wiring is neatly concealed but easily accessible.

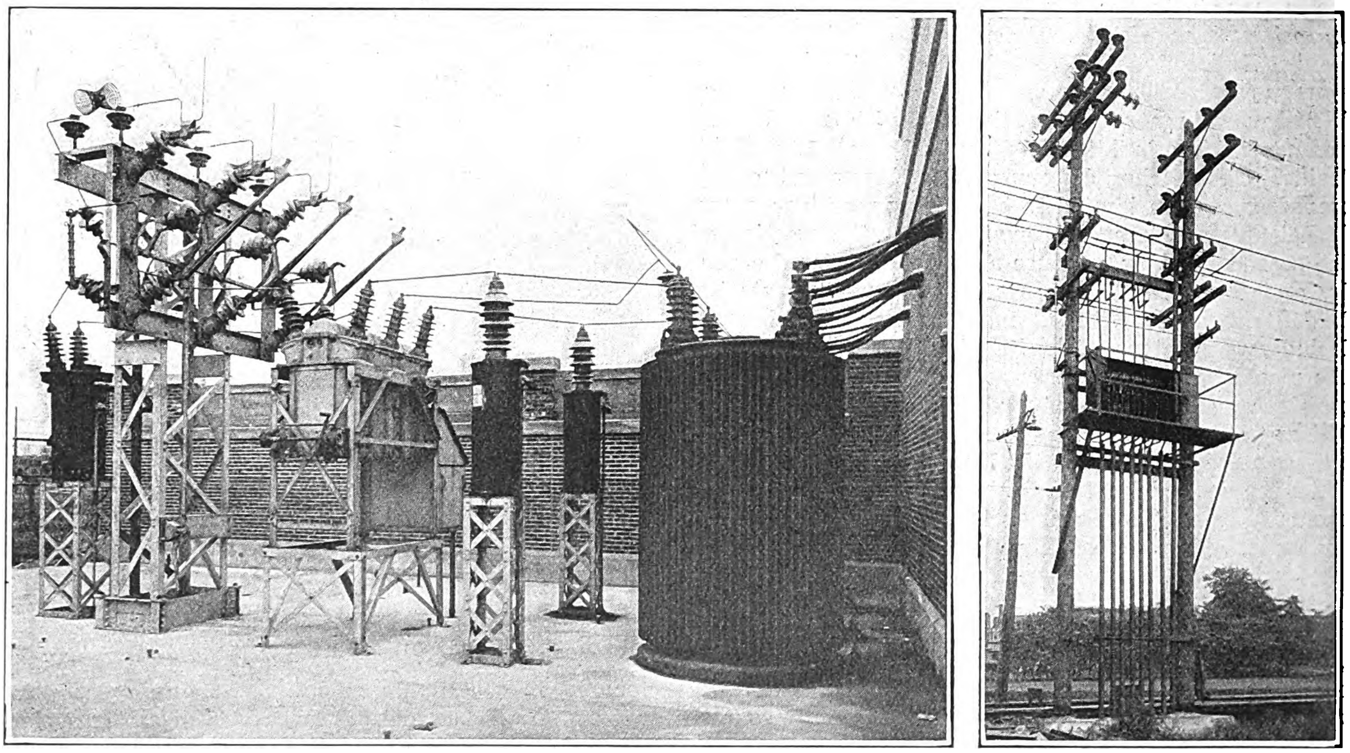
In addition to the automatic features, a supervisory control system connects the station with the power supervisor's office, 15 miles distant in the main offices of the company located in the Edison Building, Chicago. This system provides means for the supervisor to lock out or release the machine and to open or close any feeder at will. It also gives an automatic indication by red or green lamps on the supervisor's board whether the machine is running or shut down and the feeders open or closed. This indication takes place whether the action has been performed by the supervisor or automatically.

The supervisory control system consists essentially of standard telephone selector equipment with sending and receiving features at both the power supervisor's office and the substations. It operates over three wires, No. 22 gage in the railroad company's telephone cable. For sending the supervisor has manually operated selector keys, one to open and one to close each controlled apparatus. These keys actuate pole-changing relays according to a predetermined code setting, notching up the selector having the same code setting at the substation. The substation selector operates an auxiliary relay through whose contacts the control circuit of the apparatus is looped. The opening of the auxiliary relay opens the control circuit and disconnects the apparatus, while the closing of the auxiliary relay completes the control circuit and permits the apparatus to function automatically.

The return indication is initiated by interlocks on the apparatus controlled. A change in the position of the apparatus actuates a motor selector key in the substation, operating a selector in the office and lighting the proper indicator lamp. Only one-half the number of selectors are used in the office as at the substation. As an additional protection insuring proper indication, the polarity sequence of the code for indicating the open position of any one piece of apparatus is reversed for indicating the closed position. The indication itself is finally obtained by the action of a polarized relay which indicates according to the polarity of the last impulse of the code received.

A control shelf at the power supervisor's office holds the pole-changing relay which furnishes the impulses to the selectors at either end, relays for the pilot lamps and buzzer indications to the supervisor of changes in indications and locking relays preventing the mixing up of outgoing and incoming impulses. This apparatus is mounted in a steel cabinet.

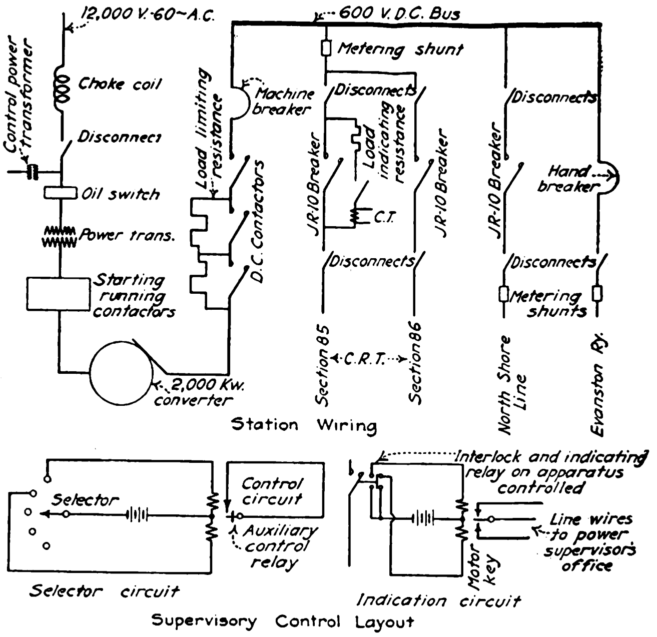
At the substation end there are mounted in a similar cabinet the selectors and motor-driven selector keys,



At Left, All High-Tension Apparatus Is Located in an Adjacent Outdoor Court, Inclosed by a Brick Wall and Wire Fence. At Right, Laterals and Switches Connect the Duct Line from the Substation with the Overhead at the Railway Right-of-Way

the ordinary telephone system and waiting for their report back, the switching and indication is accomplished instantaneously. Although not done in this case, as ample telephone cable facilities are available, it is possible to utilize the control wires for the operation of telephones as well.

The automatic reclosing feeder equipment consists of a high-speed circuit breaker with control circuits and relays which provide protection for both the machine and the feeder section itself. The high-speed breaker with "trip free" feature has been entirely successful in protecting the rotary converter from flashovers. Tests made by short-circuiting a feeder just outside the substation have opened the circuit breaker without so much as producing a "squeal" on the converter. The control circuit relays provide for taking the control current from either the bus or the feeder, whichever has the higher voltage. The breaker will remain closed as long as the potential on either side is 250 volts or above, thus providing for feeding either out from the substation, or when the station is shut down for feeding through the station bus.


12,000 V.-60~A.C.
600 V. D.C. Bus
Control power transformer
Choke coil
Disconnect
Oil switch
Power trans.
Starting running contactors
2,000 Kw. converter
Load limiting resistance
Machine breaker
D.C. Contactors
Metering shunt
Disconnects
JR-10 Breaker
Load indicating resistance
C.T.
JR-10 Breaker
Disconnects
Section 85
C.R.T.
Section 86
Disconnects
JR-10 Breaker
Hand breaker
Disconnects
Metering shunts
North Shore Line
Evanston Ry.
Station Wiring
Selector
Control circuit
Auxiliary control relay
Selector circuit
Interlock and indicating relay on apparatus controlled
Line wires to power supervisors office
Motor key
Indication circuit
Supervisory Control Layout

General Schematic Wiring Diagram of Station and Supervisory Control

Thermal relays in the feeder busbar provide for opening the breaker when the bus becomes overheated, reclosing again when the temperature decreases. This feature, however, is unnecessary as the installation is designed to carry maximum useful loads while the high-speed breaker will care for short-circuit conditions. This breaker has a reclosing coil and a holding coil which holds the breaker closed. A bucking bar paralleled by an inductive shunt, in series with the load, produces a field opposed to that of the holding coils. When the field produced by the bucking bar becomes greater than that of the holding coil, the breaker is opened by a spring. The field of the bucking bar varies with the rate of increase of the load, a slow increase permitting a greater portion of the current to go through the inductive shunt than a rapid increase. Thus the breaker will open on a lower current produced by a short circuit with its rapid current rise than where the current is taken for ordinary uses with a comparatively slower rate of increase.

When the breaker is opened automatically a time delay relay starts. It completes its action in 15 seconds, closing a small feeling-out contactor which completes the feeder circuit through a load indicating resistance, in series with which is a current transformer. If the short circuit still exists the rush of heavy current through this transformer trips a relay which opens the small contactor and starts the whole cycle over again. At the same time the small contactor closes, an auxiliary time delay closing relay starts to close, its action taking long enough so that if the tripping relay operates it will be restored and again start its action at the proper place in the cycle. This action will be repeated until the short-circuit condition is removed and the current through the small contactor, resistance and current transformer is small enough to prevent a kick which will open the tripping relay. If the tripping relay does not operate, the auxiliary closing relay completes its action and closes the high-speed breaker. Variation of the current setting at which the breaker will trip is obtained by varying the reluctance of the magnetic circuit of the holding coil.

The apparatus is provided with disconnects on each side of the circuit breaker and thus can be isolated for inspection or maintenance. Although the main contacts of the circuit breaker are comparatively small for the current rating, no trouble has been experienced with them. The breaker is opened manually by a knife switch in the control circuit. The supervisory control operating relay contacts are in series with this same circuit.

All this apparatus and the station equipment were furnished by the General Electric Company.

Ventilation inside the station is natural through louvers placed low on the walls and four 3-ft. diameter ventilators in the roof. Two ducts lead from outside the station directly into the converter pit. On warm days the temperature inside the station rises well over 100 deg. F., but it was not felt that sufficient decrease in this temperature could be obtained by forced ventilation to warrant its use, and several protective relays have been redesigned to withstand these temperatures. The station is well lighted both inside and out, with an emergency throw-over switch so that the lights can be thrown onto any of the feeders entering the station.

The number of customers supplied from this one station has necessitated a complicated metering arrangement, but hourly reading printometers record accurate information not only of the daily output but of the hourly output, which is necessary for determining the maximum demand.

The station normally runs from 6 a.m. to 1 a.m. and during this time the load is such that it never shuts down from lack of load. During the other five hours of the day it is locked out by the power supervisor.

On the daily inspection, which takes one to two hours, printometer tapes are changed, meters and apparatus counters read, supervisory control lines are tested and a casual inspection is given to the apparatus. Once a week the maintainer makes a night inspection, which gives 5 hours during which the station is shut down for careful inspection and any work not possible while it is running. A daily report is made to the office, and by means of apparatus counter readings, voltmeter charts and meter readings a very accurate account is available of the operation of the station.

Automatic Rear Exit Doors on Toronto Rebuilt Cars

Sixty Former Two-Man Cars Are Being Arranged for One-Man Operation by Installation of Automatic Doors at Rear—Passengers Will Enter at Front End Only, but May Leave at Either End

AS PART of a general program of remodeling 351 cars taken over from the Toronto Railway in 1921, the Toronto Transportation Commission is now converting 60 of these cars for one-man operation, utilizing a front entrance and exit in combination with a rear exit controlled by an automatic exit door. In the arrangement of the car and the door control a number of interesting features are included, some original with the Toronto installation and others adapted from designs in use elsewhere.

The automatic rear exit feature is patterned after the design which has been found successful on a sample car operated by the Washington Railway & Electric Company and which was described in the ELECTRIC RAILWAY JOURNAL of Aug. 30. In the case of the Washington car, however, the treadle arrangement is installed on each platform of a double-end car, so as to be used as a rear exit regardless of the direction of motion, while the new Toronto cars will be single end, and only one treadle per car will be necessary.

Originally equipped with longitudinal seats, these cars are only 8 ft. ½ in. wide over the side posts. They are now being equipped with cross-seats on one side, giving an aisle width of 2 ft. 8¾ in., so as to encourage passengers to move toward the rear end instead of blocking the space at the front end of the body near the entrance door. The seating arrangement adopted, together with circular seats at the rear end, gives a total seating capacity of 51.

At the front end, a passageway for both entrance and exit is provided. The entrance door is pneumatically controlled from the brake valve, while the exit door at this end is manually operated by means of an auxiliary control provided for the purpose. The arrangement is such, however, that when the entrance door has been opened, it will in closing also close the front exit door if the latter is open at the time.

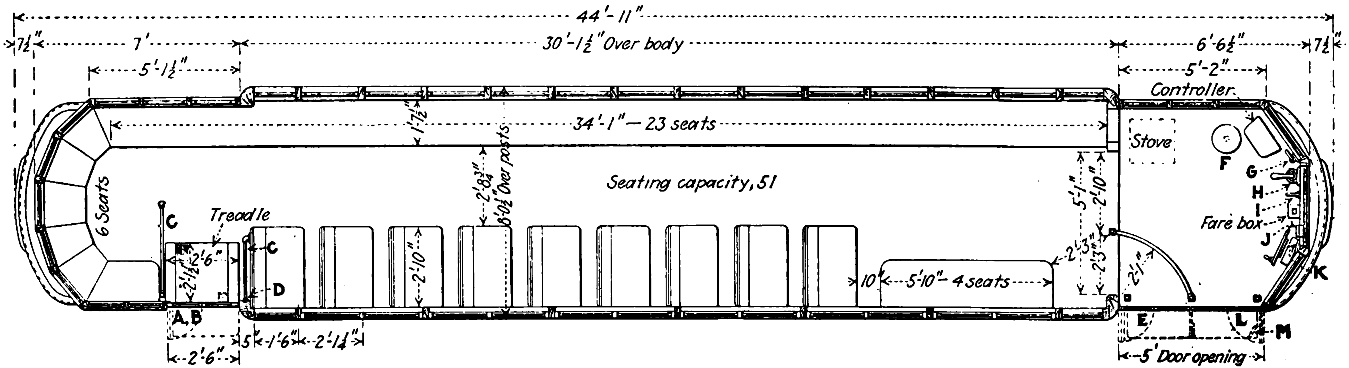
Control of the door engines is obtained from the brake valve. Two door-opening notches on the segment of this valve give a selective control between the front door and the rear treadle-operated exit. In other words, when the valve handle is set to the first door-opening notch, the rear exit door will open provided there is a passenger on the treadle, or this will occur whenever a passenger steps on the treadle while the valve remains in the same position. If the handle is moved to the second door-opening notch, the action of the rear door will be exactly the same, but in addition the front door will be opened. Under both settings of the handle, the rear door closes automatically as soon as the alighting passenger has cleared the step. Thus the rear door is automatically closed to prevent passengers entering at that point, and this also prevents the door from remaining open in cold or inclement weather any longer than is necessary to allow passengers to leave the car.

DOOR ACTION SUPERVISED BY MOTORMAN

When the brake valve handle is returned to the release position the rear exit door does not close until alighting passengers have entirely cleared the exit step. When the step is clear the door then automatically closes. An additional safety feature is provided in the form of a small auxiliary control valve adjacent to the brake valve, which enables the operator either to lock the rear door against the action of the treadle when the front door is opened, or to open the rear door directly, if this becomes necessary for any reason when no passenger is on the treadle.

Mirrors are arranged at the front end of the car to enable the operator to see both the interior of the car back of him and the rear exit step, without turning around. Extra lights installed over the rear door are lit only when the door is open. At the front end a standard door interlock signal lamp is installed, and in addition an auxiliary red lamp is lit when the rear door is open.

Both the pneumatic door equipment and the automatic treadle device are being furnished by the National Pneumatic Company. The rear platform of the car is flush with the body floor, but the rear exit treadle is set down 9½ in. so that an alighting passenger steps down to the treadle and then to the exit step.



Automatic Rear Exit One-Man Car for Toronto

Passengers board at the front end, and leave either at that end or at the rear through an automatic rear exit door. Selective door control is obtained from the brake valve, and mirrors and signal lights are arranged so as to give the operator a view of the rear step.

A—Rear exit door is controlled by treadle. It is operative only when the air-brake valve is in "door open" position.

B—Extra lights installed over rear door are operated by the treadle, lighting when the door is open and being extinguished when the door is closed.

C—Rear exit grab rail.

D—Push button for use of passengers standing on or near treadle.

E—Front exit doors are operated both ways manually, but will close pneumatically with entrance doors when the latter have been open.

F—Motorman's removable seat in socket.

G—Manual handle for operating front exit door.

H—Brake and pneumatic door control.

I—Valve to open or lock rear exit door independent of treadle.

J—Signal lamps. Upper, standard door interlock signal lamps. Lower, red lamp, lighting when read door is open, and extinguishing when door is closed.

K—Mirror for observation of interior movement.

L—Front pair of doors fully pneumatically operated from brake valve.

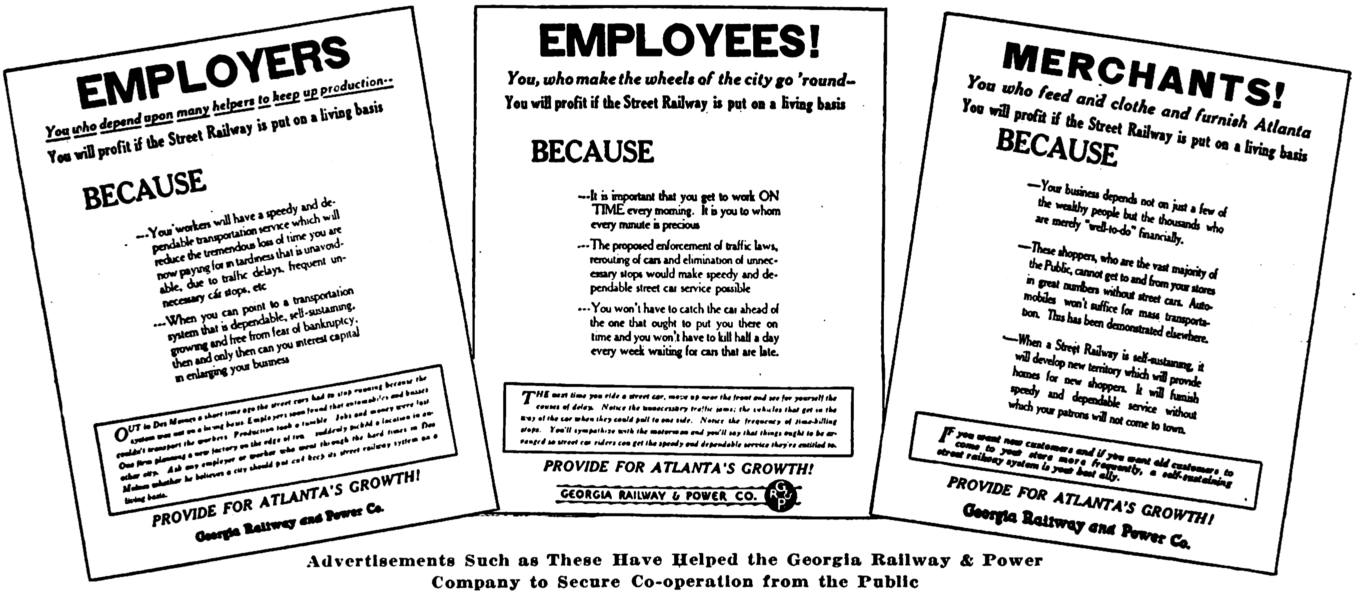
M—Mirror for observing rear step.

Changing Knockers Into Boosters

Skillfully Conducted Publicity Campaign of Georgia Railway & Power Company Has Been an Important Factor in Influencing Public Opinion

THAT it pays to advertise public utilities as well as other lines of business has been effectively demonstrated during the past year or two by the Georgia Railway & Power Company, Atlanta, Ga. Only a few years ago the company was spending comparatively little money in newspaper advertising, but an indication of its changed policy is seen in the fact that its new business advertising for this year will amount to more than $50,000.

This company is one of three in the South to conduct a public relations department. The department uses various means for accomplishing its end—advertising, speakers, car cards, billboards, and a street-car publication distributed from "take one" boxes. The work of the department has proved profitable beyond all expectation in building up good will in the territory served.



EMPLOYERS

You who depend upon many helpers to keep up production--

You will profit if the Street Railway is put on a living basis

BECAUSE

---Your workers will have a speedy and dependable transportation service which will reduce the tremendous loss of time you are now paying for in tardiness that is unavoidable, due to traffic delays, frequent unnecessary car stops, etc

---When you can point to a transportation system that is dependable, self-sustaining, growing and free from fear of bankruptcy, then and only then can you interest capital in enlarging your business

OUT in Des Moines a short time ago the street cars had to stop running because the system was not on a living basis. Employers soon found that automobiles and busses couldn't transport the workers. Production took a tumble. Jobs and money were lost. One firm planning a new factory on the edge of town suddenly decided on a location in another city. Ask any employer or worker who went through the hard times in Des Moines whether he believes a city should put and keep its street railway system on a living basis.

PROVIDE FOR ATLANTA'S GROWTH!

Georgia Railway and Power Co.

EMPLOYEES!

You, who make the wheels of the city go 'round--

You will profit if the Street Railway is put on a living basis

BECAUSE

---It is important that you get to work ON TIME every morning. It is you to whom every minute is precious

---The proposed enforcement of traffic laws, rerouting of cars and elimination of unnecessary stops would make speedy and dependable street car service possible

---You won't have to catch the car ahead of the one that ought to put you there on time and you won't have to kill half a day every week waiting for cars that are late.

THE next time you ride a street car, move up near the front and see for yourself the causes of delay. Notice the unnecessary traffic jams; the vehicles that get in the way of the car when they could pull to one side. Notice the frequency of time-killing stops. You'll sympathize with the motorman and you'll say that things ought to be arranged so street car riders can get the speedy and dependable service they're entitled to.

PROVIDE FOR ATLANTA'S GROWTH!

GEORGIA RAILWAY & POWER CO.

MERCHANTS!

You who feed and clothe and furnish Atlanta

You will profit if the Street Railway is put on a living basis

BECAUSE

—Your business depends not on just a few of the wealthy people but the thousands who are merely "well-to-do" financially.

—These shoppers, who are the vast majority of the Public, cannot get to and from your stores in great numbers without street cars. Automobiles won't suffice for mass transportation. This has been demonstrated elsewhere.

—When a Street Railway is self-sustaining, it will develop new territory which will provide homes for new shoppers. It will furnish speedy and dependable service without which your patrons will not come to town.

IF you want new customers and if you want old customers to come to your store more frequently, a self-sustaining street railway system is your best ally.

PROVIDE FOR ATLANTA'S GROWTH!

Georgia Railway and Power Co.

Advertisements Such as These Have Helped the Georgia Railway & Power Company to Secure Co-operation from the Public

Soon after it was decided to organize a public relations department, an extensive publicity campaign was launched. One of the first steps was the issuance of a little four-page pamphlet called "Two Bells," published weekly and distributed on the street cars. Considerable advertising space in the daily newspapers was used and the message was further "got over" to the public by the use of dash signs and inside car cards. Another publication is a window card changed weekly, known as "The Empire State," and setting forth the things for which Georgia, the so-called "Empire State of the South," is most famous. The matter used is wholly of an educational nature, unmixed with propaganda of any sort, and the card quickly became popular over the whole state. Its slogan, "It's Great to Be a Georgian," has been taken up by other organizations in the company's territory. As for "Two Bells," it is a breezy little paper, 5½ in. x 8½ in., set two columns to the page. Each issue contains quips and messages ingeniously and palatably mixed. The running heads are used to remind readers to "Use Street Car Tickets and Help Speed Traffic," to "Obey Traffic Laws" and to convey similar admonitions.

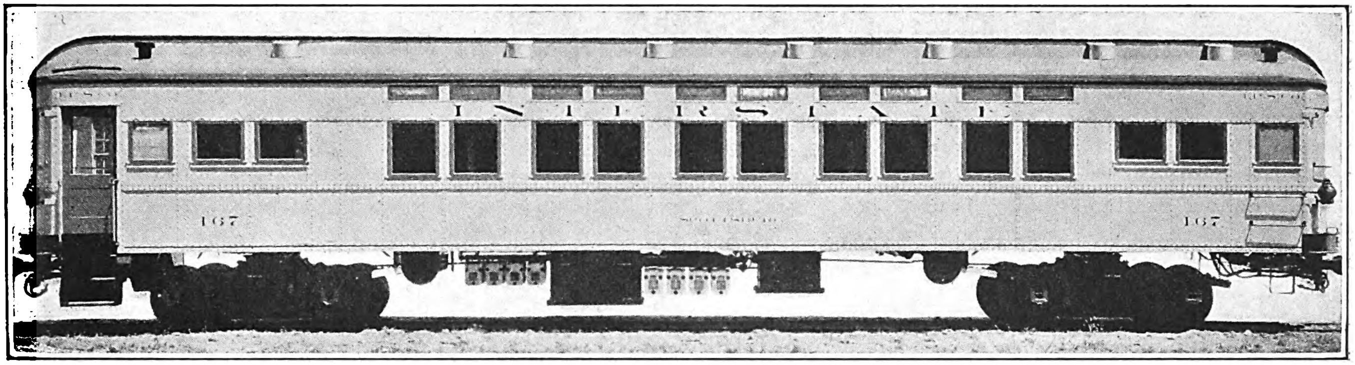
The department also issues a monthly company publication, "Snap Shots," which stands in the front rank of utility publications throughout the country. Still another publication, "The Ally of the Home," containing information about the appliances sold by the company useful to housewives, is published monthly and sent out with the monthly bills. All the publications are printed in the company's own plant, as are most of the forms and other printed matter used by the company. This plant is operated under the direction of the public relations department and effects a large saving yearly over the old method of sending out all printing jobs.

ROMANCE OF POWER DEPICTED

A series of posters of an educational nature on the subject "What Is Power?" was prepared some time ago and placed in conspicuous places in all of the city cars and interurban cars operated by the company. The information in the posters is the result of original research work done by engineers of the company. It depicts the romance of power and traces the development from the days of prehistoric man to the present time. The posters were all copyrighted by the company. The complete story was told through a series of twelve brief lectures, running one each week.

Under the direction of the public relations department the company also ties in with community affairs by using its dash sign space for good-will advertising of local events, church and other charitable affairs. It has organized a quartet, whose services are free for such affairs. This has proved a valuable instrument in building up good will for the company.

Through the work of the public relations department, the car riding public and also the patrons of the other departments of the company have come to have a better idea of the problems and perplexities of operating a public utility. They have learned that the company really has little voice in the matter of the rates charged for street car rides, for gas and electric service. They have learned that the company is in the business of selling service and that in addition to that the company is willing and anxious to be identified with the community life of the city.



One of Three 62-Ft., 10-Section Sleeping Cars Recently Placed in Service Between Louisville and Indianapolis

Sleeping Car Service Begun by Interstate Public Service Company

Extra Long Berths, with Windows Alongside Uppers; Large Washrooms and Easy Riding Qualities Are Features of Three Sleeping Cars Recently Placed in Service Between Indianapolis and Louisville—They Are Operated on a Slow Schedule with a Layover Before Entering Terminal—This New Equipment Cost $100,000

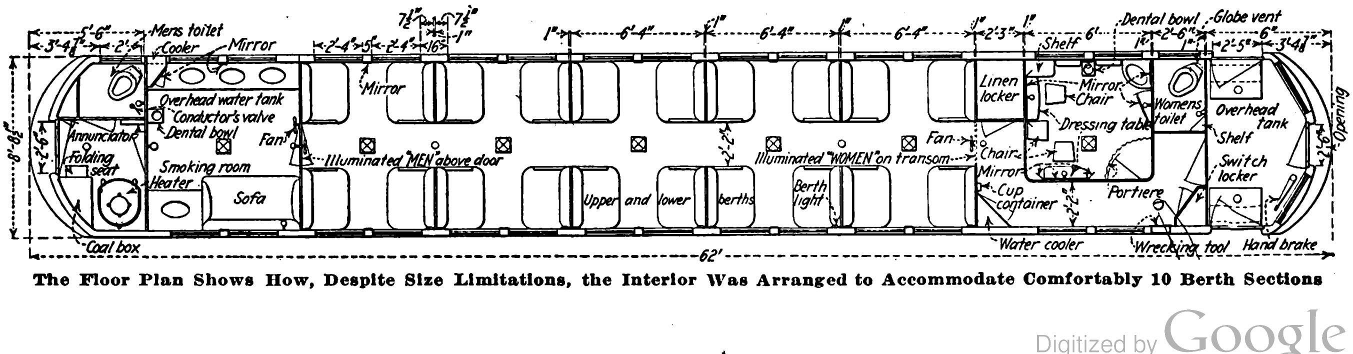
ELECTRIC railway transportation between Indianapolis and Louisville was advanced another step when the Interstate Public Service Company began the operation of sleeping cars. To furnish this service, three all-steel 10-section sleepers were designed by the company. These cars embody the latest ideas to be found in steam railroad equipment of the same type. In addition they have several new features. In spite of limitations as to length, truck size, width and overhang the cars have been arranged so that the available space is utilized to such advantage that greater convenience and comfort is afforded than is found in a standard Pullman sleeper. These cars are not motorized. They were built by the American Car & Foundry Company. The three cost approximately $100,000.

The car is 62 ft. long and 8 ft. 8½ in. wide, with a total weight of 50 tons. It is mounted on Baldwin interurban-type, four-wheel trailer trucks with special elliptic and coil springs to secure riding comfort. Rolled-steel wheels of 34-in. diameter and having 3½-in. A.E.R.E.A. tread are used. The Tomlinson M.C.B. automatic radial couplers at either end have G.E. 10-wire coupler plugs which carry the train control line, a 600-volt lighting circuit and a signal system. Air connections at both ends of the car provide for brakes and a service supply.

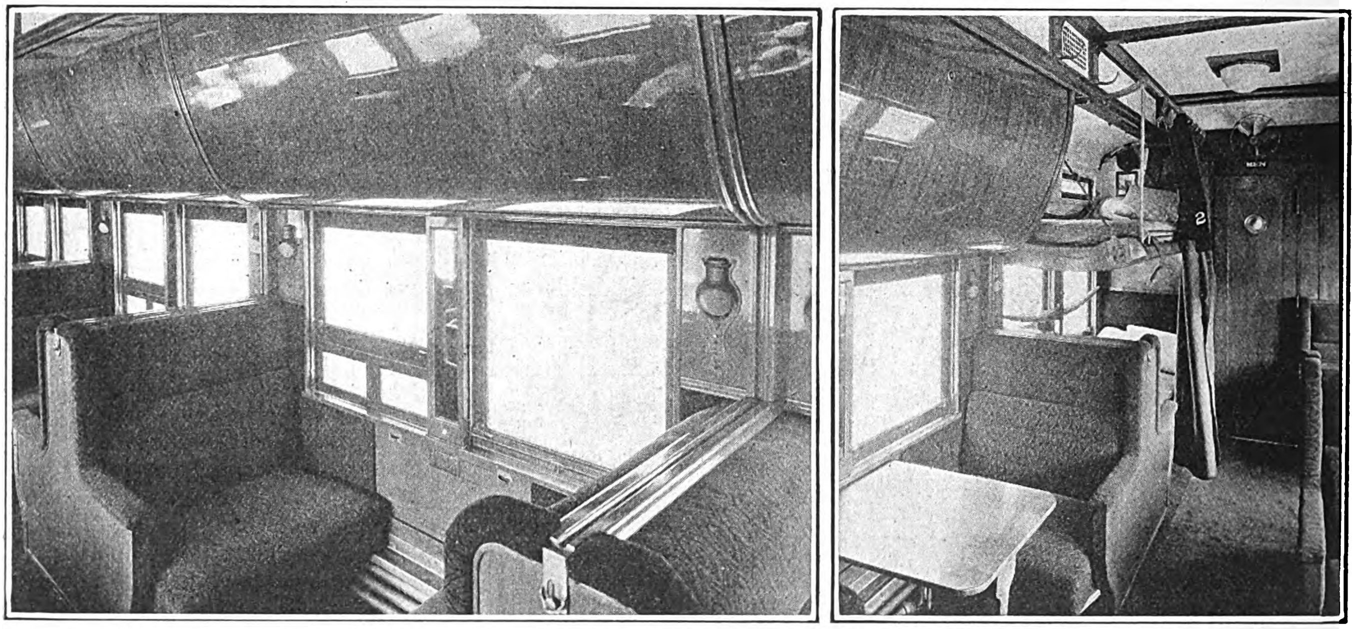
As most of the lamps within the car require a 32-volt current, an Edison 24-cell, 300-amp.-hr. battery of that voltage is carried under the car. To charge this battery a motor-generator set has been installed instead of the resistor grids originally provided. This machine operates from the 600-volt trolley circuit, being supplied with power through the car-to-car jumper or by means of a pole hooked on the trolley wire when the car is standing at a terminal. The set is cut in and out by means of a relay actuated by a reversible watt-hour meter mounted on the switch panel. Two electric heaters located under the car and controlled by a thermostat supply hot water to the washrooms. These heaters have 5-gal. copper tanks surrounded by heating coils and asbestos packing. The coils receive energy from the 600-volt circuit.

The car has steps on both sides but only at the front end. It is to this end that the motor car is coupled. Although an end vestibule door has been provided at the rear, it is necessary to pass through the men's dressing room in order to leave the car at that end. Standard Interstate orange enamel, set off with red sash, doors and roof, gives the car an attractive appearance. The company name and the name and number of the car are lettered on the sides. The three cars have been named "Scottsburg," "Indianapolis" and "Louisville."

Passenger comfort and safety were the two outstanding considerations in the design. A heavy, sound-insulated trail car, without air compressor, motors, or trolley pole, was the result. The sub-frame is built up


5'-6"
3'-4⅞"
2'
Mens toilet
Cooler
Mirror
7½"
7½"
1"
2'-4"
5"
2'-4"
16"
1"
6'-4"
1"
6'-4"
1"
6'-4"
1"
2'-3"
1"
Shelf
6'
Dental bowl
1½"
2'-6"
1"
Globe vent
6"
2'-5"
3'-4⅞"
8'-8½"
2'-6"
Overhead water tank
Conductor's valve
Dental bowl
Annunciator
Folding seat
Fan
Smoking room
Heater
Sofa
Coal box
Mirror
Illuminated "MEN" above door
Upper and lower berths
2'-2"
Illuminated "WOMEN" on transom
Berth light
Fan
Linen locker
Mirror
Chair
Dressing table
Chair
Mirror
Cup container
2'-2"
Womens toilet
Overhead tank
Shelf
Switch locker
Portiere
2'-6"
Opening
Water cooler
Wrecking tool
Hand brake
62'

The Floor Plan Shows How, Despite Size Limitations, the Interior Was Arranged to Accommodate Comfortably 10 Berth Sections of two 7-in., 16.4-lb. channel center sills and 5-in. x 3½-in. x 5/16-in. side sills tied together with 7-in., 9.8-lb. channels with 8-in. x ¼-in. top and bottom plates, and 4-in., 5.4-lb. channel floor beams. The bolsters are built up of structural steel sections having 5/16-in. double web with a 26-in. x ⅜-in. top cover plate and a 12-in. x ⅝-in. bottom cover plate. The end sills are 7-in., 9.8-lb. channel sections with 12-in. x ¼-in. top cover plate. A 10-in., 15.3-lb. channel placed with flanges outward serves as a buffer beam at each end of the car. A 5½-in. Rico anti-climber 4 ft. long has been placed inside the channel at its center. This buffer is attached to the ends of the 7-in., 15.4-lb. channel platform arms, which extend to the bolster. The entire sub-frame is strengthened by 4-in., 8.2-lb. diagonal braces of Z section which extend between the bolsters and end sills, and between the bolsters and the adjacent floor beams.


At Left—Each Berth Section Is 6 Ft. 4 In. Long and 3 Ft. Wide and Is Arranged in a Manner Similar to that of a Pullman.
At Right—Ventilating Windows for the Upper Berth Are Provided and Two-Section Curtains.
In the Foreground Is a Folding Table for Use During the Daytime

Mounted on this sub-frame is a steel-framed body. The wider side posts are 2½-in. x 2-in. x ¼-in. angles, while the narrow ones are single 3-in., 4.1-lb. channels. The letterboard is between the single sash windows and the small upper berth windows. The carlines are 2-in. x ½-in. x 3/16-in. angles bent to form the monitor roof, and are continuous from side plate to side plate. A tongued and grooved ½-in. poplar roof is laid on yellow pine furring attached to the carlines. Over this is a layer of felt paper and a layer of canvas. The side sheathing is No. 11 steel, reinforced and attached to the side posts, side sill, belt rail and side plate.

MANY CONVENIENCES ARE PROVIDED

Every effort was made to have the interior of the car commodious and luxurious in appearance. The ladies' dressing room at the front end of the car, with a passageway to one side, is somewhat larger than that found on Pullman cars. A three-section mirror is located on each of the two side walls. Below each mirror is a dressing shelf and a hair receiver. Three low-back, upholstered chairs have been provided. A corner washbowl is directly under one of the windows and a dental lavatory is between the two side windows. The finish of the woodwork and walls below the belt rail is light mahogany. Above the belt rail the side walls are finished in buff enamel decorated with gold. A dome light and three wall fixtures provide illumination over the mirrors. Two towel racks have been mounted over the side windows. The interior finish of the toilet room is white enameled Lincrusto wallboard with an embossed tile design.

The men's room occupies the entire width of the car at the rear end. It has a three-bowl washbench along one side and a single bowl and small upholstered seat on the other side. Water for use in the dressing rooms and toilets is supplied from a 100-gal. tank located over the vestibules and dressing rooms at each end of the car. The bowls were furnished by the Adams & Westlake Company and are arranged with tilting lever faucets and drain. The interior finish of the men's room is of light mahogany throughout with the exception of the ceiling, which is finished in white enamel to correspond with the rest of the car. Artificial illumination is afforded by a dome light and five wall fixture lamps.

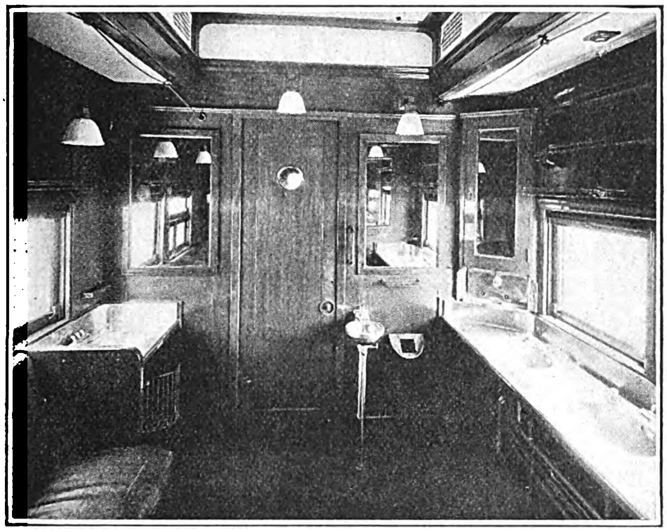
On one side of the rear vestibule is the men's toilet. The other side holds the coal box and Peter Smith hot water heater. Three rows of heater pipes extend the entire length of the car on either side.

BERTHS ARE EXTRA LONG

The car has 10 berth sections. Seating accommodations are sufficient for 40 people. Each section is 6 ft. 4 in. long and has a width of 3 ft. These provide a berth longer by approximately 3 in. than that in standard sleeping cars. The cushions and backs of the seats have spring-edge wood frames and are upholstered in green figured plush. The arrangements for making the berths are similar to those in Pullman sleepers of the latest type. Mexican mahogany with hand-rubbed finish is used for all interior trim. Fixtures are finished in dull statuary bronze.

Two windows 8 in. high and 23½ in. wide, arranged so as to swing in at the top, are placed in the side wall of each upper berth. Permanent copper wire screens are fastened on the outside and the sash may be regulated to any desired position. In addition to the ventilation afforded the lower berth by means of a sliding type ventilator in the lower edge of the storm sash, an independent ventilator is located in the inside lining directly below the narrow side post. This has a slide cover in the inside wall, while its lower end opens under the car. Fifteen American Car & Foundry Company's exhaust-type ventilators are located in the monitor and have 6-in. x 12-in. registers. A 6-in. Globe ventilator is placed in each toilet room.

Floor lamps are installed under four of the seats, to illuminate the aisle when the deck lights are off and the berth curtains are closed. Each upper and lower berth has two shaded lamps. Berth lamps, floor lamps, dome lights in the main compartment, washrooms and toilet, and the fixtures in the dressing room are operated from the 32-volt storage battery. A single five-light, 600-volt circuit for emergency purposes consists of two unshaded lamps in the main compartment, one in the smoking room, one in the vestibule and one in the ladies' dressing room. Push buttons are connected to a 26-position annunciator located on the wall in the rear vestibule.



The Men's Smoking Room at the Rear End Takes Up the Complete Width of the Car. Washbowls, Mirrors, Drinking Water and Seat Are Provided

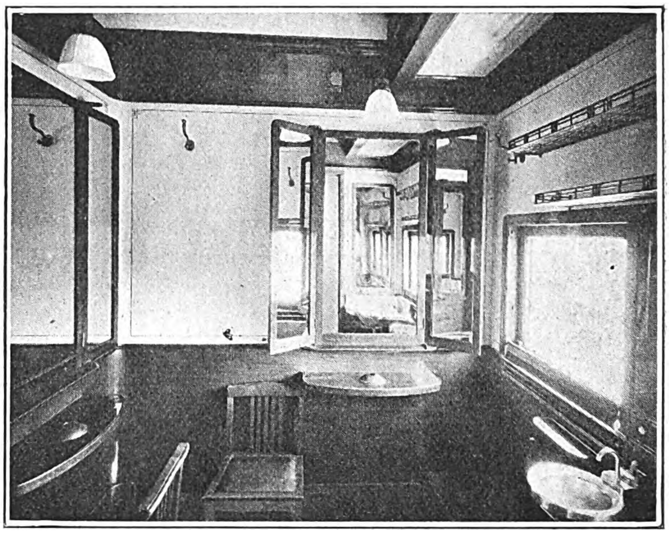
Precautions to Deaden Noise

Insulation against road noises has been accomplished by means of heavy flooring. A $\frac{13}{16}$-in. yellow pine false flooring is cleated to the stringers; it is separated by a 1-in. layer of hair felt from the double tongued and grooved yellow pine flooring, the lower course of which is $\frac{13}{16}$ in. thick while the upper course is $\frac{15}{16}$ in. A layer of building paper separates the two courses. Over the vestibule floor, trapdoors, passageway and smoking room floors is a layer of 1-in. red and green checkered inlaid linoleum. The ladies' dressing room, ladies' toilet and main section of the car are covered with a green figured Wilton carpet, with one layer of felt underneath. The floor in the men's toilet is of Flexolith, reinforced with galvanized-iron wire screening. The side and end walls are insulated with two-ply salamander composition fastened to the outside sheathing.

A Federal portable vacuum cleaner has been provided. Two electric outlets for attaching this are available, one in the men's washroom and the other in the passageway at the forward end of the car. Folding tables are also a part of the equipment.

Sleeping Car Schedule Is Slow

As it is only 110 miles between Louisville and Indianapolis and the running time for a high-speed train is only 3 hours and 45 minutes, it was considered necessary to arrange a new schedule for the sleeping cars in order to bring them into the terminals at a reasonable hour in the morning. A car is ready for occupancy in either terminal at 9 p.m. At 11:30 it is coupled to the last regular train out of the terminal, and by operating on what is known as a "slow drag" the car has a quiet trip going south from Indianapolis to Scottsburg, which requires approximately 3½ hours and is approximately 50 minutes run from Louisville. Here the sleeping car is detached from the train and placed on a siding. At 6:10 in the morning it is picked up by the first train into Louisville, arriving at the terminal at 7:05. A similar layover is provided in the other direction. Passengers are permitted to occupy the car until 9 a.m. The price of a lower is $2.75 and the upper is $2.

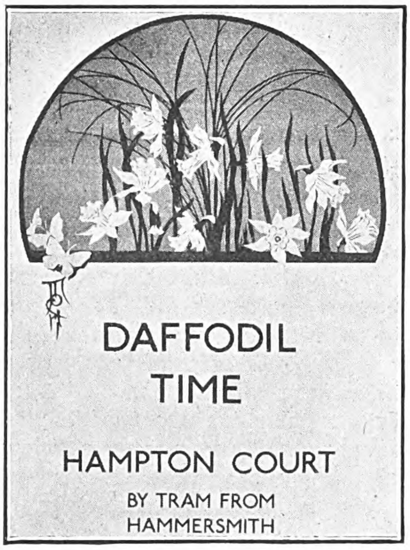


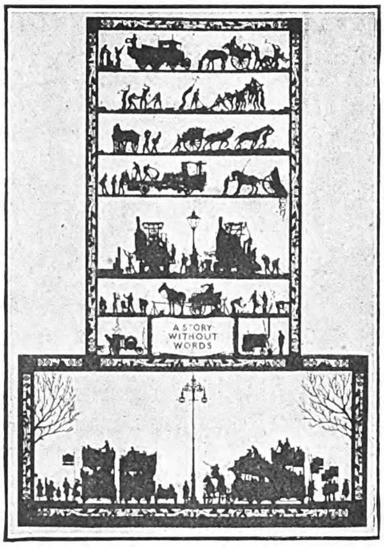
The Ladies' Dressing Room Contains the Latest Appointments, Including Two Sets of Three-Section Swinging Mirrors, Three Chairs, Washbowl and Dental Lavatory

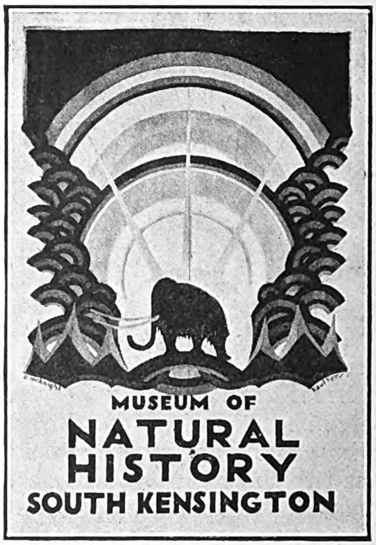
The public had opportunity to inspect the cars while they were in the terminals prior to the inauguration of the sleeper service. In order to give the operating staff an opportunity to perfect the service, the company waited until after the sleepers had been running for two weeks before doing extensive advertising.

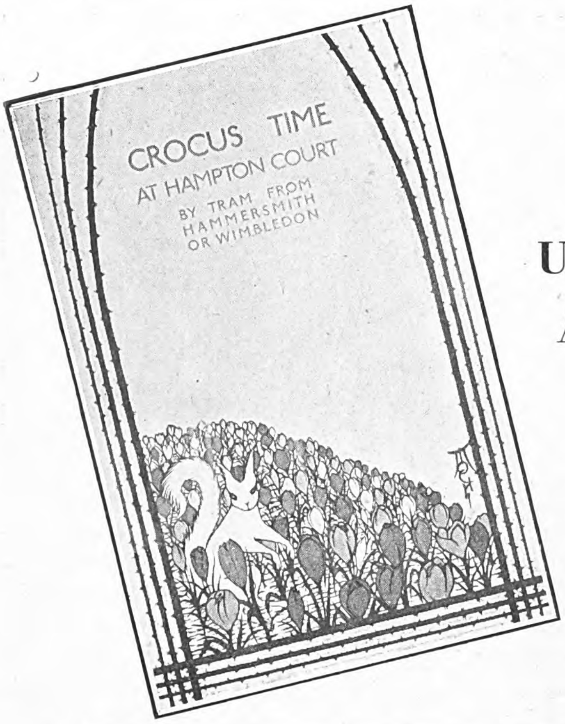
Acts as Entertainment News Editor

CLINTON D. SMITH, general manager of the Beaver Valley Traction Company, New Brighton, Pa., has found a new way of stimulating riding on the railway lines to reach entertainments, lectures and the like. This is the editing of a "What's Going On" department in the Beaver *Daily Times*, which lists the amusements, sports, and other public events. These items are gathered by the commercial department of the railway and published without charge by the newspaper.

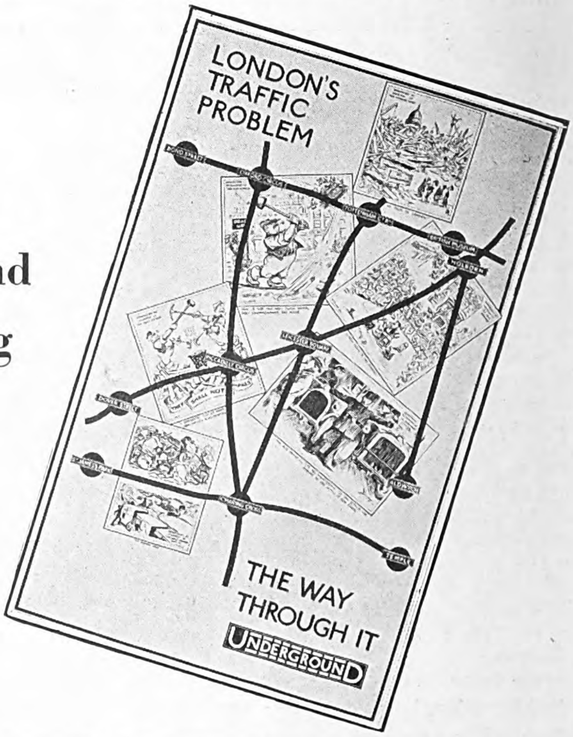

DAFFODIL
TIME
HAMPTON COURT
BY TRAM FROM
HAMMERSMITH

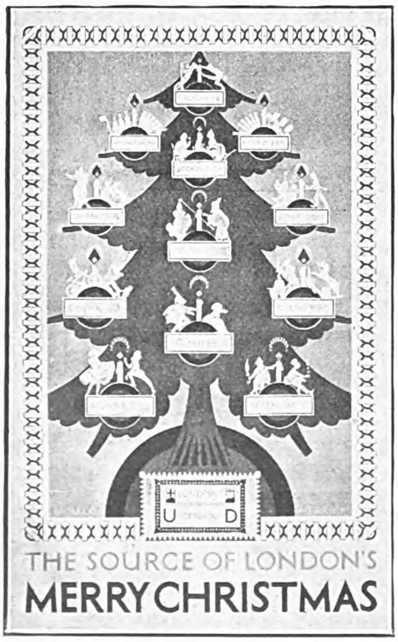

A STORY
WITHOUT
WORDS

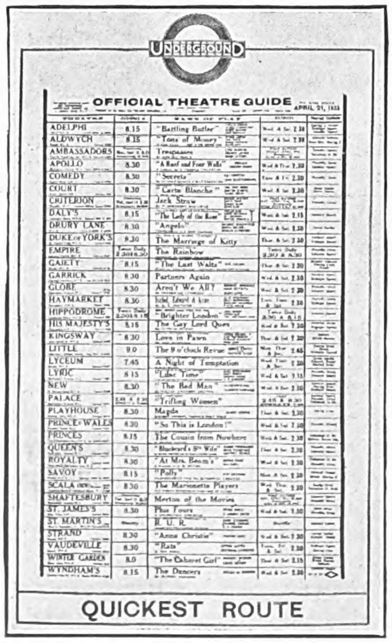

MUSEUM OF
NATURAL
HISTORY
SOUTH KENSINGTON

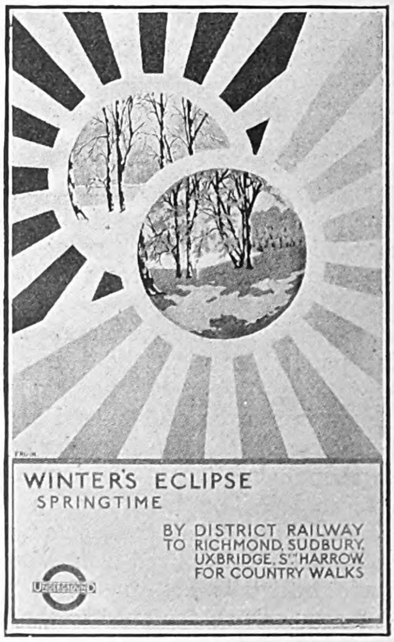

CROCUS TIME
AT HAMPTON COURT
BY TRAM FROM
HAMMERSMITH
OR WIMBLEDON

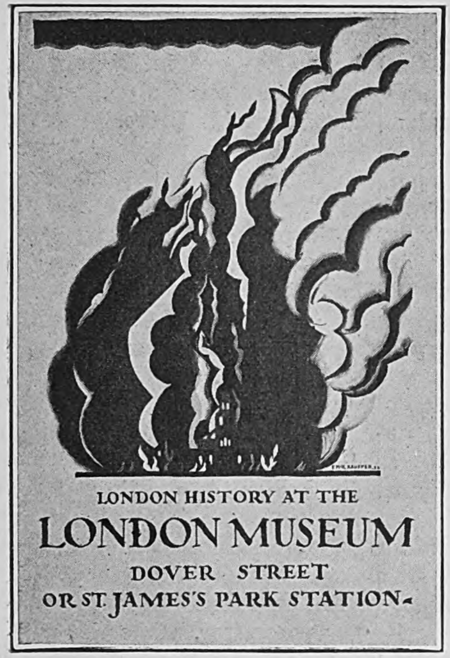
Recent
London
Underground
Advertising
Posters

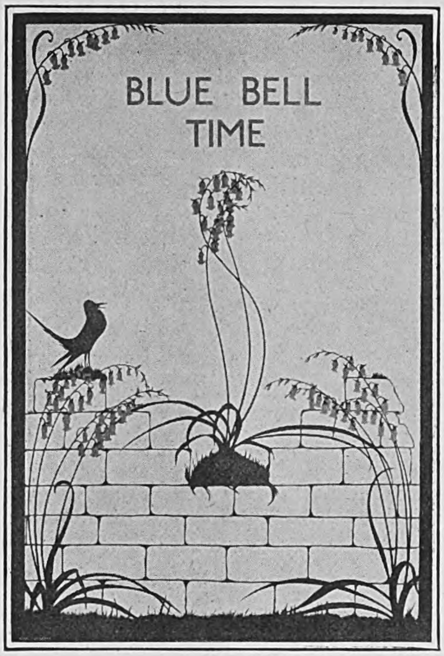

LONDON'S
TRAFFIC
PROBLEM
THE WAY
THROUGH IT
UNDERGROUND

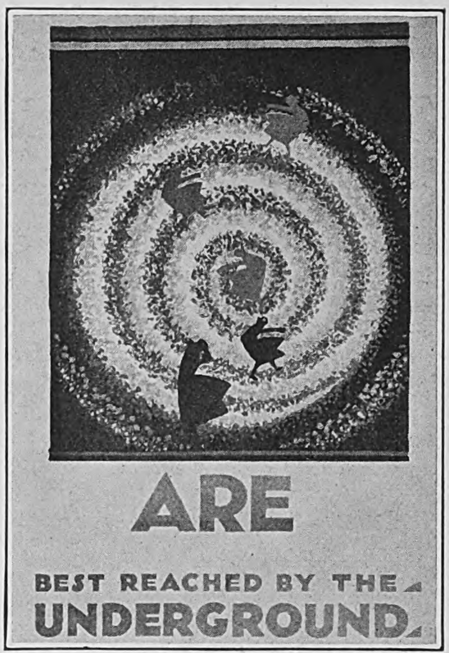

THE SOURCE OF LONDON'S
MERRY CHRISTMAS


UNDERGROUND
OFFICIAL THEATRE GUIDE
QUICKEST ROUTE


WINTER'S ECLIPSE
SPRINGTIME
BY DISTRICT RAILWAY
TO RICHMOND, SUDBURY,
UXBRIDGE, S.T HARROW
FOR COUNTRY WALKS


LONDON HISTORY AT THE
LONDON MUSEUM
DOVER STREET
OR ST. JAMES'S PARK STATION

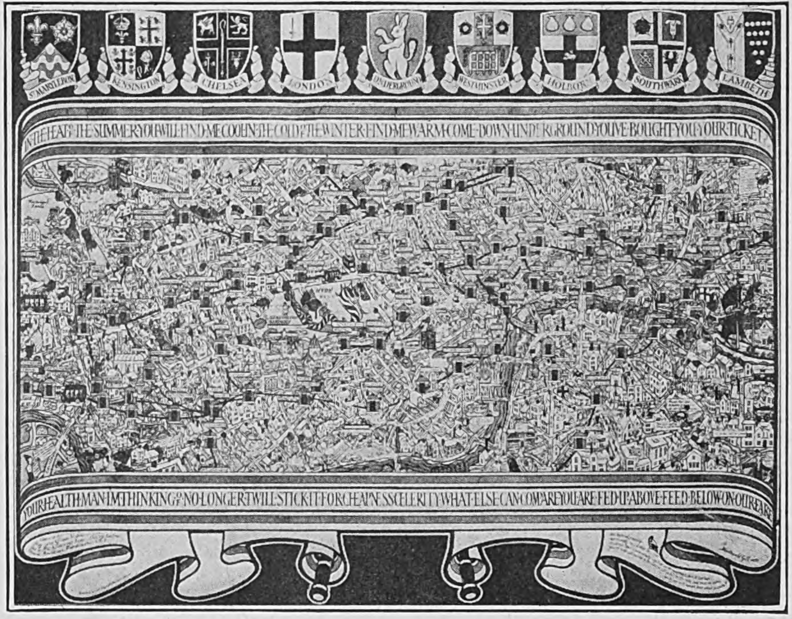

BLUE BELL
TIME

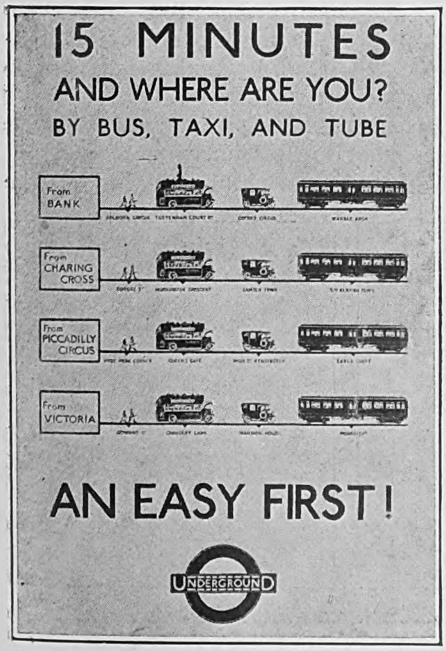

ARE
BEST REACHED BY THE
UNDERGROUND

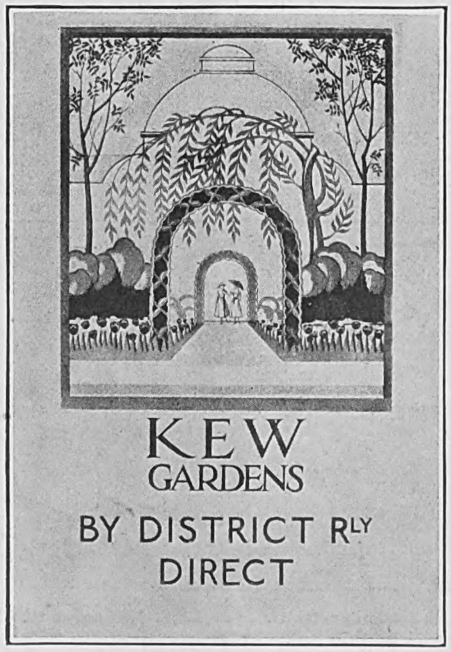
WHATEVER the message—advertising for traffic or to build public understanding and good will—the "Underground" of London seems to have a way of presenting it that tells much at a glance or has an especial appeal from sheer beauty. The reproductions here lose much of their effectiveness because they do not show the colors, but they give a good idea of the subject matter at least.

Aside from those whose attractiveness helps to "put over" the suggestion for seasonal riding, note the extent of the story that is told. The poster to the right gives a remarkable bird's-eye view of the location of all underground stations. The poster itself measures 50 x 39 in. Another shows the increased distance that can be covered in 15 minutes on the Underground as compared to walking or riding the bus or the taxicab. Another tells a construction story without a word and still another shows the way to overcome delays due to traffic.

We Americans, though greatly superior in the character of our general magazine advertising, nevertheless lag far behind these London railway men in our transportation advertising.


St MARYLEBONE
KENSINGTON
CHELSEA
LONDON
UNDERGROUND
WESTMINSTER
HOLBORN
SOUTHWARK
LAMBETH
IN THE HEAT OF THE SUMMER YOU WILL FIND ME COOL IN THE COLD OF THE WINTER FIND ME WARM COME DOWN UNDERGROUND YOU'VE BOUGHT YOU YOUR TICKET
YOUR HEALTH MAN I'M THINKING NO LONGER T'WILL STICK IT FOR CHEAPNESS CELERITY WHAT ELSE CAN COMPARE YOU ARE FED UP ABOVE FEED BELOW ON OUR EARTH


15 MINUTES
AND WHERE ARE YOU?
BY BUS, TAXI, AND TUBE
From BANK
HOLBORN CIRCUS
TOTTENHAM COURT Rd
OXFORD CIRCUS
MARBLE ARCH
From CHARING CROSS
CAMDEN TOWN
From PICCADILLY CIRCUS
QUEEN'S GATE
HIGH St KENSINGTON
EARLS COURT
From VICTORIA
CHANCERY LANE
MANSION HOUSE
AN EASY FIRST!
UNDERGROUND


KEW
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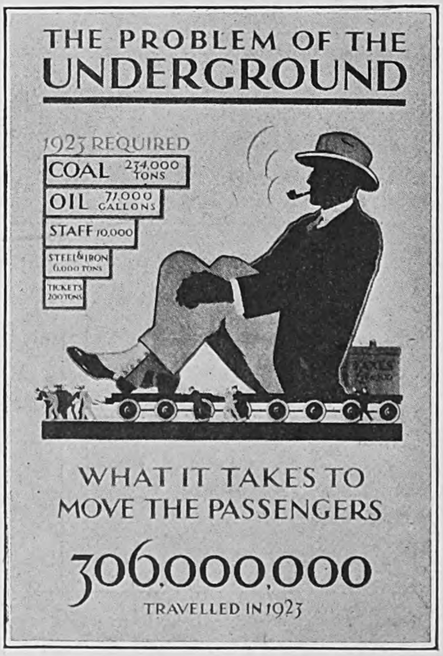

THE PROBLEM OF THE
UNDERGROUND
1923 REQUIRED
COAL 234,000 TONS
OIL 71,000 GALLONS
STAFF 10,000
STEEL & IRON 11,000 TONS
TICKETS 200 TONS
WHAT IT TAKES TO
MOVE THE PASSENGERS
306,000,000
TRAVELLED IN 1923

Analysis of New York Surface Transportation

THE accompanying two tables give in brief form the main factors with which to compare the operation of the street railways in New York City with that of the Fifth Avenue Coach Company and the municipal buses. They were prepared by John A. Beeler, consulting engineer, New York, and it may be said that the information is from reliable sources.

SURFACE TRANSPORTATION—MANHATTAN AND BRONX—YEAR ENDED JUNE 30, 1923. ANNUAL OPERATIONS

	Fifth Avenue Coach Company	Municipal Bus Estimated	Surface Railways
Operating revenue (a)	$5,710,557	$3,500,000	$28,626,829
Operating deductions (b)	$3,978,823	$3,018,000	$23,008,040
Taxes	586,223	376,000(c)	2,129,689
Total operating deductions	$4,565,046	$3,394,000	$25,137,729
Net earnings	$1,145,511	$106,000	$3,489,100

(a) Includes passenger revenue and other revenue from operations.
(b) Includes operating expenses and reserve for renewals and retirements.
(c) Estimate based on cost to Coach Company on a ton-mile basis in order to make a true comparison of operations.

The commodity which all three systems are selling is transportation and the method that delivers the most car-miles per car-hour has an advantage over the others. At present the street car is last, making but 7.16 miles, while the coach leads with 8.17.

Traffic on Fifth Avenue is given every advantage over the crosstown traffic under the present tower system. Another condition favoring the Fifth Avenue Coach Company is that its routes are in large part over thoroughfares free from intersecting streets, such as along Central Park and out Riverside Drive.

SURFACE TRANSPORTATION—MANHATTAN AND BRONX—YEAR ENDED JUNE 30, 1923. COMPARATIVE OPERATING STATISTICS

	Fifth Avenue Coach Company	Municipal Bus Estimated	Surface Railways
Passengers carried (revenue)	55,974,100	70,000,000	502,350,281
Passengers carried (transfer)	3,450,608	....	77,069,244
Passengers carried (total)	59,424,718	70,000,000	579,419,525
Per cent total surface passengers carried	8.4	9.9	81.7
Maximum vehicles in daily service	293	206	1,599
Average seats per vehicle	48	20	44
Revenue-miles	10,019,805	9,022,500	43,909,814
Revenue-hours	1,224,493	1,203,000	6,125,732
Miles per hour	8.17	7.50	7.16
Passengers per revenue-mile	5.92	7.76	13.20
Seat-miles per passenger	8.10	2.58	3.32
Average length revenue ride, miles	1.85	.90	1.41
Average per cent seats occupied	23	35	42
Cash rate of fare, cents	10	5	5
Receipts per passenger, cents	9.62	5.00	4.95
Amount per mile, cents	5.41	5.55	3.54
Operating revenue per hour	$4.67	$2.91	$4.68
Total operating deductions including taxes per hour	3.73	2.82	4.10
Net earnings per hour	.94	.09	.58
Operating revenue per mile, cents	57.0	38.7	65.4
Total operating deductions including taxes per mile, cents	45.6	37.6	57.3
Net earnings per mile, cents	11.4	1.1	8.1
Per cent operating expenses to total operating revenue	69.7	86.2	80.6
Per cent taxes to revenue	10.3	10.7	7.4
Per cent net earnings to revenue	20.0	3.1	12.0
Investment	$3,612,000	$2,500,000	$88,714,429
Investment per dollar of total operating revenue	$0.63	$0.72	$3.10
Investment per passenger carried, cents	6.1	3.6	15.3
Per cent return on investment	31.5	4.2	3.9

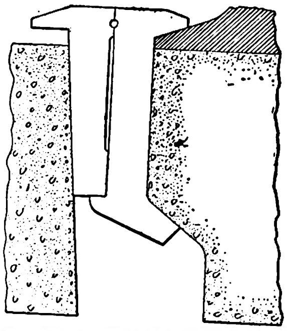
The municipal buses operate under much less favorable circumstances and are doing fairly well, making 7.5 m.p.h. Their operations are practically confined to short-haul crosstown routes in populous districts.

In order to make a true comparison of the operations, Mr. Beeler added taxes to the operating deductions of the municipal bus. As operated, however, this is not done and the buses actually enjoy an earning power of 13.5 per cent. The Fifth Avenue Coach Company earned 31.5 per cent. The street car, after all operating deductions including taxes, earned 3.9 per cent. With the street cars relieved of taxes, as are the municipal buses, they would show a net earning of 6.4 per cent, even under present low speeds.

Looking at the situation from another angle, the municipal bus with its short-haul riders and the Fifth Avenue Coach Company with its 10-cent fare average about 5.5 cents per mile per passenger, while the railway averages 3.5 cents.

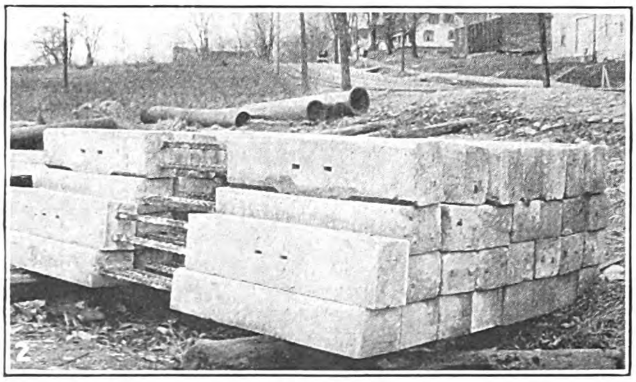
Concrete Ties Tried in Bangor

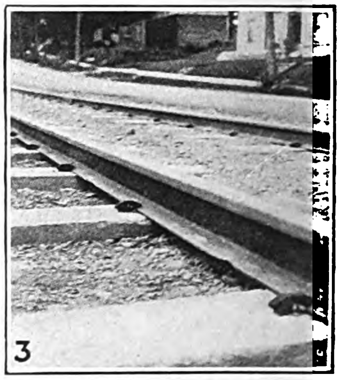
A TRIAL installation of reinforced concrete ties was recently made by the Bangor Railway & Electric Company, Bangor, Me. These ties are of unusual design, consisting of a rectangular block at each end and two steel connecting rods. The rectangular concrete blocks are of the same general cross-section as the ordinary wood tie, with beveled edges. The steel rods run throughout the length of the tie. Spike holes are made in the concrete when it is cast.


Detail of Spike and Spike Holes in Concrete Ties

The rail rests directly on the concrete, to which it is fastened by a spike of special design. This spike secures its grip by hooking under a in the lower part of the tie. projecting edge of concrete Driving the spike is facilitated by making it in two parts, which are inserted successively. After being inserted, the two parts are held in place by a cotter pin, as shown in the accompanying sketch.

Thirty ties of this type have been installed on the





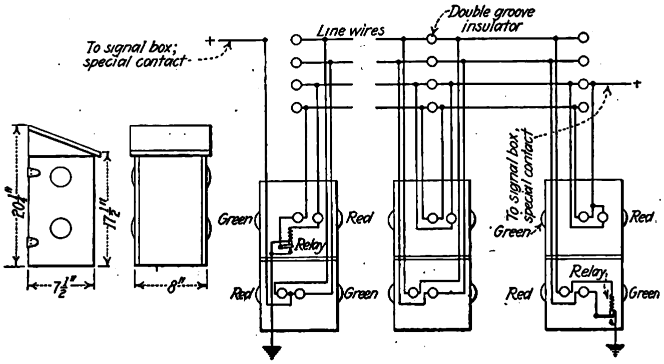
No. 1. Trial Installation of Concrete Ties on the Bangor Railway & Electric Company. No. 2. The Ties Are Made of Concrete Blocks Connected by Steel Rods. No. 3. The Special Spikes Used Are Made in Two Parts Held Together by a Cotter Pin

Hampden line on private right-of-way, under the supervision of E. W. Jennison, engineer maintenance of way. The ties are manufactured by the Maine Concrete Tie Corporation, Corinna, Me. They present a neat and attractive appearance, and so far as casual observations show, they make a track structure with about the same riding qualities as track built with wood ties.

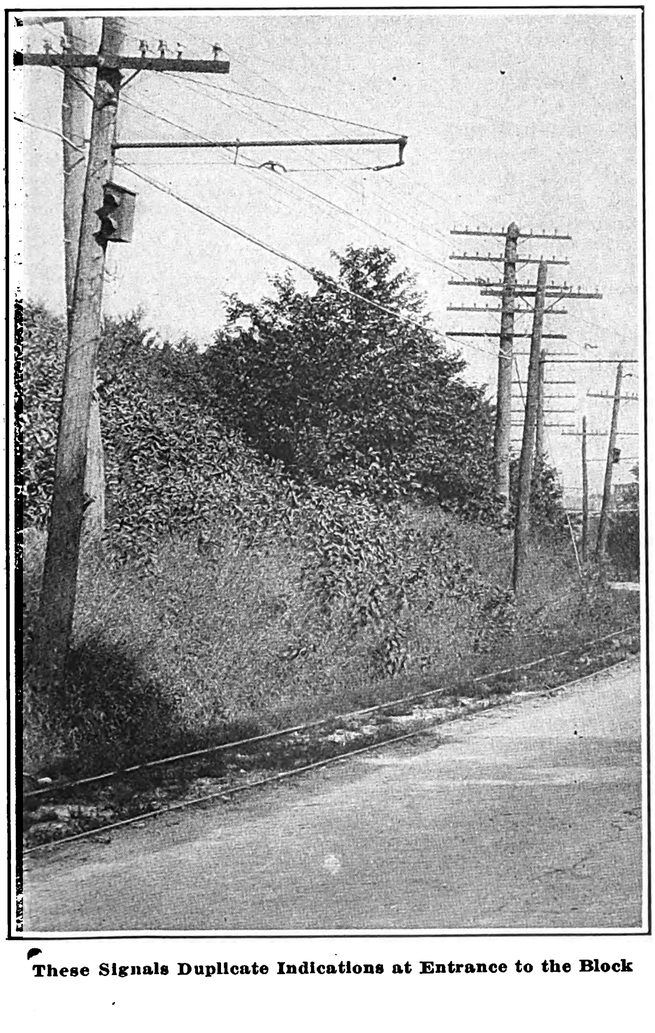
Duplicate Signal Protects Blind Curve

ON A DANGEROUS stretch of single track where there is a combination of blind curve and steep grade on the lines of the Androscoggin & Kennebec Railway, Lewiston, Me., protection is afforded by a duplicate signal system. Several accidents have occurred at this point, and investigation showed that confusion existed at times in the matter of signals.

Chapman registering signals are standard on this railway. In the rush hours, however, trippers operate through this stretch of single track in groups of four or five. As these cars follow one another rapidly past the signal contactor it is difficult to tell whether all cars register properly. In case the last car fails to register, it is, of course, left unprotected in the block as soon as the preceding car has cleared the signal. Under these circumstances, the car on the single track being out of sight around the blind curve, an opposing car might enter the block.



Connections of End Signals and One Intermediate Signal



These Signals Duplicate Indications at Entrance to the Block

To eliminate this danger the railway has installed auxiliary signal lights at two points on the curve. Each auxiliary signal contains a red and green light electrically connected to the main signal system. When the registering signals are set for an outbound car in the block, green lights show in the auxiliary signals. If a motorman has failed to set the signal when entering the block these lights will not be burning. If by chance he should be in the block running against an opposing signal the auxiliary lights will be red. In this way, motormen after entering the block are reminded of the signals and know whether they are proceeding in safety or not.

The signal boxes were built by the railway at the suggestion of the Chapman Company. There are four circuits in each box, two for each light. An arrangement has been made whereby a relay closes the second circuit if the first burns out. This installation has saved the necessity for double-tracking this portion of the line.

The Readers' Forum

Comment on Foreign Committee Report

THE INTERNATIONAL REGISTER COMPANY

CHICAGO, ILL., Oct. 23, 1924.

To the Committee:

Not until this morning have I had an opportunity of glancing at your report, but I have the very handsomely gotten up pamphlet reprinted from the ELECTRIC RAILWAY JOURNAL of Sept. 20, 1924, and I have spent an hour or more this morning glancing it over and am now starting on a thorough reading of it.

First of all, it is evident from your itinerary trip on page 114 that this was no junket, and you fellows surely did lay out a hard road to travel and evidently traveled it. It seems to me that this extended and complete report of yours is pretty nearly a classic and is something that is going to be read very carefully and sometimes several times over by those having any interest whatever in transportation problems.

I think you are to be congratulated most heartily on this most wonderful report. It shows not only the diligent study and careful inspection of what you saw but that you have the ability and have used that ability to put the facts before us in such readable form and yet so thoroughly condensed.

JOHN BENHAM,
Vice-President.

From 300,000 to 400,000 miles without turning is obtained on the wheels of London Underground trailers by using "feroda" asbestos brake lining for the brakeshoes. Three or four layers of this material are bolted on to cast-iron backs held on the brakeshoe head in the usual way.

Association News & Discussions

New Englanders Resume Activities

The Program at Boston Last Week Featured Maintenance, Education and Bus Application

THE first meeting of the New England Street Railway Club this season, held on Oct. 30, attracted a large attendance on account of the diversity of topics included and the caliber of the speakers. Afternoon and evening sessions were held at the Copley Plaza Hotel, Boston, President Thomas Kendrigan being in the chair.

At the afternoon session W. C. Bolt, superintendent of rolling stock and shops Eastern Massachusetts Street Railway, Boston, presented a striking paper on "A Comparison of Maintenance Costs of Old and Modern Car Equipment," giving the results of the application of improved methods with increased production and lessened costs at the shops of this important system, and this was followed by a paper by H. N. Ransom of the Railway Improvement Company, New York, on "The Lubrication of Railway Motors." Abstracts of these papers appear elsewhere in this issue.

Following the usual dinner, Edward Dana, general manager Boston Elevated Railway and chairman of the educational committee of the A.E.R.A., gave a short talk on "Education"; A. E. Potter, president United Electric Railways, Providence, R. I., read an extended paper on "The Co-ordination of Motor Vehicle and Electric Railway Service by Electric Railways," and R. D. Hood, general manager Massachusetts Northeastern Street Railway, Haverhill, Mass., spoke on "Observations at the Recent A.E.R.A. Convention." Mr. Potter's paper is published in abstract on another page.

In his talk on education, Mr. Dana pointed out that through proper training in industry, many a "round peg can get out of a square hole" and find increased usefulness in congenial and well-fitted tasks. He outlined the work of the American Electric Railway Association during the past three years in the educational field and said that this movement, like the original "safety-first" movement, is slowly making headway but is surely gaining speed and scope. Many agencies are available to help utilities in this work, and some of the larger companies are big enough to set up their own educational activities. At present the success of a good deal of publicity work is spoiled by the ignorance of employees. The speaker paid a tribute to the pioneer work of the Milwaukee company and commended the educational activities of the operating organizations at Fort Worth, Tex.; San Francisco and other places. He also referred to a useful pamphlet, printed by the A.E.R.A. educational committee, and entitled "Starting Educational Work on the Electric Railway."

Mr. Dana described briefly the work of the Boston company in the educational field. Several hundred men have taken courses under the auspices of the Massachusetts Department of University Extension during the past two years on the Boston system. This year 600 men are enrolled, and group conferences are planned at which talks will be given on various aspects of the company's departmental activities. Thus, in the maintenance group there will be a rolling stock session with talks on car-body painting and car repairs, and in the transportation department the fundamentals of operation will be set forth by qualified speakers. Each year in May there is a dinner at the end of the course, and the students have been addressed on these occasions by no less personages than the presidents of the Massachusetts Institute of Technology and Harvard University. The day will come, Mr. Dana said, when the Boston company will have its own educational director.

The educational committee does not propose to be a taskmaster to the industry, but merely to help in this work of organized instruction. In this connection Pennsylvania State College is preparing a practical, common-sense publication which will give in clear terms the fundamental economic principles of the public utility business.

Reducing Maintenance Costs*

Notable Savings in Cost and Greatly Increased Mileage per Pull-In Are Effected Through the Use of Modern Equipment

By W. C. Bolt
Superintendent of Rolling Stock and Shops
Eastern Massachusetts Street Railway

THERE is a great difference between the service demands today and those of 10 years or even 5 years ago. Our standard of service efficiency has been greatly increased within recent years. We believe that on our property we have in a large measure met the new service demands of the riding public, and we are now able to operate approximately 1,700,000 electric railway passenger car-miles per month with approximately 100 car failures, resulting in car pull-ins.

It has become necessary in recent years to add a great many detailed equipment parts, including pneumatic door-operating equipment, folding doors, heat-regulating equipment, variable load brake equipment, destination signs, emergency air-brake equipment, air-sanding equipment, pneumatic snow scrapers, better lighting equipment, electric contactors and many other refinements. All of these parts necessarily require careful inspection, attention and maintenance. We cannot regard the cost of maintaining the modern car in the same light as the cost of maintaining the old simple car. It is wise business policy to provide each year some new equipment and replace old equipment which has become obsolete. Yet by scientific study the cost of maintaining our present modern cars has been reduced to a very low figure.

Our cost of car maintenance since 1918, in cents per revenue car-mile, is given in the accompanying table. This cost excludes all fixed charges, such as depreciation and retirement of equipment, and represents only the following Interstate Commerce Commission accounts:

29—Superintendence of equipment
30—Maintenance of car bodies, trucks and air brake equipment
32—Maintenance of brakes and service cars
33—Maintenance of electrical equipment
36—Shop tools
37—Shop expense
39—Miscellaneous equipment

The average age of our car equipment, as of Jan. 1, 1920, was 12 years, some cars being 22 years old. The average age of our passenger equipment as of Jan. 1, 1924, was 7 years, there having been added to our complement of equipment within the last 4 years 225 safety cars and 75 double-truck, light-weight cars.

Our maintenance figures, as given in the table, include the cost of maintaining our rather extensive fleet of snow-fighting and service equipment, comprising 11 double-truck service cars and 114 snow-fighting units, of which 84 are double truck and 30 single truck. The expenditure for the year 1923, for instance, for rehabilitation of snow-fighting equipment was $103,000.

We likewise include in these expenditures all indirect expense at our two major shops, such as services of watchmen, janitors, firemen, the expense of heating the shops, cost of a.c. power for operating machinery and the d.c. trolley power used in the shops on a basis of 2 cents per kilowatt-hour. The figures also include the cost of inspection of equipment at carhouses, sometimes charged to the operating group of expenditures. On the Eastern Massachusetts Street Railway this expense is considered a part of the maintenance of equipment group and represents approximately 0.7 cent per car-mile.

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*Abstract of paper presented at a meeting of the New England Street Railway Club, Boston, Mass., Oct. 30, 1924.

While the cost of maintaining our equipment as a whole is now 3½ cents per car-mile, we have some divisions where this cost is only 1.6 cents per car-mile. This figure, by the way, represents the actual cost of maintaining 10 standard Birney safety cars for a period of 44 months. These 10 cars during this period have made approximately 1,200,000 car-miles. Each car has had two complete shop overhauls and painting, one at the end of 60,000 car-miles and another at the end of 120,000 car-miles and each car is today in first-class mechanical condition. In other words, there is no deferred maintenance on these 10 cars. The cost of 1.6 cents per car-mile may be classified as follows:

	Cents
Carhouse inspection labor per car..........	0.425
Replacement of rapidly wearing parts at car houses..............................	0.250
Shop expense, including overhaul and paint..	0.925

We define a car pull-in as "any car removed from service prior to completion of its regular prescribed run, for any mechanical or electrical failure." In July, 1920, we had 222 cases of air brake failures, 180 cases of controller failures, 339 cases of hot bearings, 101 cases of wire and cable failures, and numerous others, aggregating a total of maintenance pull-ins of 1,489, or a pull-in for every 1,400 miles. In September of this year we had a total of 104 car pull-ins, or one pull-in for every 14,500 miles. Even now we have a wide variation as between our several divisions. One of our larger divisions is now operating 75,000 car-miles for every car pull-in. These two illustrations clearly demonstrate the changed conditions. The table also gives the car-miles per maintenance pull-in from 1920 to date.

In July of 1920, when we operated a large proportion of old type equipment, we employed 346 so-called "carhouse employees," this representing one employee for every 6,000 passenger car-miles. At present our carhouse organization comprises 132 employees, or one employee for every 12,000 car-miles. Similarly at our major shops in July of 1920 we employed 447 employees, or one employee for every 4,700 passenger car-miles. Today we are employing 188, or at the rate of one employee for every 8,400 car-miles.

METER RECORDS AND OTHER IMPROVEMENTS

Early in 1921 it was decided to place our car maintenance on a systematic basis, and power meters were installed on each active car equipped with so-called "inspection dials." These inspection dials have materially assisted us in determining promptly and at minimum cost when individual cars become due for attention.

In 1921 we established a shop overhaul schedule of 30,000 car-miles. This was later increased to 45,000 car-miles. As rehabilitation of our equipment and materials of more suitable design and size were installed, the overhaul interval was later changed to 60,000 car-miles, and now all of our modern equipment cars are overhauled on a basis of 75,000 car-miles.

TABLE SHOWING DATA ON CAR MAINTENANCE, EASTERN MASSACHUSETTS STREET RAILWAY

	Total Charges to Car Maintenance, Exclusive of Depreciation and Obsolescence	Cost of Car Maintenance, Cents per Car-mile	Wage Level, Cents per Hour	Average Maintenance Pull-Ins per Month	Car-Miles per Maintenance Pull-In
1918	$1,361,000	5.02	37.0	......	......
1919	1,485,000	5.70	48.0	......	......
1920	1,418,000	6.20	58.0	1,203	1,550
1921	915,000	4.63	57.0	869	1,884
1922	857,000	4.42	54.5	414	4,035
1923	797,000	4.06	56.0	248	6,745
1924*	650,000	3.54	58.0	163	9,638

* First nine months of year.

NOTE—Figures for car maintenance include cost of car overhauling and repainting.

Our car maintenance today is carried out according to this schedule, and we are able through this means to maintain our equipment efficiently and at minimum cost. We have planned our work so that our organization is kept at a constant size, thus assuring the highest standard of work on the part of each workman. Each man is a specialist in his particular duties and he has no fears that he will shortly be without a job.

This plan has enabled us to reduce our carhouse requirements for small, rapidly wearing parts from a total of $190,000 in 1921, or approximately 1 cent per car-mile, to $87,000 for the year 1924, or less than ½ cent per car-mile.

Modern practice, together with modernization of equipment, has contributed largely to our substantial reduction in armature failures. In 1920 we were having armature failures at the rate of 500 per month. These failures were largely on motors of the old types, including GE-67, GE-80, GE-57 and GE-1,000, these representing 12 per cent of the total motors in service which failed during the one month period. At present our failures aggregate 65 or 70 per month, or 1.7 per cent of the total in service.

In 1920 we operated less than 5,000 car-miles per armature failure. Now we operate approximately 30,000 miles per armature failure, and this record could be substantially increased if these failures should be burdensome. It still is our practice, however, to run some of our armatures to the point of breakdown, thus securing maximum life of the armature winding. Every armature on our property is dipped and baked and thoroughly tested every 60,000 or 75,000 car-miles, and this procedure has very materially decreased our armature troubles.

Similarly, thorough examination, testing, dipping and baking of field coils every 75,000 car-miles has reduced our field coil failures from some odd 300 per month in 1920 to practically 100 per cent performance. As a matter of fact, we have not purchased any new field coils for some two or three years.

Modernization of our air brake equipment has produced results. In 1920 we had an average of 80 AA1 air armature failures per month, this representing approximately 12 per cent of the total number of AA1 air compressors in service. Today an air motor armature failure is practically unknown.

Substantial progress has been made in the matter of car lubrication. In 1920, with a larger proportion of old type equipment, we were using at the rate of from one to 1¼ gal. of car oil per 1,000 car-miles. We are now using less than ½ gal. of car oil per 1,000 car-miles. I think, however, that our lubrication methods are still crude and that further progress can be made in this direction, not only for savings in oils and greases, but also in bearings themselves. Dust and dirt today are responsible for a great deal of wear in armature and axle bearings, and as soon as bearing housings are so constructed as to keep dirt and grit from getting into the wearing surfaces further savings will be possible, this affecting not alone oil and bearings, but also the rotating shafts. When this has been accomplished, we may expect perhaps 150,000 or 300,000 car-miles per set of axle and armature bearings, as distinguished from the 75,000 car-miles which we are now securing on our modern motors.

To overcome frequent resistance failures on our safety cars we have, within the past two years, installed the resistance on the roof of the car, and during the past winter we had no resistance trouble on cars which had been so arranged.

We believe in frequently repainting our cars, but by the paint-spraying system our repainting costs have been substantially reduced. We have always felt that the light yellow color with which our cars were painted has made the cars easily visible and has had a tendency of avoiding a great many accidents.

Within the past year we have removed cumbersome draw bar and fender apparatus from our cars. This has tended to eliminate at least some of the ordinary rattles and has also saved some weight.

Welding equipment has played an important part in our campaign of cost reduction. Many equipment parts are constantly being repaired and the purchase of new parts has been avoided. A great deal of welding has been done on our car trucks, so that they now operate with less noise and rattle than heretofore.

DOUBLE-TRUCK, LIGHT-WEIGHT CAR

This discussion would not be complete without mention of the so-called "double-truck, light-weight car." We cannot always justify the purchase of new equipment entirely through anticipated savings in the cost of maintenance. This is particularly true with light-weight cars. While some savings in maintenance may be expected, the larger savings accrue from reduction in power consumption and the lessened wear and tear on tracks. The latter two items of saving should easily pay for the fixed charges on the new investment. Our records indicate that the total cost of maintaining a double-truck, light-weight car, weighing perhaps 32,000 lb. and equipped with four 25-hp. motors, together with all of the other modern appurtenances, would be in the neighborhood of 2 cents per car-mile for the first 100,000 car-miles. This figure would include the reconditioning of each car at the end of this mileage interval. If we did not include the cost of reconditioning, the cost would be approximately 1.2 cents. During the second cycle of 100,000 car-miles this cost would be slightly increased.

I attribute the success of the Eastern Massachusetts Street Railway and its present wonderful financial stability in no small part to the savings made in our maintenance of equipment as outlined. Modern equipment systematically maintained will result in efficient and uninterrupted service to the public and in low cost of maintenance.

Seven Kinds of Bus Operation*

United Electric Railways of Providence Has Already Undertaken Five Different Classes of Service—Direct Profit Is Not Expected—Chartered Buses Are Good Revenue Producers

By A. E. Potter
President United Electric Railways, Providence, R. I.

When the United Electric Railways formulated a program for the operation of buses it had seven plans of operation in view. The transportation system in Providence radiates from the center of the city like the spokes of a wheel, with Pawtucket and Woonsocket lying to the north and having similar radiating lines. Cranston is to the south and Arctic and the rest of the Pawtucket Valley to the southwest.

Plan No. 1 was to provide both local and express service, either the buses furnishing the local service and the electric cars running express, or vice versa. This method has been adopted on Broadway between the center of Providence and Olneyville Square. [See Electric Railway Journal for March 15, 1924.] The Broadway bus line shows earnings of 36.02 per cent per bus-mile for the nine months ended Sept. 30, 1924, and indicates what may be expected of bus operation on lines where there is some density of traffic.

Operation of cars running local between Providence and Pawtucket and buses running express was also considered. Pawtucket is a community of some 75,000 people, lying about 4 miles to the north of Providence. The reasons for considering a different arrangement were that the car lines between Providence and Pawtucket terminate in Pawtucket, and that four car lines operate to Pawtucket, branching out in four directions after leaving Providence. It was planned to reverse the Broadway operation and run the electric cars local and the buses express. Nothing has been done in inaugurating this type of service because part of the highway over which the electric cars operate has been widened and passing tracks installed and express electric car service established. [See Electric Railway Journal, July 12, 1924, page 45.]

Plan No. 2 was to provide direct interurban limited stop express bus service or to supplement electric car service on high-speed interurban lines which stop only at stations. A direct limited-stop express service has been put into operation, known as the Arctic bus line. Arctic is a community in the center of a mill settlement of more than 15,000 inhabitants, approximately 10 miles from Providence. There are also other settlements along the car line between Providence and Arctic, and to serve these other settlements the line takes a somewhat circuitous route. This is shown by the fact that the running time of the car is 70 minutes, against 40 minutes for the express bus.

There are independent jitneys operating on this line, this time being the one instance where the Public Utilities Commission granted the petition of several jitney operators for certificates of necessity. The decision was based on the fact that this route paralleled no tracks and the jitney route was established before the United Electric Railways began bus operation.

At first a street car type bus was operated. However, on March 4, 1924, three parlor car buses were put into operation and the patronage on this line increased considerably in a short time. But the mill depression, which has been particularly severe in Arctic and the vicinity, has of course been reflected in the revenue. Recently some of the independent operators who had been operating built-over touring cars have substituted 20-passenger buses. This bus line, with earnings of 24.22 cents per bus-mile for the nine months ended Sept. 30, 1924, should be one of the best paying bus lines operated by the company, and would be were it not for the fact that jitneys leave just ahead of the buses of the railways. There does not seem to be sufficient business for all and it is a question which can survive the longer.

The United Electric Railways is operating buses to supplement its car service on a high-speed interurban line between Providence and Oakland Beach, approximately 12 miles in length. The car line operates for a great part of the distance over a private right-of-way and stops only at stations. There are, however, scattered colonies along the line and in many instances a walk of a mile or more is necessary to reach a station. This bus line parallels the car line, following the state road, and passes through the several scattered colonies which are not served by the high-speed electric car line, cutting across country and crossing the electric car line at three points. Buses stop on signal. The colonies along both these lines are essentially summer resorts and in the winter both car and bus service is considerably reduced.

This bus line for the nine months ended Sept. 30, 1924, earned only 24.50 cents per bus-mile in the winter months except for the fact that it serves territories that are more or less remote from the trolley stations. In the summer it shows earnings in excess of 32 cents per mile.

Plan No. 3 was to furnish auxiliary service on heavy riding car lines. This type of operation has not been put into effect although it has been considered. Such lines may be relieved in the downtown congestion by supplementing the car service with bus service and using streets for loading where there are no tracks.

Plan No. 4 was to furnish auxiliary bus service on lines where the present car service has outgrown the existing turnouts, and where the street is not sufficiently wide to permit of double-tracking. As yet nothing definite has been done by the company in carrying out this program, although it has been considered in connection with two single-track lines on which it was becoming difficult to operate cars on schedule during the rush hour. The business depression, however, has lightened the traffic on these lines to such an extent that for the present it is not necessary to consider bus operation.

Plan No. 5 was to replace suburban car service with bus service where such lines are not earning sufficient revenue to take care of construction and renewal charges of track, overhead lines and substations. The United Electric Railways' greatest development in the bus field will shortly be in operating buses where car service has been abandoned. As an illustration of such operation the Pawtuxet-Lakewood line, slightly more than a mile in length and connecting the end of one line 5 miles out of Providence with a point about 5 miles out on another line 13 miles long, never paid the full cost of operation. The tracks for a part of the route were along the state highway and the State Board of Public Roads notified the company that the state intended to rebuild the highway. This would have necessitated renewing a portion of the track, at a cost in excess of the price of a modern 29-passenger bus. Accordingly, the company took up its track and substituted bus operation, thus reducing the losses on this line. This bus line earns only 5.50 cents per bus-mile.

Car service will be abandoned shortly on the Woonsocket-Nanville line, approximately 6 miles in length. The line is a rather circuitous route, with a mileage of 5.93 against 3.40 for the bus. Permission has been obtained for the operation of this line, but the company has been waiting for the highway over the proposed route to be rebuilt.

Two other suburban lines, the Providence-North Scituate and the Barrington-Warren and Bristol, have operated at a heavy loss for some time. Buses are now on order for operation on these lines and deliveries are expected early in November. As soon as the buses arrive operation will be started.

Plan No. 6 was to provide feeder bus service in territories which have no car facilities, but which are not sufficiently developed to warrant the capital expenditures necessary for track and overhead lines. One such bus line, the Pawtuxet-Warwick Downs, is in operation. It is approximately 1¼ miles in length and serves a summer colony. Only a few trips night and morning are run in the winter, although all-day service is given in the summer. Previous to inauguration of bus service, the residents had no transportation service whatsoever, either summer or winter, except what they could provide for themselves. This bus line showed earnings of 12.02 cents per bus-mile for the nine months ended Sept. 30, 1924, although in the summer months it shows earnings of about 20 cents per bus-mile.

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*Abstract of a paper before the New England Street Railway Club, Boston, Mass., Oct. 30, 1924.

Plan No. 7 was to provide crosstown bus service to connect up existing car lines or to provide a means of transportation between two or more communities each in the same section of the city where there is a community interest, but which communities cannot be reached by cars except by taking a roundabout way through the center of the city. One such bus line is in operation in the outer district of Providence, known as the Olneyville-Eddy Street crosstown line. It is located about 2 miles outside the business center of Providence and operates from Olneyville to Eddy Street, a distance of 2½ miles. It crosses six existing car lines and connects with a car line at each terminus of the line. At both termini of the line there are a number of mills and factories. Many of the workers in these mills and factories live along this bus route or continue their journey on one of the electric car lines which the bus route crosses or connects with. Transfers are issued to and from the electric cars and buses on this particular operation. The line for the nine months ended Sept. 30, 1924, shows average earnings of 31.12 cents per bus-mile.

The United Electric Railways has not found that the bus business is profitable, as is indicated by the earnings on the lines as a whole. The Broadway bus line and the Eddy Street crosstown bus line are more than meeting the cost of operation. Other of the bus lines are not meeting the cost of service, nor was it expected that they would at the time they were inaugurated. The Pawtuxet-Warwick Downs, Providence-Oakland Beach and Providence-Arctic lines were put on to serve territory that was not served by the cars or that could be served better by buses. The Scituate and Barrington-Warren and Bristol bus operation is to be operated to reduce the losses due to heavy track maintenance.

The company has just offered some of its bus equipment for special or chartered bus service. It was believed that spare bus equipment might be profitably used for this type of service and this belief is borne out by the fact that in the month of September, 1924, the earnings were 83.15 cents per bus-mile. However, due to the irregularity of the demand for this service, the investment charges for equipment used in this service would be excessive were it not for the fact that this extra equipment is used from time to time in regular service.

Most of the non-paying bus lines and car lines act as feeders to the rest of the system, so that the car rider on the profitable lines is not actually obliged to pay any substantial sum on account of the rider on the unprofitable lines. Provided the operation of these non-paying car and bus lines is not overdone, it constitutes one of the advantages to the car rider and the community of a unified system of transportation, with a co-ordination of electric car service and bus service.

Obtaining Longer Life from Motor Bearings*

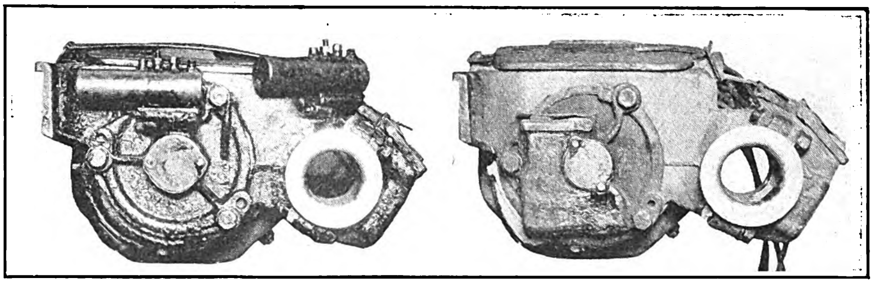
Important Maintenance Considerations Include Keeping Bearings Tight in Housings or Motor Frames, Keeping Out Dirt and Water and Providing a Moving Oil Film in Bearings

By H. N. Ransom

Sales Manager Railway Improvement Company, New York, N. Y.

At the recent convention of the A. E. R. A. at Atlantic City, I was admiring the bearings of a railway motor and I asked the designing engineer this question: "If that motor was operating under load in this clean hall, and a can of oil was suspended over it, dropping oil every few seconds into the bearing housings, how long do you think the motor would run?" His answer was: "Longer than you and I will live."

When I inspected another exhibit showing a side roller bearing, I was told by the engineer that they did not lubricate these bearings, due to the fact that oil or grease would collect dirt and grind the bearings out.



At Left, New Design of Axle Cap with Bearings Turned to Use a Solid Lower Half. At Right, Original Axle Bearing Arrangement

We all know that power-house apparatus and all types of stationary motors will run for years, and the bearings never seem to wear out. Last week I saw such a motor that had been in operation more than 20 years. If any engineer is asked why these bearings last longer than railway motor bearings, the answer always is: "Look where the car motor operates in all the dirt and water." If that is so, then how are the excellent results that are obtained from the bearings in air compressors accounted for? They are subject to exactly the same conditions as a railway motor. Why should one big railway spend in one year for motor bearings $22,300 and use only six bearings in its air compressors?

Did you ever stop to think that the four bearings in your motors must be true and the clearances held to a minimum so that motor axle and shaft will be in line and operate under the conditions for which the engineers design it? There are four bearings in the transmission case of your automobile, and you all realize that all these bearings must be O. K., and not just two of them.

Careful attention is given to the armature bearings of railway motors due to the fact that the air gap tells the story, and it costs big money if the armature goes down on the pole faces; but how about the wear on axle bearings? Are they given the same care and attention?

The gear and pinion manufacturer has a perfect right to expect his gears and pinions to be operated within a safe margin for clearances of bearing wear. Loose axle bearings are as dangerous to gears and pinions as are loose armature bearings. From a half to two-thirds of the mileage of motors is lost by axles and shafts being out of proper alignment.

You are all 100 per cent on dipping and baking. Then why lose the good from such a process by allowing a hammer blow that will take place when the gear and pinion are not properly in mesh? These blows will loosen any armature coil and reduce the benefits from dipping and baking. I would suggest that you take your shop men out in one of your cars, operate it on a hilly route, open up the trapdoors, remove the gear case and watch what happens when the axle bearings and caps are worn and loose. An object lesson of this nature is often worth hours of talk.

Motors are manufactured with a clearance between the shafts and bearings to take care of metal expansion and to allow room for the oil. An armature shaft does not revolve on a bearing. It revolves on a sleeve of oil that in reality can be considered as a liquid bearing. How wonderful it would be if some one discovered a process whereby you could pour metal in a housing and form a new bearing without the great expense that is necessary to bring the motor into the shop and open it up. In one sense that is just what can be done with oil, if the sleeve of oil is not broken or destroyed by water. The oil sleeve keeps the shaft off of the bearing, and it is cheaper to wear out the oil than the bearing. To obtain maximum bearing wear, this sleeve of oil must be maintained and the shaft protected from pounding and wheel wash.

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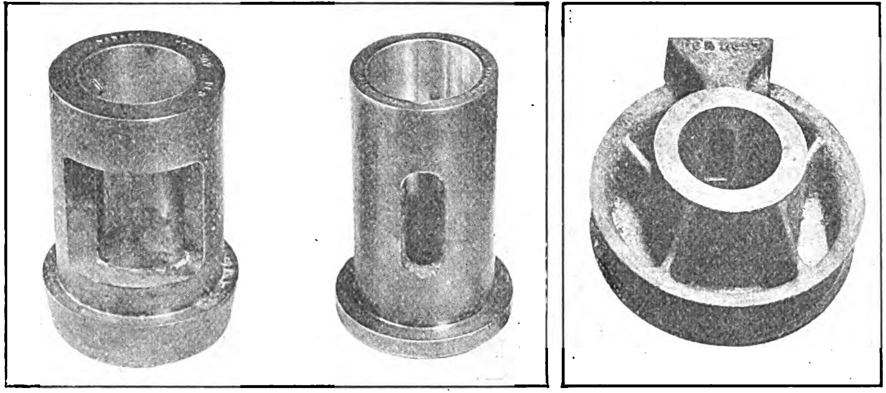
*Abstract of a paper before the New England Street Railway Club, Boston, Mass., Oct. 30, 1924.

If you take a motor with an extended armature shaft and slip on an extra bearing, you can hold this bearing in your hands with the motor in operation, if the bearing is lubricated. If water is poured in this bearing the twist will tear it from your grip. That is exactly what occurs in a motor when water enters the bearing, as the condition of the key, dowel pins and holes all goes to prove. These bearings are allowed to twist themselves loose and naturally wear on the outside, and also wear the frames or heads as well as the axle caps.



A New Design for the Housing Has Permitted the Use of Bearings with Reduced Size of Windows. No Keys Are Required to Hold the Bearings and Larger Bearing Surface Is Obtained. At Left, Old Bearing. In Center, New Type. At Right, Housing Without Keys to Hold Bearing

When new motors are put in service, the first bearing mileage is tremendous. After replacing the bearings the mileage from the second lot is hardly a quarter of that obtained from the original, because these are not held tightly in the motor frames or housings. Water enters the bearings and the shafts pound, which results in destroying the sleeve of oil that the shaft is supposed to run on.

As the clearance in the frames or housings increases some try to correct it by the use of shims. The wear that has taken place is not even, consequently it is practically impossible to obtain a perfect fit for a bearing by the use of shims. This also applies to shimming of housings in motor frames. More bearings and housings are ruined from this cause than any other. If you will spin your motors with power when assembled, you will be in a position to judge whether the bearings are pinching or not, and it is far cheaper than having the car sent back to your shop with a hot bearing.

If a motor is worth a set of new bearings, it should be put in condition to receive these bearings. When you changed from split to solid gears, you depended upon a key for safety. Today you know that with a proper fit the key is not necessary. The same principle applies to a bearing in a housing. If the waste window is not too large, the bearing will not buckle when pressed in the housing and the fit can be correct and held so, which will eliminate the use of keys in armature bearings. I know of hundreds of motors that are in operation that do not depend on keys to hold their bearings in the housings. The next time it is necessary to remove a bearing from a housing, record the pressure required and check this against the pressure the manufacturer used when the motor was assembled. I believe it is around 4 to 5 tons.

You are all welding and know you are saving money, and how essential your welding outfit is to your shop. Then why not weld and bore your motor frames and axle caps? Is it that you cannot afford to bore, since the welding is not expensive? Welding and boring cost less per motor than a set of new bearings, as is shown by a road that has just finished boring and welding 8,000 motors. Its record shows the bearing life has been tripled. You can also save pounds of metal in your bearings, as many of the old motors have bearings that will permit a cut in weight of nearly 50 per cent. You can also reduce the size of the waste window in both armature and axle bearings, which gives more metal to run on. A road operating high-speed service and using 7½-in. axles, by welding has been able to turn the bearings in the caps and use a solid lower half. The upper half is practically solid as only a 2-in. hole for the waste to come in contact with the axle is used, and as this hole is at the top the pounding really holds the waste to the axle and does not cause it to sag or drop away. This road is obtaining six times the previous life of its axle bearings.

I realize that most of the roads have specifications that call for well-chamfered bearings at the waste windows, but there are many bearings the edges of which are entirely too sharp, and I believe that it would be wise to have your men check this before the bearings are put in motors. A very good way to impress your men in regard to this point is to take a top feed motor and use a bearing properly chamfered on one side and one having sharp edges on the other. See that the clearances are kept to the minimum. Remove the waste and put in a cup of oil in each housing. On one side the oil will disappear around the bearing, while on the other it will be thrown out of the housing.

Use good wool waste. It's money saved, and remember that in the latest type of motors with oil wells the waste will only lift oil 3 in. There is a difference in the feed of oil to the shaft of 8 to 1 when oil in the window is lowered an inch. Many of the roads change from summer to winter grades of oil to counteract the change in temperature, but forget that a motor is subject to both electrical and mechanical heat. Heavy grades, trailers, snow, short circuits and stuck brushes will cause a variation of the motor temperature far greater than winter to summer climate conditions. It is most essential, if you wish to retain your sleeve of oil, to have oil in the bearing and not in your store room. Any bearing that shows oil coming out of the end is being well lubricated, and water cannot enter.

Dr. de Ferranti Honored

A LUNCHEON was given at the Yale Club in New York, on Nov. 6, by the Founders' Societies in honor of Dr. S. Z. de Ferranti. John W. Lieb, vice-president New York Edison Company, acted as toastmaster and extended the hand of professional fellowship and greeting to the guest of honor and spoke in a most complimentary way of his genius, broad vision and extraordinary ability as an engineer.

Dr. de Ferranti is president of Ferranti, Ltd., England, and one of the world's best-known engineers. He was one of the first to see the field of the central power station, and he has been the inventor and the first to demonstrate the use of many of the developments which can be said to be responsible for the tremendous growth of the use of electricity. He is a past-president of the Institution of Electrical Engineers of Great Britain, a member of the English civil and mechanical societies, and an honorary member of the American Institute of Electrical Engineers.

Mr. Lieb called upon Fred R. Low, editor of *Power* and president of the American Society of Mechanical Engineers; Alex Dow, president Detroit Edison Company and representing the American Society of Civil Engineers; J. V. W. Rinder, president-elect of the American Institute of Metallurgical and Mining Engineers, and Calvert Townley, past-president of the American Institute of Electrical Engineers, who expressed the felicitations and welcome of the four founder societies.

Dr. Ferranti responded. He showed his broad concept of the engineering profession when he said that engineering is the accomplishment of great things for the benefit of the community. Engineers work to do these things on such a scale and at such a cost that they can become available to all the people. He considered electricity as the greatest of labor savers and that it is of the greatest possible good to the whole of the people of any of the engineering products. He felt that there was nothing more worth while than to pursue its ultimate development. He reminisced on some of the original problems that he had had to work out in the very early stages of electricity supply in London and greatly interested his audience of 150 admirers. But he said the field still open for development is even greater than the accomplishments already made.

American Association News

Obstruction Is Necessary to Real Progress*

At the Risk of Being Considered Reactionary Railway Men in New England Oppose Bus Operation Where This Would Duplicate Existing Service

By Robert H. Newcomb
Assistant to the Vice-President New York, New Haven & Hartford Railroad

WITHIN the past few years there has grown up in New England a new form of transportation, the value of which, in many cases, is very doubtful and the permanence of which is even more open to question. This development first confined itself to the carriage of freight over highways in motor trucks, but more recently the passenger bus has been added. The tremendous pressure of business incident to the World War was largely responsible for the first. It is probable that the activities of the bus builders are responsible for the great recent growth of the second.

If this development has come to stay, and apparently to some degree it has, then, in all fairness to every one, motor vehicles should be subject to the same regulations as are the railroads, and should show before they are allowed to operate that public convenience and necessity are to be served by their introduction. Anything less than this is unfair to the older forms of transportation. This applies with equal force to the steam railroads and to the electric street railways. Both existing forms of transportation face the same results if unregulated competition is allowed to continue. Both work under franchises which have great value and the maintenance of service under these franchises is of supreme importance to the people of New England. If, then, we are to have a third factor introduced into the problem of transportation, surely that factor should be limited and controlled as are the two others.

The present situation in Massachusetts demands attention. Too much leeway is permitted the bus and too little regulation covers its operation. In fact, there is no regulation whatever. Beyond securing a local license nothing is required in Massachusetts. It is significant that failure to secure a local license has seldom acted as a deterrent. The situation in Rhode Island and Connecticut is better. In those states it is necessary to secure a certificate of convenience and necessity before a license to operate is obtained. It is not at all clear, however, that even there the commissions have deemed it best to prescribe rates, routes and service to the extent that these are prescribed for street railways and railroads. As far as it goes, therefore, regulation in Rhode Island and Connecticut is sound.

Recently a new angle has been added to the problem. It is now being contended that where a bus line operates between cities in different states neither state has authority over its operation. No state can prohibit or unduly restrict interstate business, but surely each state may exercise its authority over the use and abuse of its highly extensive road system. If the reasoning of the bus men is sound, then no commission or legislature has authority over local railroad service, nor the right to issue charters and enact laws governing transportation agencies which cross state lines. In a community of short distances like New England any such rule becomes absurd.

If there is any railroad man who thinks that the passenger bus can be abolished he certainly is suffering from a condition which is likely to prove fatal to his employment. We must concede that the bus is here to stay. Our problem is to find a way to co-operate with it and to secure a condition which will place all carriers on the same footing. In the course of this last effort it will probably be inevitable that the railroads appear to be standing in the way of progress. As a matter of fact this is not at all what the railroads propose. But unlimited and unrestricted free use of the highways to the injury of all concerned is not necessarily progress. It may mark an increase in bus output at the factory, and it may be progressive when viewed from a salesman's standpoint alone. Present conditions, however, do not, and never can, make for permanent progress. Progress is not a selfish thing. The present situation has selfishness for its only excuse.

At the risk, therefore, of temporary misunderstanding it will be the policy of the New England railroads to tell the truth about the situation. Where buses operate in territory adequately served by present facilities objection to their continuing will be raised and insisted upon. If they are allowed to skim the cream of the income, then existing service will have to be reduced. This is not said as a threat. It is a statement of simple business law. No manufacturer can go on indefinitely producing a product for which there is no sale.

So long as a good sized slice of the taxes paid by the railroads is spent to maintain highways which are free to buses and trucks in competition with those railroads, just so long will the railroads persist in an effort to have the tax situation corrected and the bus and truck contribute their fair share of the general burden. So long as the railroads are supervised by public service commissions, regulated as to rates, service, and the like, then just so long will the railroads strive to have exactly the same supervision and regulation extended to buses and trucks. To combat the situation the railroads stand united. Progress to be permanently beneficial must be based on fairness to all, and not on the selfish interests of the few.

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*Abstract of a paper presented before the company section meeting of the United Electric Railways, Providence, R. I., Oct. 16, 1924.

"Shop Early" Campaign Renewed

SO SUCCESSFUL was the industry in the use last year during the holidays of the "Shop More from 10 to 4" posters that the committee on publicity has recommended that a more intensive campaign be made this year to encourage off-peak-hour shopping.

Therefore, the "Shop More" poster used last year has been revised so that it appears in more striking colors. This poster can be obtained from association headquarters in New York in the form of gummed stickers, window posters, window cards for stores and single, double and three-column mats for use in newspaper ads.

Many companies which used these posters last year state that they found it very easy to obtain the co-operation of merchants in this shop-early effort. Experience has shown that once it is made clear to the merchants that it is as much to their advantage as it is to the street car companies to scatter the traffic throughout the day, they are willing to lend their aid.

Special Reports Available

THE Bureau of Information and Service of the American Electric Railway Association announces that the following special reports have been prepared and are available to member companies in good standing upon request:

Customer and Employee Ownership of Electric Railway Securities: Gives summarized accounts of campaigns by exclusively electric railway companies to sell their securities to their employees and the local public, including data on amount of securities sold, number of new security holders obtained, methods of conducting campaign, samples of publicity work, cost of selling campaign and opinions of executives as to the benefits derived.

Transportation Service by Motor Bus Lines: Results of an investigation made to determine the kind of transportation service, if any, now being given in territories where electric railways have completely abandoned service.

Wages of Employees Other than Trainmen: Compilation based on the reports of about 175 companies showing their classifications of employees and the wages paid in their shop, carhouse, way and structure, power, overhead line and storage departments.

Series of Charts Illustrating Developments in Electric Railway Industry: Reproductions of charts first exhibited at the Atlantic City convention covering growth of electric railway riding habit, effect of automobile operations on electric railway traffic, recent trend of electric railway traffic and trend of revenues, expenses, wages and fares.

In addition to the above, supplements to the wage bulletin, fare bulletin and the cost of living studies have been prepared, bringing them down to date.

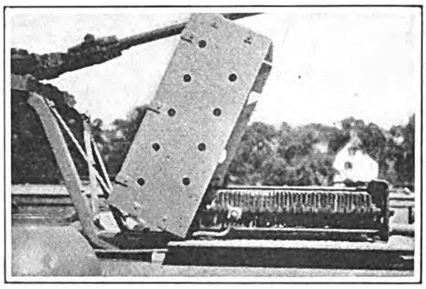
Maintenance of Equipment

Roof Mounting of Motor Resistors

BY H. T. HURLOCK
Engineer of Rolling Stock and Shops, Eastern Massachusetts Street Railway, Boston, Mass.

THE mounting of motor resistors beneath the car body is generally recognized as good practice and under ordinary conditions proves quite satisfactory. The single-truck Birney cars on this property, however, have been exceptions.

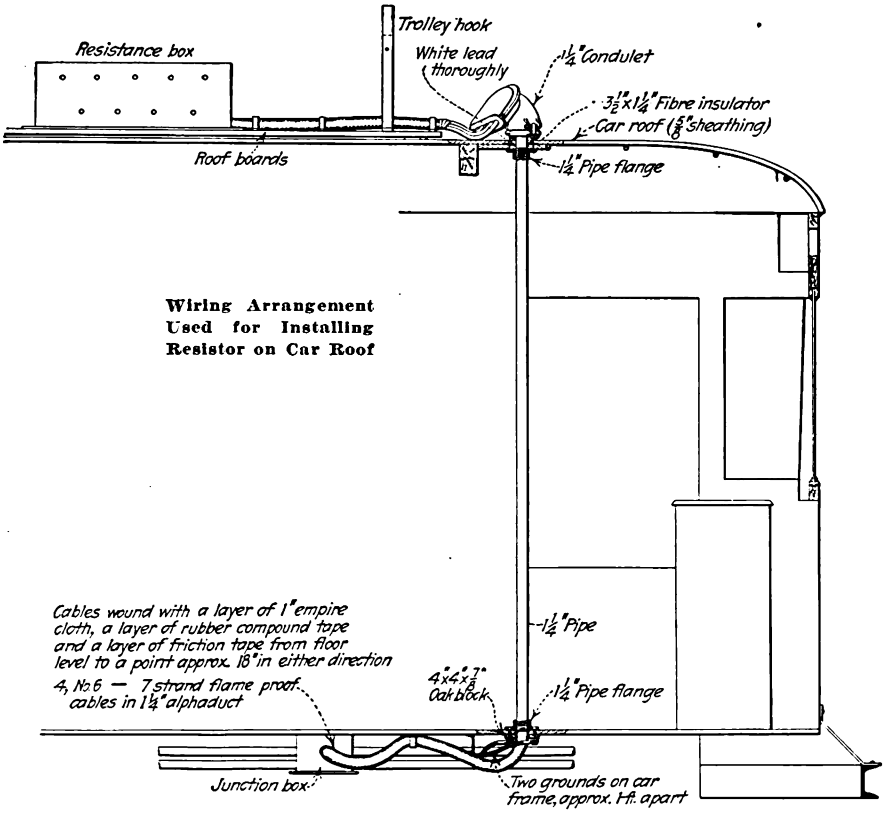
The only available location for the resistors on this type of car was under the platform, where the necessary protection against dirt and water could not be obtained even with a generous application of splash guards. During the winter, the undersides of these cars became thorougly saturated with water and a most careful installation did not prevent the frames from grounding. Because of low floors, the resistors were necessarily close to the street, and being located at the front end it was not uncommon to have the light-weight grids broken by stones or covered with ice and snow. Of the 154 Birney cars operated in the territory north of Boston during the winter season of 1922-1923, 84 were removed from service for resistance trouble, which constituted the largest cause for pull-ins on cars of this type.



Resistor Installed on Roof of Car

As a result, it was decided to locate the motor resistors on the roof. Five experimental cars were placed in service for several months, and the improvement shown was so great that plans are under way to make the installation on some 225 cars. To date 150 cars have been modified, and over an average period of six months there has been but one resistance failure and that due to breakage from vibration.

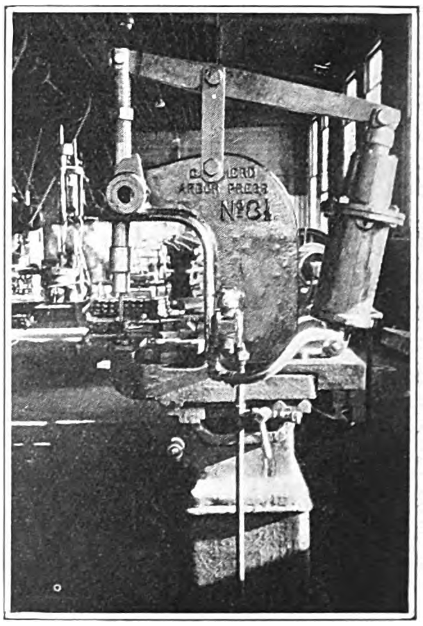
It was realized that an additional fire hazard was introduced by locating the resistors on the car roof. For this reason special precautions were taken to make the installation fireproof. The single frame is totally inclosed in a box of asbestos lumber, perforated with 1-in. holes for ventilation. The top and sides are held together by iron straps and hinged at the rear, permitting the box to be raised for inspection. The resistance leads are conveyed to the roof in a 1¼-in. iron conduit and brought out at the top through an inverted type condulet. The conduit itself is thoroughly grounded to protect passengers. It is separated from the roof condulet by a 1¼-in. fiber bushing. The arrangement prevents water from entering the conduit and at the same time eliminates the possibility of fire due to the trolley wire coming in contact with the metal roof condulet. Flameproof wire is used for the resistance leads.


Trolley hook
Resistance box
White lead thoroughly
1¼" Condulet
3½"x1¼" Fibre insulator
Car roof (⅝" sheathing)
Roof boards
1¼" Pipe flange
Cables wound with a layer of 1" empire cloth, a layer of rubber compound tape and a layer of friction tape from floor level to a point approx. 18" in either direction
4, No. 6 — 7 strand flame proof cables in 1¼" alphaduct
1¼" Pipe
4"x4"x⅞" Oak block
1¼" Pipe flange
Junction box
Two grounds on car frame, approx. 1 ft. apart

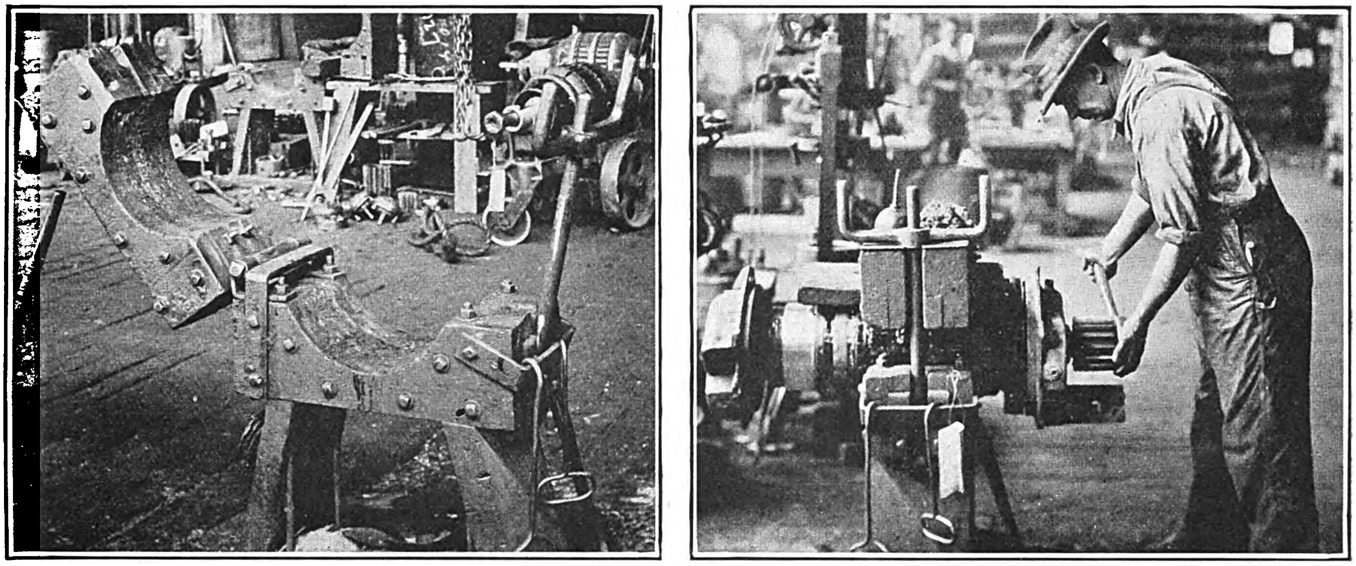
Wiring Arrangement Used for Installing Resistor on Car Roof

Air-Operated Arbor Press Makes Handy Shop Tool

AN OLD hand-operated arbor press, equipped with an air-operating cylinder in the mechanical department shops of the Twin City Rapid Transit Company, has been found to make a very handy ma-



An Old Brake Cylinder Mounted on an Arbor Press Makes a Very Handy Machine Tool in the Shops of the Twin City Rapid Transit Company



At Left—The Armature Clamp Is Hinged at One Side and Is Pulled Down Tight by Means of a Large Wing Nut. At Right—With the Armature Held Securely in the Clamp, One Man Easily Loosens the Nut or Removes Pinions Without Any Assistance

chine tool for a number of common electric railway shop uses.

This outfit is mounted on the end of the bed of a large lathe in the machine shop, where it is convenient for use on many of the jobs going through this department. The air cylinder is pivoted at the rear of the machine, and the power is transmitted to the spindle by means of an overhead lever. A large nut on the threaded upper portion of the spindle forms a stop and limits its travel to any predetermined amount.

For many drifting operations, such as that of drifting the holes in copper rail bonds, for pressing in and out brake-rigging bushings, and for other similar work, this simple home-made outfit has been found extremely useful and efficient.

Wood Clamp for Holding Armatures

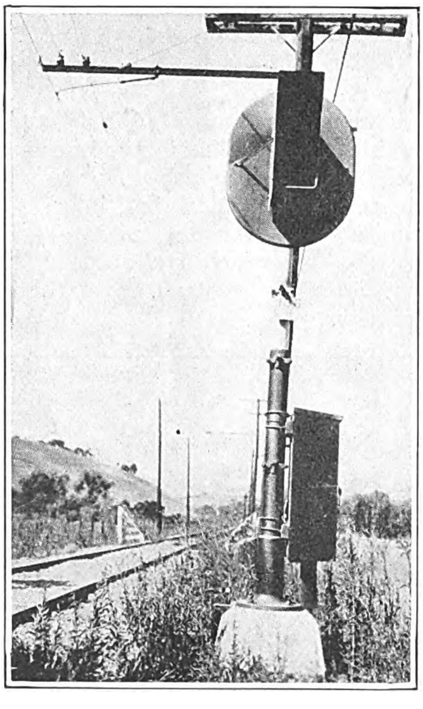
When it is necessary to loosen the pinion nut for removing the pinion on an armature, a split block is used in the shops of the Kansas City Railways to hold the armature securely, so as to insure against any damage from rubbing or other cause while the nut is being taken off. This is a very simple rig, but it avoids possible damage to armatures.

The block is shown in the accompanying illustrations, both in open and closed positions. It clamps down on the laminations, holds the armature securely, and does not damage the coils. By holding the armature in this way one man changes pinions without any assistance.

As shown in the illustration, the block is made up of heavy timbers formed for holding the armature between the two halves. For smaller armatures, a filler block is inserted to give the desired clamping effect.

Automatic Lamp Control Saves Power*

In sparsely settled territory along the route of the San Francisco-Sacramento Railroad there are numerous small shelter stations in the vicinity of which the company has no agent. In order that these stations should be adequately lighted when passengers are boarding or alighting from trains, it was customary to keep the lamps burning continuously. Recently, however, the railway has connected these station lamps to the block signal system in such a way that they are lighted only when the train is within 3 miles of the station coming or going. This has saved a considerable amount of power during the night when there are few trains on the line, and has also had a tendency to prolong the life of lamps. Similarly, the block signals themselves have been arranged so that they are now lighted only one block ahead of the approaching train.



On the San Francisco-Sacramento Railroad Signals of This Type Are Lighted Only in the Block Immediately Ahead of an Approaching Train

Testing Contactor Mechanisms

A convenient method of testing various parts of control contactor mechanisms has been worked out in the Wheaton shop of the Chicago, Aurora & Elgin Railroad with the result that irregularities in the contactor operation are discovered and remedied before the mechanism is placed in service. The apparatus consists of a rack from which hang the three types of stationary contactor parts used by this property, including the magnet coil, arc chute, and framework for receiving the movable mechanism. The magnet coils are hooked up in parallel and are connected to a 220-volt d.c. line from the shop switchboard. By means of a switch located on a board back of the test rack, any one of the magnet coils may be put in service.

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*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

The mechanism to be tested is attached to the stationary coil in much the same manner as it would be under a car. By making and breaking the connection to the magnet coil, it is possible to "pick up" or "drop out" the contactor armature upon which is mounted the contactor tip. In case of failure to operate the necessary adjustments or repairs are made to the movable mechanism.

The supporting bracket is made of 1-in. x 1¼-in. steel held in position by a light framework at each end. Each stationary mechanism is labeled with the type of control system to which it belongs, thus facilitating the work of testing.

New Equipment Available

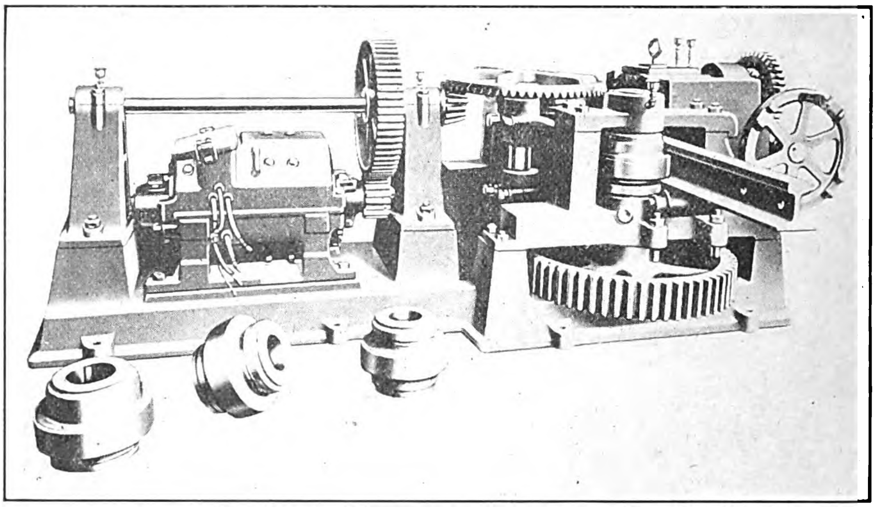
Improved Power Rail Bender

An improvement to its former type of power-driven rail bender has recently been put on the market by the Watson-Stillman Company, New York. This improved type apparatus will not only bend rails to any desired radius but it can be used also to straighten curved rails.

In operation three rolls fitting the section of rail are used. Two gear-driven feed rolls are spaced 32 in. apart center to center. The third or center roll is forced against the rail by two large screws operated by hand wheels, the position of this roll determining the curvature. The rails are passed back and forth between the rolls by using a reversible motor. In case the machine is belt driven the motion is controlled by a belt shifter with tight and loose pulley.

The frame of the machine is of open-hearth steel with cast-iron bedplate. Gears have cut teeth and are made of either cast iron or steel as desired. Rolls are cast steel. The roll shaft and gear shaft are of machinery steel.

Rails are passed through the machine at a speed of about 50 ft. per minute. T-rails require one set of three rolls. Guard or girder rails require one set of six rolls for each rail section. All rolls can be changed easily by removing the frame cap and one gear. Guards are furnished with the machine to conform to safety laws. The machine is built in two sizes, 75 tons and 100 tons. The larger size has sufficient power to curve or straighten any rail section now in use.

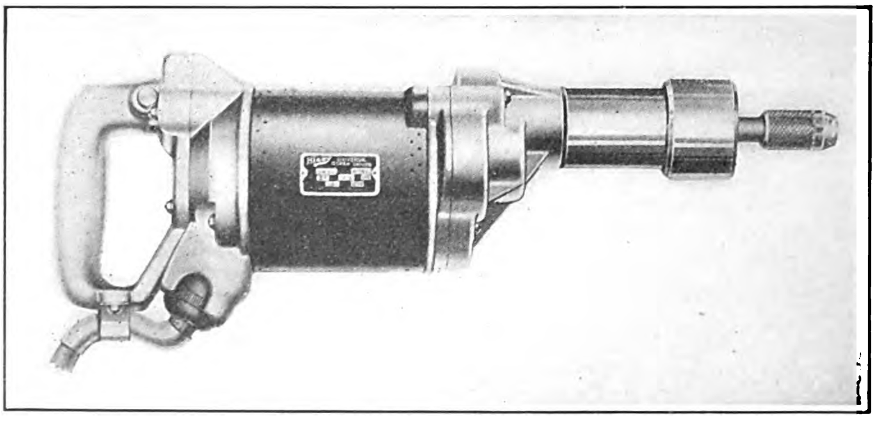


This Power-Driven Rail Bender Will Curve or Straighten Any Rail

Friction-Head Screw Driver

An improved electric screw driver is being offered to the trade by the Hisey-Wolf Machine Company, Cincinnati, Ohio. New features in the design include a disk-type friction clutch, which is automatically adjusted according to the pressure applied by the operator. The clutch casing is of convenient size and serves as a grip when the work requires. The device is equipped with ball bearings throughout and is provided with a universal motor for operation either on direct or alternating current.

This machine can also be used for setting up nuts, and standard nut sockets can be furnished in sizes of ¼ in., 5/16 in., and ⅜ in. for either square or hexagonal nuts. These are recessed for bolt clearance to a depth equal to twice the bolt diameter.



Electric Screw Driver with Friction Head

Light-Weight Insulating Board

To meet the demand for a light-weight low-cost insulating board with high dielectric strength, the Panelyte Company, Trenton, N. J., is placing on the market a new insulating material weighing only 74 lb. per cu.ft. This material is compounded of several well-known dielectric substances produced by nature, including cellulose fibers. It is not brittle and is easily drilled, tapped, sawed and polished. Panelyte has a black polished surface, which it is said is not affected by acids or oils. Sandpapering and rubbing with oil will produce a dull surface.

When ignited this material burns slowly. If left alone, the burning dies down and finally goes out without consuming the panel. It is claimed that the destructive effect of the burning does not penetrate all the way through the panel. Among the uses for which Panelyte is suited are controller backboard panels for switchboards, fuse blocks, exciters, converter panels, busbar supports and back-connected switches.

The News of the Industry

Compromise in Cincinnati

In New Traction Franchise Railways Make Concessions to City to Further Early Settlement

Surrender by the Cincinnati Traction Company and the Cincinnati Street Railway on six disputed proposals and compromise on two others, the compromise being in favor of the city of Cincinnati, is contained in the latest draft of a new traction franchise which will be submitted soon to the Mayor's citizen traction committee. Some of the conclusions of the conferees follow:

The Avondale and Bond Hill cars will continue to run to Fourth and Main, instead of only to Sixth and Main, as desired by the company.

The company agrees to pay half the expense of the upkeep of the city street car director's office, its share not to exceed $15,000 annually.

The company agrees to pay rental for viaducts, instead of only share expense of track and overhead maintenance.

The company agrees to eliminate the wage proviso in the 7½-cent fare guarantee for the initial three years.

The company agrees not to increase fares on owl cars.

The company relinquishes the proposal that on purchase of the properties by the city there shall be a 10 per cent premium on stock.

A compromise was effected in the matter of court costs and extension of the "rehabilitation" period so that it goes to Dec. 31, 1928.

The printed draft of the ordinance will contain the proposal that the company shall pay not to exceed $25,000 in any one year for street paving. But an alternative proposal is that the company shall share half of the expense of paving only on streets improved during or since 1920.

It was made plain by Walter A. Draper for the two companies and by City Solicitor Saul Zielonka that the changes and modifications were tentative and contingent. The companies make their concessions only on the consideration that the city accepts one or the other of the alternative paving proposals.

Rapid Transit Agitation Renewed in St. Louis

Mayor Henry W. Kiel is expected to be a candidate for re-election to a fourth four-year term on the rapid transit issue next spring so the administration is expected to speed through the preliminary survey. C. E. Smith, consulting city engineer, has very decided views on the city's rapid transit needs. He favors a system of subways downtown with feeder elevated lines reaching into the outlying sections of the city and its suburbs.

The special transportation committee in its report to the Board of Public Service recommended that a system of zone fares be worked out so that those outside the city who will benefit by rapid transit will have to pay part of the cost of building and maintaining the system.

The committee has recently repeated its former declaration that the cost of building a rapid transit system should not be laid at the doors of the car riders alone, but that private property which benefits should be assessed part of the costs as is done at the present time in street widening and paving projects.

The proposed rapid transit system for St. Louis would cost upward of $100,000,000. The city under a recently enacted state statute has ample authority to vote bonds for that purpose.

New Franchise Agreement Approved at Akron

Franchise Submitted to Direct Vote of Car Riders—Four Years of Operation Under New Fare and Other Conditions Proposed—Municipal Bus Plan Defeated

BY A VOTE of 28,682 to 24,872 the residents of Akron voluntarily took the traction issue out of politics Tuesday and gave to the Northern Ohio Traction & Light Company a new franchise for four years at a 7-cent cash fare, four tickets for 25 cents, or 17 tickets for a dollar. The new rate is to go into effect immediately. Express bus service is provided at a 10-cent fare. The company is given the right to use one-man safety cars, but they must be of double-truck design. No new railway extensions are provided, but the city has the right to order additional bus service amounting to the operation of 500,000 miles annually.

City officials, who by their refusal to grant the company an increased fare last February caused Akron to be without car service for four weeks, tacitly approved the agreement by keeping silent about it. They took no position for or against it officially, but by declining to oppose the agreement made it clear that they were not against it. In other words, the city administration maintained a "hands off" policy as did both of the leading political parties and one of the newspapers. One newspaper advised the people to vote against the franchise and another condemned the proposal and at the same time denounced the administration for failure to take a stand on the issue. Only one publication, a woman's magazine, bitterly opposed the franchise.

The franchise was submitted by the company through initiative petitions. More than 11,000 persons signed these petitions, although only 3,850 signatures were needed.

The company conducted its own campaign and appealed to the fairness of the public. Early in the campaign the company made its plea to the car riders and it may be said that it was the car and bus riders who voted for the proposal. The measure was opposed by independent bus operators, former jitney operators and by an organization known as the Car Riders' League. In its campaign the company paid no attention to attacks made upon it. All of the work done was carefully mapped out in advance and in no way did the company deviate from the course laid down. Election day was fair and a very heavy vote was polled.

The new franchise takes the place of the temporary contract made Feb. 27, following a period of 27 days when the city attempted its famous motorization scheme. The old 25-year franchise expired on Feb. 1 and the city attempted to compel the company to continue operation for a period of three or six months at the old 5-cent rate of fare, the voters more than two years ago having granted the company that rate, the old rate being on a 4-cent ticket basis. When the settlement came in February, a temporary agreement was made until Dec. 4 at a rate of 5 cents cash with a 1-cent transfer charge. If no new contract had been adopted at the general election, the temporary proposal provided a 6-cent cash fare from Dec. 4 until May 1, 1925, at which time the company was to discontinue operations, under order of the Council.

One feature of the new franchise which was assailed was the company's right to abandon car lines and substitute buses on streets to be paved or repaved. The company took the position that it could not reasonably be expected to make heavy capital expenditures under a 4-year contract. Another feature which met opposition was the provision eliminating competition on routes where the company now operates.

The city administration submitted a bus bond proposal at the same election. This proposal provided for the issuance of $3,000,000 of bonds for the purpose of establishing a municipal bus system in the city. The measure was defeated by more than 9,000 majority. Several other bond issues submitted at the same time were defeated with one exception.

Chicago Elevated Answers Mayor's Strictures

An answer to Mayor William E. Dever's recent implications that the Chicago Rapid Transit Company (elevated railroads) would be unable to procure money to build a subway if granted permission by the City Council was embodied in a page advertisement taken by the company in the seven Chicago dailies.

The ad was headed "A Record In Railroad Building." It outlined the construction records being made on the Niles Center extension of the rapid transit lines, pointing out that the work is already two-thirds completed and that the line will be in operation by Feb. 1, 1925.

Permission was granted on April 3, 1924, by the city of Evanston, in the limits of which the railroad is being constructed, it being the first suburb directly north of Chicago. Therefore the railroad construction work will have consumed only ten months time.

In the center of the advertisement an editorial was reproduced which had been published in the Chicago *Tribune*, leading morning paper, berating the city's lassitude in subway matters. The editorial was headed "Laugh, Darn You, Laugh." It is considered a very good one from the point of the railroad. Part of it follows:

> The elevated rattles around in downtown Chicago, depreciating property values, an offense to the eye, and an outrage to the ear. It is the only approach to rapid transit we have, and no doubt as good as is can be made with the limitations placed upon it.
>
> When Mr. Insull begins to build outside the Chicago limits he deals with a municipal corporation which belongs in the year 1924. He is allowed to come down off stilts and get underground. He must wait until he escapes from Chicago before he is allowed to consider the general good of the community, the values of adjacent property, the possibility of giving real rapid transit to his passengers, or any of the requirements of modern metropolitan transportation.
>
> Let's try and laugh this off. Evanston has a subway. The Chicago elevated is in it.
>
> Will Evanston take us in? Or should we apply at Dunning?

Incidentally, it should be mentioned that Dunning is the site of the Insane Asylum for Cook County, in which Chicago is located.

The advertisement was illustrated with six pictures of recent steps in the construction of the extension, and the text described several of the difficult engineering problems which were encountered in the construction work. In speaking for the company Luke Grant said:

> It is the policy of the company to answer any statements of politicans regarding our affairs, whenever possible. In this case we attempted to show that we have already proved our ability to accomplish construction, similar, in a way, to that proposed in Samuel Insull's plan for a subway in Chicago.

Trackless Trolley Installed in Cohoes

A test was made by the United Traction Company, Albany, N. Y., on Nov. 1 of the trackless trolley installed by that company in the city of Cohoes. The installation was made by the Capitol District Transportation Company, a subsidiary of the United Traction Company. The plans of the company called for the use of four vehicles at the outset. The route over which the new equipment will be run is known as the Belt Line. The period of the franchise applying to the trackless trolley route is four years. It is stipulated that fares on the trackless lines are not to exceed the rate charged on the other lines of the company. Among the manufacturing companies that contributed to the installation were the Brockway Corporation, the General Electric Company and the Wason Manufacturing Company.

Will Await Decision on Interstate Bus Companies

Decision as to the right of interstate bus companies to operate in Massachusetts without a license from local authorities, which has been asked of the Attorney-General of that state from a score of towns and cities, will depend largely on the decision in the case of Buck vs. Kuykendall, which is due to be argued before the United States Supreme Court on Nov. 10. Attorney-General Benton of Massachusetts says he considers the transportation issue on this point so vital that he will withhold his decision pending developments in the Supreme Court case and will go to Washington to hear it argued.

The Massachusetts Department of Public Utilities has also decided to enter this case and will be represented in a brief to be filed by John E. Benton, general solicitor of the National Association of Railroad and Utility Commissioners. The national association, which is composed of the state commissions, will take the attitude in this case that until Congress acts in the matter the various states may exercise regulatory power over bus lines operating over highways including those operating interstate, and that such regulation incidentally affects and does not unduly burden interstate commerce.

Chairman Henry C. Attwill of the Massachusetts commission says in his instructions to the general solicitor of the national association that every effort should be made to sustain the proposition that the state have jurisdiction to regulate motor vehicles running from one state into another state.

The case now before the United States Supreme Court grew out of the petition of a bus line for a license to operate a bus between the state of Washington and points outside the state. The Department of Public Works of Washington denied the petition on the ground that there was a bus line already in existence operating under a previous permit. Mr. Buck appealed that case to the federal court seeking to enjoin the state officials from interfering with the operation of his proposed line. The lower court denied the injunction and ordered the bill in equity dismissed, whereupon Mr. Buck appealed to the Supreme Court of the United States on the point that interference by state authorities with interstate commerce is in contravention of the commerce clause of the federal constitution.

Whatever the decision by the Supreme Court, it will affect all state commissions, and if the issues are similar to the issues which have been raised in Massachusetts regarding the bus lines that operate from various Massachusetts cities to Providence, R. I., it will determine the course for those cases.

At present the lines in Massachusetts maintain they can operate from state to state without any license from local authorities.

Increased Service in Indiana

A complete change in schedules, providing for more fast through cars between Fort Wayne and Indianapolis, about 120 miles, will go into effect shortly on the Indiana Service Corporation and Union Traction of Indiana lines, according to an announcement of local officials of the corporation. The main feature of the schedule change will be the establishment of six new fast trains to be known as the Hoosierlands and Wabash Valley Fliers. These cars will make the entire distance of the trip in four hours. These cars will augment the existing schedule, which calls for the operation of two fliers on each division daily. An equal number of fast trains will be started from the Indianapolis end of the system, providing fast through service at practically all hours of the day. Other changes will be made in the schedule to make possible better traction connections to all parts of the Middle West.

Ten Killed in Chicago Grade Crossing Accident

Ten passengers were killed an two score injured, some seriously, early on Nov. 2 when a Chicago, Milwaukee & St. Paul Railroad freight train, backing into the yards, wrecked an electric street car crossing the tracks. Most of the victims were neighbors returning from a Hallowe'en party.

Contracts for Use of Indianapolis Terminal Facilities Hold

The petitions filed by the Cincinnati, Indianapolis & Western Railroad against the Indianapolis Union Railway asking that the plaintiff's contracts be rescinded with the Indianapolis company for use of its terminal facilities at Indianapolis were dismissed for lack of equity in an opinion given by Judge Hickenlooper in United States District Court at Cincinnati. In his opinion Judge Hickenlooper said that for two years after entering into the contract the plaintiff paid rentals under the contract. He held that, while the law provided relief for a mistake of law or fact, proceedings to rescind must be begun immediately.

The petitions were originally filed in the foreclosure suits of the Central Trust Company and Equitable Trust Company, New York, as trustees under mortgages against the Cincinnati, Indianapolis & Western Railroad, and sought to have rescinded contracts for use of terminal facilities. The railroad was to pay two-thirteenths of the fixed rental for its use of the terminal. The plaintiff alleged that when it purchased the property of the Cincinnati, Indianapolis & Western Railroad in 1914 it agreed to only one contract regarding the use of the terminal.

Buses Supplant Maumee Valley Line

The Maumee Valley Railway, Perrysburg, Ohio, ceased operating cars at midnight on Nov. 1, and early the next morning the Maumee Valley Transportation Company, a subsidiary of the railway, put a fleet of seven Fageol coaches in operation over the former traction route. Five of the coaches are equipped with wicker chairs and two are of the street-car type for use at rush hours. The interurban station at Toledo is used.

The company has not yet received permission to operate on the west side of the Maumee River between Toledo and Maumee, but it is expected that the State Public Utilities Commission will authorize the company to use the old belt line as territory for the new bus line.

Rails, poles and other equipment of the railway will be removed and sold. The railway operated seven passenger cars over 23 miles of line.

North Shore Transports Students to Automobile Plant

The Chicago, North Shore & Milwaukee Railroad recently carried 140 students of Lane Technical High School, Chicago, to Kenosha, Wis., for a trip through the Nash Automobile Company plant. Britton I. Budd, president of the North Shore Line, in order to increase the interest of the high school students in their trip, offered a gold watch as a prize for the best descriptive essay on the trip. The boys were picked up by a North Shore train at a station directly adjacent to their school and professors in charge of the tour were high in their praise of the service rendered by the company. At the Nash plant a short talk had been arranged for the high school students by the city manager of Kenosha.

Boston & Maine Will Study Truck and Bus Transportation

The Boston & Maine Railroad, Boston, Mass., has announced the establishment of a department to study the subject of motor truck and bus transportation. Special attention will be given to the study of motor transportation, both passenger and freight, as related to the Boston & Maine traffic by Howard F. Fritch, formerly assistant general manager of the Eastern Massachusetts Street Railway. Frank I. Hardy will represent Homer Loring, chairman of the executive committee, in various investigations. Mr. Hardy was formerly manager of the Chelsea division of the Eastern Massachusetts. Both these newly appointed assistants to Mr. Loring were referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 25.

According to the statement from President Hustis of the Boston & Maine, the work to be undertaken is of great significance. The inroads of motor competition in Boston & Maine territory have been constantly growing. The result of the question in some sections is whether the railroad or motor truck can best serve the territory. He believes it is apparent that in certain fields both agencies cannot be continued and that either one or the other must prevail. He said further that the problem was not necessarily one of competition, but involved the elimination of expensive duplication and the adjustment of both forms of transportation to a logical and permanent basis.

Stunned by Injustice, Boise Railway Is Ready to Quit

Discontinuance of city service by the Boise Valley Traction Company is considered probable, should the City Council grant a 10-cent bus franchise. W. R. Putnam, vice-president of the railway, has written to Mayor Sherman pointing out the injustice of the proposal. He says in part:

> The owners of these properties could have no other conclusion when a 10-cent bus franchise is granted than that street car service, at a cost considerably less than bus service, is not desired, and therefore would be warranted in taking steps to discontinue city street car service.
>
> At present 90 per cent of the fares paid for city service are 5 cents, and the average fare paid by all city riders is less than 5¼ cents. We have been quite interested in the situation that has developed, namely, that some of the very people who have objected to our receiving an average fare in excess of 5¼ cents are now advocating a 10-cent fare for other types of transportation. This is of particular significance when one considers that the installation of buses in the city presumably means that street cars in Boise are considered a thing of the past and their operation will be shortly abandoned.

Station Plans Announced for North Shore Line

Developments announced recently on the Niles Center extension of the Chicago, North Shore & Milwaukee Railroad, over which trains of the Chicago Rapid Transit Company will be operated for a distance of 5½ miles, are the announcement of the plans for the stations and the laying of the first sections of permanent track.

The stations are of three types, directly above the tracks where the road is in the open cut; below the tracks where the road is elevated; between the tracks on the surface. There will be a large terminal station.

Granite terra cotta, steel, concrete, art marble and tapestry brick are among the materials to be used in the construction. Beauty of design is embodied in the station plans, in order that they may harmonize with the suburban surroundings of the territory served.

Engineers in charge of construction maintain that they will have trains running early in January, 1925, their original schedule. If they do it will constitute a record in railroad construction. Details of some of the construction problems were outlined recently in the ELECTRIC RAILWAY JOURNAL.

New Agreement in Fostoria

A wage and working agreement was recently reached between the union and the Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, after several conferences at which were present Elmer Smith, general manager of the line, and H. Lee Camp, business representative of the union, and a committee representing the employees. Under the agreement conductors and motormen on passenger cars are to receive 47 cents an hour for the first year in service, 49 cents an hour for the second year, and 52 cents an hour thereafter. Freight car crews are to receive 2 cents an hour above that schedule in the three classifications. No run is to pay for less than the 10-hour minimum day. No change was made in the wages of shopmen, but improved working conditions were provided.

The Toledo, Fostoria & Findlay is about to take over the Fostoria & Findlay line. In the event of the consolidation the new agreement is to cover the men on that line. The contract is operative from Oct. 1, 1924, to Oct. 1, 1925. There is a plan for an agreement between the various interurban lines in that section of the state to establish through service between principal points on the various lines. In that event the new agreement provides that the men on the Toledo, Findlay & Fostoria line are to get 50 per cent of operations north of Findlay.

Change in Boston Fare Made Nov. 5

The 6-cent fare did not go into effect on the Boston Elevated System on Nov. 1 as first planned. Owing to the amount of detail involved in preparing for the change, the increase from 5 to 6 cents was withheld until Nov. 5. On the bus lines the introduction of the 6-cent fare will be gradual, as the buses come under the jurisdiction of the city and town authorities, by whom they were licensed to operate at a stipulated fare unit.

Indiana Company Will Transport Coal

Transportation of coal by traction will be inaugurated for the first time in Indiana during the coming year, if plans now being formulated by officials of the Interstate Public Service Company, Indianapolis, Ind., materialize. It is the plan of the company to begin transportation of coal from the Ohio river landings to Indianapolis in large volume early next year. This, it is understood, will mean a substantial reduction in transportation costs between the coal fields of West Virginia and western Pennsylvania and Indianapolis, part of which may be reflected in lower fuel prices to the consumer.

In order to enter this field the Interstate, Bert Weedon, traffic manager of the company, said, would purchase 100 new gondola coal cars and make necessary improvements at the Ohio River, such as running of switches along the riverfront and installing loading equipment at the docks, all of which may entail an expenditure for equipment and trackage of approximately $300,000.

Little Rock's Service Better.—In accordance with the recommendations made by Ross W. Harris, traffic expert, recently employed by the city of Little Rock, the Arkansas Central Power Company has made changes in its tracks and lines which are helping to solve Little Rock's traffic problems and giving better service to the patrons.

Bureau Opposed to Jitney Competition

The Board of Commissioners of Charlotte, N. C., recently passed an ordinance requiring definite routes and schedules to be maintained by buses and the posting of indemnity bonds of $5,000 each. This action was taken for the "sake of the safety of the public." The commissioners reserve to themselves the power to revoke the license wholly or in part whenever in their estimation the buses as operated are unduly interfering with the use of the streets by the public or traffic rules and regulations are violated or when the schedules as outlined are not followed. The North and South Carolina Public Utility Information Bureau has recently expressed some concern over the jitney competition which seems to be prevalent throughout the states of North Carolina and South Carolina. It feels that Charlotte in regulating her buses has taken a step which should be followed by other larger municipalities in the state. It calls attention to the fact that in Asheville, N. C., the unregulated jitney is jeopardizing the street railway, with the public indifferent enough to deny protection to the company's franchise.

New Tariff Increases Rates

The Syracuse & Eastern Railroad, operating lines to Fayetteville and Manlius from Syracuse, N. Y., has been granted permission by the Public Service Commission to increase its cash rates from 3 to 3½ cents a mile and for ticket fares from 2 to 3 cents a mile, with an increase in 50-trip commutation tickets from 1½ cents to 2 cents a mile. The minimum cash fare will be 7 cents and the minimum ticket fare 9 cents. The new tariff became effective on Oct. 20. Harvey D. Gross, general manager of the company, explained that the increase was sought because he was convinced that the public would not ride in cars in any greater numbers solely because of lower fares. He said that the fare was decreased in 1921 to 6 cents, with the view that people would give greater patronage; that the rates had not been changed since then, but that the extra number of passengers had not increased materially. The company operated at a loss in 1923 and the profits this year so far have been small. The company is making an effort to induce commuters to use the line. These will benefit by a rate of 2 cents a mile, with the 50-trip ticket selling for $4 instead of $3.

Orders Service Continued

Modifying a previous order, the New Jersey Board of Public Utility Commissioners has directed that trolley service be continued by the Trenton & Mercer County Traction Corporation to the northern limit of Pennington. Early in August the board granted permission for the abandonment of service at a point near the center of the town. Pennington residents objected to half of the town being without trolley service.

Substitution of buses for cars on the Hopewell branch of the Trenton & Mercer County Traction Company between Pennington and Hopewell was authorized some time ago by the Board of Public Utility Commissioners of New Jersey. The commission pointed out that the trolley line showed an operative deficit of more than $7,000 for the last year. Testimony was offered that the county purposes to pave the streets in Pennington and Hopewell over which the tracks run, insisting upon the installation of modern tracks, the estimated cost of which would have been more than $50,000.

News Notes

Invites Criticism.—Seeking better to serve the patrons on the various bus lines, S. S. Crane, general manager of the Logan Valley Bus Company, a subsidiary of the Altoona & Logan Valley Electric Railway, Altoona, Pa., is distributing questionnaires to the patrons urging them to make constructive suggestions.

Electric Railway Planned.—It is reported that plans for the construction of a $2,500,000 electric railway between Manitowoc and Sturgeon Bay have been announced by C. D. Smith of Fond du Lac, president of the Wisconsin Southern Railway, and C. V. Sheldon, chief engineer. The contract for the project is reported to have been awarded to the Ed Shuster Construction Company.

Authorizes Fare Increase. — The Maine Public Utilities Commission on Nov. 1 rendered its decision on the application of the Bangor Railway & Electric Company, Bangor, Me., for permission to increase its fares on all lines from 7 to 10 cents. A protest against the increase was made on behalf of the University of Maine students, many of whom live in Bangor.

Bus Line Asked.—The Los Angeles Railway, Los Angeles, Cal., has filed an application with the State Railroad Commission for permission to run a bus line from San Pedro Street and Florence Avenue to Florence and Pacific Boulevard. The north half of Florence Avenue is in the city of Huntington Park. The city trustees of Huntington Park have been notified of the proposed new service.

Changes Made in Fare.—The Public Service Commission has approved the fifty-four-trip monthly commutation ticket fare of $25 on the Olean, Bradford & Salamanca Railway between Olean and Salamanca. The fifty-four-trip commutation ticket fare of $24.50 between Olean and Killbuck was canceled. The changes are effective Nov. 28.

Wants Suggestions on Operations.—C. D. Smith, general manager Beaver Valley Traction Company, New Brighton, Pa., has sent out a circular to all employees soliciting suggestions relative to the operation of the road. Employees of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway are included in the program, whereby suggestions are to be submitted to William A. Coyle, chairman of the committee on suggestions, subsequently to be considered for prizes, which are offered every three months. The prizes vary from $1 to $75. The suggestions can apply to any part of the property of the Philadelphia Company and affiliated corporations, including the Pittsburgh Railways.

P. R. T. Carriers Successful.—The demand for the P. R. T. carfare carriers has far exceeded the supply, 65,000 having been sold from Oct. 30 to Nov. 2. The company is making every effort to renew its supply in sufficient quantity to meet the need. On Nov. 10 distribution of carriers on the cars will be resumed. These token carriers were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 1.

Plans Faster Interurban Service.—In its plan to cut from 20 to 30 minutes from the running time of its present interurban service out of Milwaukee to Watertown, East Troy, Burlington and intermediate points, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has purchased land for rights-of-way in the towns of Lake and Wauwatosa, thus avoiding the longer route now used through West Allis. A cut-off is under contemplation to speed up the Racine and Kenosha service.

Minimum Fare of Ten Cents.—The Gardner & Templeton Street Railway, Gardner, Mass., has abolished the 5-cent zone fare collection system and put into effect a minimum fare of 10 cents. The new fare affects the employees of an industry in Templeton and another in East Templeton and residents between Johnson's Switch and West Gardner Square on Parker Street, who have been riding for 5 cents.

Abandonment Hearing Deferred.—A hearing will be held on Nov. 15 before the California Railroad Commission, when the towns of Chula Vista and National City will present their reasons for their opposition to the application of the San Diego Electric Railway for permission to discontinue railway and bus service between National City and Chula Vista. The railway is seeking to abandon service because operation in these parts is a losing proposition. Until a final ruling is made railway and bus service will be continued by the company. The commission heard evidence submitted by the company on Sept. 12 to show that the car and coach services failed to meet expenses.

Jitneys Again in El Paso.—Jitney competition has aroused public ire in El Paso, Tex. The El Paso *Herald*, under recent date, stated its desire to hear from readers the reasons why jitneys should be allowed to operate again in the city of El Paso. The item compared jitney operation with railway operation, with the argument strongly in favor of relegating the jitneys off the streets of the city, and concluded by saying that Mayor Dudley would have the backing of all the people if he would take the necessary steps to break up the jitney competition "that is just now beginning to become a real menace." Jitneys ceased operating in El Paso on April 30, 1923, following the enactment of an ordinance. Another Texas city where jitneys have been ruled out is Fort Worth. The Supreme Court of Texas at Austin handed down a decision on Jan. 24, 1924, declaring valid the city ordinance prohibiting the operation of jitneys within the Fort Worth limits. The jitney operators had previously secured a temporary injunction against the enforcement of the terms of the ordinance.

Greater Use of Bus Recommended at Toronto.—After a survey of the transportation system in Toronto H. S. F. Langsdown, traffic superintendent of the London General Omnibus Company, has stated that the city is ready for omnibus service paralleling the electric railway lines in the downtown districts. Mr. Langsdown said that instead of taking traffic from the trolleys, the new mode of transportation would encourage motorists to leave their cars at home and ride downtown in a bus. He suggested that the buses be used in the surrounding country on Sundays and holidays. The railway in Toronto is municipally owned and operated.

Safety of Operation to Be Discussed.—Charles Hansel of New York city, consulting engineer of the Pennsylvania Railroad, the Philadelphia & Reading system, the Central Railroad of New Jersey and a member of the presidents' conference committee representing all the rail lines of the country, is in Buffalo, at the invitation of Herbert G. Tulley, president of the International Railway, for consultation in matters affecting the operation of the local and interurban lines. The purpose is to determine if it is desirable to rearrange any conditions respecting the safety of operations. Mr. Hansel is thoroughly familiar with the properties of the International Railway and, at the request of President Tulley, he made a report in July, 1923, suggesting some minor changes, all of which were promptly made by the International Railway. Special attention will be given to the Buffalo-Niagara Falls high-speed line division of the International since the Oct. 19 wreck at Ellicott Creek crossing.

Supplement for Business Purposes.—"Current Topics" will hereafter carry a supplement with reliable and specific information to the employees and officials of the Illinois Power & Light Corporation and its allied companies as to the products of the industries in the various cities served by them. By this move it is hoped to "turn business to the industries in our territory." In the November issue a Topeka supplement is published, telling in detail of this pioneer city of Kansas.

Wants to Extend One-Man Service.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has applied to the Railroad Commission for authority to extend its one-man car service to its Walnut Street line, which passes through the downtown section of the city into the northwest section of the city. The company is now operating one-man cars on three other lines in the city.

Allowed to Operate Ten Buses.—Five decisions granting permission to the Central Transportation Company, a subsidiary of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to operate ten buses in Trenton have been handed down by the Board of Public Utility Commissioners of New Jersey. These buses are already being operated under city ordinances, but since they parallel the same streets with trolley tracks approval had to be given by the state body. The company has also been authorized to operate a bus between Trenton and Allentown.

Appleton-Sheboygan Bus Service Started. — The Wisconsin Traction, Light, Heat & Power Company has commenced the operation of its Appleton-Sheboygan bus service. Connections will be made at Sheboygan with the trains of the Milwaukee Northern Railway, an electric railway operating on an hourly schedule to Milwaukee.

Rerouting Plan Proposed.—A comprehensive plan for the rerouting of the car lines of the United Railways & Electric Company serving northwest Baltimore has been prepared by the transportation bureau of the Public Service Commission and sent to the United Railways for study. The plan was prepared by Ben Haughey of the commission staff.

Opposes Bus Line. — The Cincinnati Traction Company, Cincinnati, Ohio, has filed a protest with the Ohio State Public Utilities Commission against the application of Walter King and William McDaniels for authority to operate a bus line between Lebanon and Cincinnati. The traction company asserts that service between the two places is already adequate.

Will Run One-Man Cars. — General Manager D. W. Harvey of the Toronto Transportation Commission, Toronto, Ont., has stated that one-man cars will be operated on a 10-minute schedule on the York Township car lines. He also confirmed the previous announcement that tickets would be sold on the township cars at the rate of 11 for 50 cents.

Buses to Continue Operating.—The City Council of Oskaloosa, Iowa, granted another 90 days to the Oskaloosa Traction & Light Company for operating buses instead of street cars over certain sections of the city. The trial period for bus operation was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 2.

Will Soon Operate One-Man Cars.—One-man cars will be placed in service on the Clinton division of the Clinton, Davenport & Muscatine Railway, Davenport, Iowa. The bodies of the cars were made in the Rock Island shops.

Bus Service Extended. — Extension of the River-Bayside Street bus service to Thirty-fourth and Kromer Streets, in Everett, Wash., as an experimental service will be started immediately by the Puget Sound International Railway & Power Company, under the direction of C. C. Coates. The extension is the second since the first of the year and is another step the company announces, in its desire to cover the city with transportation as fully as possible. Continuance of the service is contingent upon support by the public and safety of operation. The need of some sort of service to this district has long been outstanding. The buses will furnish 18-minute service.

Awaiting Wage Decision.—Trainmen of the Middlesex & Boston Street Railway, Newtonville, Mass., are awaiting a decision in the recent arbitration proceedings. The 350 carmen are demanding 70 cents an hour for a working day of 8 hours, the present scale being 55 cents an hour for a working day of 9 hours. Early in the present year the men were granted an increase of 4 cents an hour, the award being retroactive to July 1, 1923, and to continue in force until June 30 of the current year.

Railway Wants Relief.—The Chickasha, Okla., City Council is attempting to find ways and means to co-operate in securing continued car service for Chickasha. A letter from C. F. Woodworth of Wakefield, Mass., treasurer and general manager of the Chickasha Street Railway, advised the Council that the company was operating at a loss and would be compelled to discontinue service unless substantial relief measures could be adopted. An 8-cent fare, a substantial reduction in taxes and a lower power rate for electricity are suggested as three needed measures of relief. The City Council is believed to be anxious to co-operate and has asked the Chickasha Gas & Electric Company to consider the possibility of reduced power rate. It is stated that the road has paid no bond interest this year and has had a net loss from operation.

St. Louis Survey Planned.—The survey of rapid transit engineering and financial methods to be made under the direction of President E. R. Kinsey of the St. Louis Board of Public Service will require probably nine months' time. C. E. Smith, consulting engineer for the city, will do most of the work and will be assisted by men from his own office and certain members of Mr. Kinsey's staff. Compilation of data as to plans followed in other cities will come first. It will also be necessary to make a survey to ascertain what sewer, water, cable and gas lines will be affected by the proposed subways.

Wages Increased Two Cents.—An increase of 2 cents an hour in the pay of employees of the Rochester, Lockport & Buffalo Railway, Buffalo, N. Y., was granted on Oct. 30 following a lengthy conference between James Largay, vice-president of the street railway union, and W. W. Foster, president of the railway. The new wage became effective on Nov. 1. Trainmen were receiving 53 cents an hour and were seeking 57 cents.

Bonus Awarded for Safety.—Trainmen of the Nashville Railway & Light Company, Nashville, Tenn., were paid $3,980 in bonuses for the first eight months of 1924, because accidents were reduced. Thirty-four motormen and operators on Aug. 31 had gone throughout 1924 without one accident and without failing to attend a single safety meeting by the company in the interest of accident prevention. Both of these accomplishments are the objectives of the bonus awarded every four months by the company.

Financial and Corporate

Net Falls Off

Third Avenue Railway Reports a Decrease of $226,014—Will Provide Bus Service If Necessary

For the fiscal year ended June 30, 1924, the operating revenue of the Third Avenue Railway System, New York, N. Y., was $14,649,265, an increase of $242,481 compared with the fiscal year ended June 30, 1923. This statement was contained in the recent report of S. W. Huff, president, to the stockholders of the company. The operating expense was $11,173,480, an increase over the previous year of $446,496. The increase in expenses was greater than the increase in receipts, due to several causes, especially to the increased traffic congestion in the streets, resulting in the slowing up of service and the increase of accidents.

Mr. Huff said that the increase in congestion on the streets was making it more difficult to render an attractive service and was adding to the cost of operation. He stated that from data collected by his company at a number of traffic points it was shown that it took from five to seven times as much street space to pass a single passenger through the streets by means of automobiles and taxicabs as was required to pass them in street cars.

On the question of bus operation the report stated that there was unquestionably a field for bus operation, and at the present time there was a desire on the part of the public to ride in buses. President Huff said there were streets in which travel was not sufficient to justify the installation of electrical equipment, or where, for other reasons, such installation was undesirable, where buses could operate more satisfactorily and where the public was willing to pay for the increased cost of bus transportation. He said that such bus operation could be made more efficient and serviceable to the public when co-ordinated with existing trolley lines.

President Huff said it was interesting to note that today the electric surface lines of the greater city of New York were carrying a larger portion of the total number of passengers carried on surface lines, elevated lines and subway lines than they had since subway lines became a big factor in the transportation of the city. The use of surface car lines in recent years has increased faster than the use of subway and elevated lines. During the fiscal year ended June 30, 1924, more than 42 per cent of all the passengers carried by subway, elevated and surface cars were carried on the surface cars of the city.

He said that considering the present bus agitation the directors felt it was their duty to the security holders to make application for franchises for a bus system, to be operated in co-ordination with the electric lines; that the plan generally is to charge a 10-cent fare on the buses and to give free transfers to the electric lines. He said that the company had changed its motive power from the horse to cable, and from cable to electricity as the efficiency and desirability of each class of motive power was developed, and to the extent that buses are desirable as a supplement to electric car operation or as a substitute for it the directors of the Third Avenue Railway felt that they should offer them to the public.

The consolidated statement of income for the years ended June 30, 1924 and 1923, is contained in the accompanying table.

THIRD AVENUE RAILWAY COMPANY AND CONTROLLED COMPANIES YEARS ENDED JUNE 30, 1924 AND 1923

Operating Revenue:	1924	1923
Transportation	$14,232,952	$14,008,415
Advertising	150,000	150,000
Rent of tracks and terminals	25,649	26,005
Rent of buildings and other property	175,577	174,695
Rent of equipment	52,610	34,551
Sale of power	12,474	13,117
Total operating revenue	$14,649,265	$14,406,784
Operating Expenses:		
Maintenance of way and structures	$1,829,554	$1,425,233
Maintenance of equipment	1,523,495	1,334,189
Depreciation accruals	206,142	733,347
Power supply	1,090,857	1,223,968
Operation of cars	4,959,323	4,574,373
Injuries to persons and property—expended	1,165,882	1,074,590
Injuries to persons and property—reserved	*202,630*	*203,513*
General and miscellaneous expenses	600,855	564,794
Total operating expenses	$11,173,479	$10,726,984
Net operating revenue	$3,475,785	$3,679,800
Taxes	988,048	968,044
Operating income	$2,487,737	$2,711,756
Interest revenue	276,603	287,348
Gross income	$2,764,340	$2,999,104
Deductions from gross income:		
Interest on first mortgage bonds	$548,080	$548,080
Interest on first refunding mortgage bonds	879,620	879,620
Interest on adjustment mortgage bonds	1,126,800	1,126,800
Track and terminal privileges	14,231	14,524
Miscellaneous rent deductions	8,248	7,782
Amortization of debt discount and expense	21,870	21,315
Amortization of limited franchises	9,355	10,904
Sinking fund accruals	33,480	33,480
Miscellaneous	47,392	55,322
Total deductions	$2,689,078	$2,697,829
Net income	$75,261	$301,275

*Deficit

New Orleans Earnings Sufficient to Care for Interest Obligations

The report of the New Orleans Public Service, Inc., for the twelve months ended Sept. 30, 1924, gives the net operating income of the company at $3,466,603 for the year, a gain of $119,236 over the preceding year. The rate base of the company, upon which it is allowed a rate of return of 7.5, increased from $52,939,371 to $55,242,089, or approximately $2,203,718. This resulted in a decline in earnings to 6.48 per cent, as compared with 6.61 for the twelve months ended Sept. 30, 1923. The outstanding obligations of the company are only about 6 per cent of the rate base, which will make its earnings of 6.48 per cent for the year ample to care for all interest and dividends in outstanding securities. The total assets of the company increased from $61,126,208 to $67,838,787. Cash on hand when the report was closed was $1,335,700, with $1,576,963 on hand for materials and supplies. The sum of $1,420,592 was spent during the year for renewals and replacement reserves.

Court Refuses to Dismiss $30,000,000 Subway Suit

Judge Knox in United States Court has denied the city's motion to dismiss the suit brought by Lindley M. Garrison as receiver for the New York Municipal Railway Corporation to recover approximately $30,000,000 from the city because of delays in the fulfilment of contracts to build subways. The motion attacked the jurisdiction of the federal court and the legality of naming the city as a defendant.

Judge Knox held that the federal court had full power "to award relief in equity upon a strictly legal demand." He wrote that the suit would "involve an inquiry which for detail, itemization and proof will probably surpass any accounting with which the court is acquainted, and it would be most unfortunate if jurors were called upon to undergo the hardships of such an ordeal."

The city's motion was made after the New York Rapid Transit Corporation, as owner of the assets of the New York Municipal Railway Corporation, had been granted leave to intervene as a party plaintiff in the suit instituted by the receiver.

Another Block of Chicago Property's Stock Offered

Sale of 10,000 shares of prior lien, 7 per cent stock of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., under the customer-ownership plan was announced recently by officials of the company. The stock will be sold for $100 a share, par value. This is the second block of prior lien authorized for sale by the Illinois Commerce Commission, the first block of $1,500,000 having been sold about a year ago. The second block, as in the case of the former sale, will be disposed of by employee-salesmen, every employee of the railroad who signifies his interest being made an authorized salesman of the stock.

The sale was opened at two special meetings of employees called for the purpose, which were addressed by Britton I. Budd, president, and other officials. The first block met with a ready market among patrons of the North Shore Line and it is believed that the additional $1,000,000 will go even better because of the establishment in the minds of the people of its value.

California Commission Reviews Valuation Cases

Important work has been done by the California Railroad Commission during the last fiscal year in the matter of valuations of properties of public utilities either in rate-making proceedings or in proceedings involving condemnation of those properties by municipalities; also in the valuation of railroad properties in co-operation with the Interstate Commerce Commission. An important part of the valuation work carried on during the year has been the appraisal of lands owned by public utilities within the State of California, which has involved the determination of the value of lands amounting to approximately $20,000,000 in connection with the various proceedings.

In addition to the valuations carried on in connection with the regulatory work of the commission, a limited amount of work has been done in connection with the valuation of the Los Angeles Gas & Electric Corporation's electric properties involved in the condemnation proceeding filed by the city of Los Angeles. A relatively large staff of engineers has been employed during the entire year in connection with the determination of the value of the city properties of the Los Angeles Railway and the Pacific Electric Railway. This involves property exceeding $50,000,000. Toward the close of the fiscal year work was commenced in connection with the valuation of all the electric properties of the Pacific Gas & Electric Company and Great Western Power Company in the city of San Francisco.

New Corporation to Develop Cities Service's Utilities

Formation of a new $100,000,000 corporation by the Cities Service Company, New York, to provide a vehicle for the development and expansion of its public utility enterprises is under way, to be known as the Cities Service Power & Light Company. Its authorized capitalization will consist of $20,000,000 of bonds, $10,000,000 of preferred stock, $5,000,000 of second preferred stock and $65,000,000 of common stock.

The Cities Service Company will own all the common stock of the Cities Service Power & Light Company, into which will be placed the common stocks of public utility companies operating in 15 states and serving a population of more than 2,000,000 scattered over 400 communities. Among the important properties to be included will be the Toledo Traction, Light & Power Company, which owns the Toledo Edison Company; the Ohio Public Service Company; Public Service Company of Colorado, including ownership of the Denver Gas & Electric Company; Kansas City Gas Company; the Empire District Electric Company and the St. Joseph Railway, Light, Heat & Power Company.

Gross business of the properties comprising the new corporation, it is understood, will total more than $49,000,000.

Formation of the new company will have no effect on the financial structure of the parent company except to provide a more flexible medium for development of the public utility phase of its business. This step is understood to have been long contemplated to establish a clear-cut division between the oil and utility enterprises of Cities Service and to make more effective the activities of the parent company in both fields.

Officers of the new company will include the principal executives of the Cities Service organization.

Right to Discontinue Lines Sought in Mobile

Discontinuance of certain railway service at Mobile is sought by the Mobile Light & Railway Company in a petition filed with the Alabama Public Service Commission. The petition was accompanied by a financial statement for the year ended Sept. 30, 1924, to the effect that the company's net income from railway operations for the year amounted to less than 1 per cent of its valuation. The company asked permission to take up tracks on Wilkinson Street from Charleston Street to Washington Avenue and on Washington Avenue from Wilkinson Street to South Carolina Street and to abandon service on Wilkinson Street and Washington Avenue and further asks to be permitted at any time during the next two years to take up the track on Old Government Street from its intersection with Government Street to Williams Street.

Traffic Declines on Detroit Street Railways

The city of Detroit, Department of Street Railways, has given out operating statistics for the months of July, August and September. Income and traffic figures are included in the accompanying table.

CITY OF DETROIT, DEPARTMENT OF STREET RAILWAYS

	July, 1924	July, 1923	August, 1924	August, 1923	Sept., 1924	Sept., 1923
Total revenue from transportation	$1,598,875	$1,660,055	$1,592,551	$1,671,959	$1,587,292	$1,766,670
Total operating revenue	1,669,815	1,764,174	1,639,962	1,754,349	1,654,788	1,843,027
Total operating expenses	1,175,483	1,299,326	1,168,345	1,314,975	1,170,524	1,360,890
Net revenue railway operations	$494,332	$464,848	$471,617	$439,375	$484,264	$482,137
Taxes and rent deductions	59,798	59,158	59,798	59,188	59,706	59,158
Net operating income	$434,533	$405,689	$411,819	$380,186	$424,558	$422,979
Total non-operating income	27,898	1,274	46,600	4,682	14,155	1,059
Gross income	$462,431	$406,963	$458,418	$384,868	$438,713	$424,037
Total deductions from gross income	432,312	376,012	428,102	376,929 q	412,192	364,824
Net income	$30,119	$30,951	$30,316	$7,939	$26,521	$59,213
Total car-miles operated	3,828,996	4,327,150	3,774,519	4,346,975	3,683,651	4,157,839
Total passengers carried	35,159,475	40,934,203	34,962,639	41,308,449	34,825,027	38,385,837

$7,000,000 Refunding Issue Approved at Worcester

Stockholders of the Worcester Consolidated Street Railway at the annual meeting in Worcester, Mass., on Nov. 5, voted to ask the State Department of Public Utilities for authority to create $7,000,000 in first and refunding mortgage bonds. The board of directors will have power to issue and sell bonds at such times and in such amounts as may be necessary to meet the maturing bond issues of the company. The bonds will be sold in series with different maturity dates and different coupon rates, depending entirely on the bond market at the time the money is needed. None of the bonds will bear interest at more than 6 per cent.

Clark V. Wood, president of the company, said the amount the directors suggested to the stockholders as a limit for the new bond issue was considerably more than the amount needed to meet the two maturities falling due in 1925. The mortgage will be so drawn that it will cover the entire property and equipment of the railway subject to the present underlying liens. Eventually, with the maturing of these liens, the new issue would become a first mortgage.

Two issues mature next year which must be met by the company. They are the Worcester & Southbridge Street Railway first gold 4½s, dated June 1, 1905, and due June 1, 1925, and the Worcester Consolidated Street Railway debenture gold 7s, dated March 1, 1900, and due March 1, 1920, but extended to March 1, 1925. The first of these issues is outstanding at present to the extent of $200,000 and the second to the extent of $700,000.

These two issues are the first of a series that will fall due within the next three years involving $3,083,000. Of the company's funded debt only three additional issues will be outstanding after 1927. One of these, totaling $1,449,000, will mature in 1930 and two others, totaling $124,000, will mature in 1939.

President Wood said the earnings of the company had been increasing slowly in the last quarter. The decrease in the gross earnings and the falling off in the number of passengers carried earlier in the year he assigned to unfavorable industrial conditions.

Form of Electric Railway Supplement to "Chronicle" Changed

"The Public Utility Compendium" is the title which the *Commercial & Financial Chronicle*, New York, has applied to the publication issued by it on Nov. 1 to replace that paper's former "Electric Railway Section." The compendium will be issued twice a year without extra charge to every annual subscriber of the *Chronicle*.

As the change in name implies, the new publication is much more comprehensive than the old, both in character and scope. It covers public utilities of every kind and description. Light and power companies are now represented, as well as the electric railways, and in addition there are water and gas companies and telegraph, telephone, cable and radio corporations. It is explained in part, as follows:

> In one particular the change has been forced upon us. The operation of the electric railways, urban and interurban, is now quite generally combined with the light and power business, and it is no longer possible to differentiate between the two. The development has grown out of the wonderful extension in the use of electricity which is the distinctive feature of recent times. * * * The next step was to unite the local units so that they might serve larger areas, and out of these undertakings have grown in turn the big combinations which, by reason of their splendid achievements in electrical development and in serving the advanced needs of man, are exciting the wonder and the admiration of the world.

Brooklyn City Declares an Extra of 5 Cents a Share

Directors of the Brooklyn City Railroad on Nov. 6 declared a regular quarterly dividend of 20 cents a share and an extra dividend of 5 cents a share on the 1,600,000 shares of stock now outstanding, or $400,000. The stock is of $10 par value.

The company has paid three quarterly dividends of $300,000 each on the 1,200,000 shares of capital stock outstanding prior to Sept. 30. For the full calendar year the company will have paid to stockholders $1,300,000 in dividends, and the company's surplus, according to President H. Hobart Porter, will have been increased by about $450,000. These results are based on estimated net earnings for the year of $1,750,000, which is applicable to dividends and surplus. For the first three-quarters of the year the net was $1,394,087.

Guaranteed Bonds of Lake Charles Property Offered

Stone & Webster, Inc., recently offered at 95 and interest $750,000 of first mortgage 5½ per cent gold bonds, known as Series A, of the Lake Charles Electric Company, Inc., Lake Charles, La., with guaranteed principal and interest by the Eastern Texas Electric Company of Delaware. The bonds were dated Aug. 1, 1924, and are due Aug. 1, 1949.

The Eastern Texas Electric Company recently purchased the street railway, electric light, gas and water systems and plants in Lake Charles, La. The purpose of the issue is to provide a portion of the funds required for the purchase of the above properties. The balance has been raised by the sale of capital stock of the Lake Charles Electric Company, Inc., the entire issue having been purchased by the Eastern Texas Electric Company of Delaware, which also controls, through stock ownership, the Eastern Texas Electric Company of Texas and the Port Arthur Ice & Refrigerating Company. The Eastern Texas Electric Company (Delaware) was recently organized to acquire and hold the stock of the Lake Charles and other companies.

The Eastern Texas Electric Company of Delaware guarantees the payment of principal and interest on this issue of series A bonds.

The Lake Charles Electric Company, Inc., has obtained new franchises during the current year, which run for a 25-year period and are free from restrictive and burdensome clauses. The properties are under the executive management of Stone & Webster, Inc.

$400,000 in Shares Sold.—The Wisconsin Traction Light, Heat & Power Company, Appleton, Wis., has disposed of $400,000 of its $500,000 issue of 7 per cent preferred shares. The sale was started on July 16 and the shares have been purchased by 700 new owners, most of whom are residents of the fifty-one places in which the company supplies a utility service.

Wants to Remove Certain Tracks.—The Union Traction Company, Santa Cruz, Cal., has applied to the Railroad Commission for permission to abandon service to Cliff Drive and to remove its tracks on Mission Street from Locust Street to Pacific Avenue.

Carhouses Sold.—The United Electric Railways, Providence, R. I., has sold two trolley carhouses used for storage purposes and two more are for sale at the present time.

Authorizes Track Removal.—Permission has been granted to the Trenton & Princeton Traction Company, Trenton, N. J., to remove as much of its track as lay between the terminus of the line in Lambertville, N. J., and the center of the bridge spanning the Delaware River between Lambertville and New Hope. Abandonment of the company's line in Pennsylvania has already been sanctioned by the Public Service Commission of that state.

Net Income Falls Off.—For the nine months period of the present year the Twin City Rapid Transit Company, Minneapolis, Minn., reports gross revenues of $9,527,686. This compares with $10,210,796 last year. The operating expenses decreased from $7,267,192 for the nine months period of 1923 to $6,968,918 for a similar period of the present year. The net income fell off about 36 per cent. It was $1,151,756 for the months of January to September, 1923, inclusive and $739,526 for the similar months of the current year.

Earnings Decrease.—For the third quarter of 1924 the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., reports earnings for the railway department of $209,042. Compared with a similar period in 1923 the railway receipts showed a decrease of $37,794. The decrease in the earnings of the railway department has been gradual since the beginning of 1922, only two quarterly periods during that time showing a slight increase compared with the previous quarter. The banner quarter for the railway department was the last quarter of 1920, when receipts were $318,571. They are now averaging about $100,000 less than that amount.

Manitoba Property to Suspend Service.—The Brandon Municipal Railway, Brandon, Man., it is reported, is to cease operating and is to be replaced by buses. The Brandon Electric Railway was incorporated by the Manitoba Legislature in 1911. According to the *Canadian Railway and Marine World*, plans at that time were made for building 10 miles of line and arrangements were discussed for the city to issue debentures to aid in the construction. Finally it was agreed to take a vote of the citizens on the question of private or public ownership and the result was a vote of 458 to 176 for private ownership. A 30-year franchise was arranged and approved by the voters on May 21, 1912, but following some difficulties the city took over the project and authorized the raising of $300,000 by debentures for construction purposes. Operation for first year ended June 30, 1914, showed a loss of $14,542 and each succeeding year has continued to show a loss, with a reported loss in 1923 of $41,000. The line consists of 9.91 miles of track. It is said that tenders have been invited for the operation of buses.

Abandonment of Lines Authorized.—The Oklahoma Corporation Commission has authorized the Oklahoma Union Railway to abondon its Forrest Park line and the Fife Place line. The company is also given permission to take up its tracks, poles and wire on the streets included in these lines. The company first secured permission of the city through a city ordinance to abandon the lines and then took the matter up with the commission, as was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 25.

Buys Bus Line.—The bus line between Hammond and Crown Point, Ind., has been purchased by the Gary Street Railway and is being run by that company. Three buses are now in operation between the towns and passengers are carried to Griffith, Highlands and Munster. Service to Calumet City is included in the schedule for the Gary Street Railway bus line.

Nearly $4,000,000 in Taxes.—Electric railways in Wisconsin, numbering twenty-one operating light, power and heat properties in connection therewith, will pay $3,560,968 in taxes for 1924, based on a valuation of $125,375,000. In 1923 these companies paid taxes of $2,171,140 on a valuation of $104,410,000. The Milwaukee Electric Railway & Light Company again heads the list with a valuation on its properties of $71,500,000 and a tax debt of $1,476,985.51.

Revenue Falls Off.—For the three months ended Sept. 30, 1924, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was $2,786,005, against $2,877,627 for the corresponding three months a year ago. The net corporate income fell off from $486,438 for the period ended Sept. 30, 1923, to $331,192 for the period from July to September, 1924.

Branch Line to Be Sold.—The receiver of the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, recently asked authority of the State Public Utilities Commission for permission to abandon and sell the branch road running from Dayton to Union City. This action was in accordance with an order of Federal Judge Killits of Toledo ordering sale of this line. The Union City branch has been losing money for some years, according to a statement made by J. M. Pogue, general manager of the company. A request has been filed by the Dayton-Columbus Transportation Company, a subsidiary of the traction company, for a certificate to operate a bus line between Dayton and Union City by way of Greenville, between

Dayton and Brookville and between Urbana and West Jefferson. It is said that the light-weight traction cars now being operated over the present route will be sent to Springfield, where they will be placed in service on the Springfield-Lima route.

Receiver Named for Long Island Electric.—A petition has been presented to Justice Leander B. Faber in Queens Supreme Court on behalf of the Chase National Bank, asking for appointment of a receiver in a foreclosure action which has recently been started against the Long Island Electric Railway, Long Island City. It is revealed that it is planned to try to unite the surface lines in Queens and Nassau and into one system as feeders for the elevated lines and subways that are being extended into Queens. Lincoln C. Andrews, who was formerly the general manager of the Long Island Electric Railway, has been appointed receiver.

Book Reviews

Electric Railway Handbook

A reference book of practical data, formulas and tables for the use of operators, engineers and students. By Albert S. Richey, consulting engineer and professor of electric railway engineering Worcester Polytechnic Institute. Second edition, 798 pages, illustrated. McGraw-Hill Book Company, New York. $4.

Since the publication of the first edition of this book in 1915 there have been many changes in electric railway practices. Unlike "Electric Railway Transportation," the second edition of which is reviewed on this page, Richey's "Handbook" treats of the material side of the railway property. While the fundamental principles of electric railways have not changed, as is indicated by the retention in the second edition of most of the matter dealing with theory that appeared in the former edition, there are striking changes shown in applications. Particularly is this true with regard to the light-weight types of car. The chapter on rolling stock has been completely rewritten.

A much greater use of track construction and maintenance machinery made necessary the complete revision of that subject. Other sections have been revised more or less extensively to conform with the latest practices. In this connection particular reference is made to the standards and practices of the American Electric Railway Engineering Association, many of which are quoted in full or in part. Numerous references to articles appearing in ELECTRIC RAILWAY JOURNAL also are included.

Comparatively few cost data appear in the new edition, but where such figures are given they are accompanied either by basic unit costs or the dates which apply, so that they can be converted to the present level.

There is much of value to the electric railway engineer in the volume, and with the many changes that appear in the new volume it is well worth while substituting it for the earlier edition.

Transactions Index, Volume 1-45, 1880-1923

Published by the American Society of Mechanical Engineers, New York, 1924. $3.

The present index to the Transactions of the American Society of Mechanical Engineers is the fifth which has been published, although none has been issued since the appearance of Vol. 27, which contained the index to Vols. 1 to 25, inclusive. For that reason, and because comparatively few complete editions of the Transactions are available, the present index applies more particularly to Vols. 26 to 45, inclusive.

The general style of the Engineering Index, published by the society, has been followed, grouping alphabetically all items under authors' names and subjects. This index should greatly increase the value of the Transactions for reference.

Electric Railway Transportation

By Henry W. Blake, editor ELECTRIC RAILWAY JOURNAL, and Walter Jackson, fare and motor bus consultant. Second edition, revised. McGraw-Hill Book Company, Inc., New York. 449 pages, illustrated. Cloth, $5.

This is a thorough revision of the book published in 1917 by the authors. While the same general form of presentation and chapter headings has been adhered to, there are many changes throughout the book.

When the first edition appeared the effects of the World War were just beginning to be felt. Five-cent fares were in force on nearly all city railways in America, the one-man car was just being introduced, "jitney" operation was still in its infancy, and only very few electric railways had even considered the operation of buses. The idea of merchandising transportation had made little headway, largely because most managements were content to take what revenue came naturally without special efforts toward ride salesmanship.

Many new types of cars are discussed in the chapter on "Car types in relation to traffic," showing the great progress that has been made in the design of street and interurban cars, particularly the development of light-weight and one-man designs. The chapters on adjustment of service to traffic and preparation of timetables have both been revised in the light of new developments looking toward greater utilization of men and equipment.

The complete revolution which has taken place in fares and fare collection methods and practices is shown by the entire revision of the chapters on these subjects. Practically every type of fare and fare collecting method in use in this country, and many developed abroad, are discussed.

A new chapter on motor bus operation by electric railways traces the development of this phase of the industry from its inception, considering the field of this vehicle and types of equipment desirable. Trackless trolleys and gas or battery rail cars are also treated briefly in this chapter.

To make room for the added material the chapters on "competition" and "freight and express" have been omitted from the second edition. The authors state that the former is covered in the chapter on motor-bus operation, while there have not been many changes in freight and express practices since 1917.

Elektrische Zugförderung

Train or Car Operation. By Dr. E. E. Seefehlner, Vienna. With a chapter on Rack and Cable Railways, by H. H. Peter, Zurich, 659 pages; 751 illustrations. Second and enlarged edition. Published by Julius Springer, Berlin.

This is the most extensive and scholarly volume on electric railway engineering published in Germany since Zehme's important treatise. As in the first edition, which was published in 1922, Dr. Seefehlner has limited the scope of his book very largely to the purely electrical engineering side of electric railroading; that is to say, he does not include track except so far as the return circuit is concerned, considers power stations only briefly, and does not discuss transportation questions. Heavy electric traction is treated more comprehensively than tramways, and there is an especially valuable section of 84 pages giving data, drawings and photo-engravings of the principal electric locomotives in different parts of the world. The subject of train resistance is very thoroughly discussed and in this section, as elsewhere in the book, mathematics is used extensively where it helps to clarify the discussion. In the chapter by Mr. Peter, the cable railways considered are primarily those for mountain installations. A valuable feature of the book is the inclusion, with the discussion of each subject, of an extended bibliography on that particular topic. American practice is treated in the book, and the ELECTRIC RAILWAY JOURNAL is extensively quoted.

Principles of Business Writing

By T. H. Bailey Whipple, literary critic Westinghouse Electric & Manufacturing Company, published by the Westinghouse Technical Night School Press, East Pittsburgh, 192 pages.

Originally the chapters in this book were prepared by Mr. Whipple for "Sales Letter," a Westinghouse publication intended for private circulation, and its purpose was to help in the production of clear letters and reports by those to whom it was addressed. The demand from outside, however, became so great that it was decided to put the material in book form. There are five parts as follows: I. Introduction. II. Principles of Business Letter Writing. III. Words and Phrases Often Misused. IV. Report Writing. V. Letter Writing. There is also an appendix, including some suggestions to authors of technical papers. The book is well worth inclusion in the library of every one who has occasion to do much business or technical writing.

Personal Items

A. C. Jordan, general electrical superintendent of the Elmira Water, Light & Railroad Company, Elmira, N. Y., has been relieved of the supervision of the maintenance of railroad equipment department. F. G. Maloney, superintendent of the railroad department, now has charge of the maintenance of equipment department as well as of track and transportation departments. These changes were made effective Oct. 22.

Sterling T. Dow will resign as manager of the York Utilities Company, Sanford, Me., on Dec. 1. He has been connected with the railroad company for fifteen years, being assistant treasurer for ten years, before his promotion to general manager. He was at one time freight agent of the Maine Central Railroad at Bangor and resigned to become assistant treasurer of the York Utilities. The York Utilities Company, formerly the Atlantic Shore Line Railroad, operates cars from Sanford to Biddeford, through Kennebunk and from Town House to Cape Porpoise and Kennebunkport.

A. L. C. Fell, general manager of the London County Council Tramways, is retiring, owing to ill health. He has occupied the post for 21 years. Much regret is felt in British tramway circles, as Mr. Fell is one of the best known and most highly esteemed men in the fraternity. Prior to coming to London he was manager of the Sheffield Corporation Tramways. He is a prominent member of the Municipal Tramways Association. He is an engineer by training and has been able to supervise alike the technical and administrative sides of the business. Mr. Fell is 55 years of age. He will receive a retiring allowance of about £1,000 a year. Mr. Fell was one of the men who took great pains to assist the A.E.R.A. committee on foreign operation in making its observations this past summer.

W. H. Sawyer was the principal speaker at a meeting of the Women's Republican Club of East St. Louis shortly before election day. It is not often that a public utility man will make the personal sacrifice to get out and do his bit for the cause of good government. Mr. Sawyer spoke at some length in behalf of Mr. Coolidge and Mr. Dawes, both of whom he has known personally for some 40 years.

W. W. Tarleton became assistant purchasing agent of the Georgia Railway & Power Company on Oct. 1. He was formerly purchasing agent of the Dixie Construction Company, a branch of the Alabama Power Company.

Fred W. Spring, superintendent of the Westbrook division of the Cumberland County Power & Light Company, Portland, Me., for the last 32 years, recently retired. His first position was that of a railroad conductor when the company was building the Westbrook road in 1891. For six months Mr. Spring was in charge of the construction work. When the road was opened on June 28, 1892, Mr. Spring was appointed superintendent. He has held that position continuously since then. Mr. Spring's son, Frank B. Spring, who has been his assistant for a number of years, has been promoted to succeed his father. Harry K. Higgins will become the assistant superintendent.

D. S. McManus Superintendent at Lake Charles

The new superintendent of the Lake Charles Electric Company, Inc., Lake Charles, La., is D. S. McManus, who was transferred recently from the Houston Electric Company, Houston, Tex.

Mr. McManus has been in the railway field a comparatively short time, but in a period of four years he has proved himself invaluable to his management. He entered the employ of the Houston Electric Company, a Stone & Webster property, on Sept. 1, 1920, after being graduated from college as electrical engineer. He served in the various departments until July 1, 1921, at which time he was made assistant to the manager of the Houston Electric Company and the Galveston-Houston Electric Railway. In that capacity he remained for more than a year and was then transferred to Lake Charles, where he is now in charge of the street railway, construction and distribution systems of the light and power, water and gas departments, as well as the delivery departments of the ice plant.

D. S. McManus

The property with which Mr. McManus is now associated is under the executive management of Stone & Webster and is controlled by the Eastern Texas Electric Company of Delaware. The Lake Charles Electric purchased the old Lake Charles Railway, Light & Water Works Company on Aug. 1 of this year.

Unosuke Kurihara, chief secretary of the car operation department of the Municipal Electric Bureau, Tokio, is on a visit to this country to study electric railway operation, particularly rapid transit conditions. Later he expects to visit Europe.

Ivor Fraser, publicity manager of the London Underground electric railway companies, has resigned that office to become manager of the *Morning Post*, London. A. L. Barber, commercial manager of the companies, will for the time carry on the duties of publicity manager in addition to his regular work. It was under Mr. Fraser's direction that much of the excellent work in bettering public relations in London has been done for the so-called Underground group. This work included the advertising of the lines, one of the most important features of which was the use of art posters, which have attracted attention in all parts of the world. American electric railway men will remember Mr. Fraser as one of the party of London Underground railway officials that visited this country in May, 1923.

Obituary

Maurice Tremper, roadmaster of the Seattle Municipal Railway, Seattle, Wash., a system which comprises 235 miles of line, for ten years, died in that city recently, at the age of 57 years. Mr. Tremper before going to Seattle was roadmaster of the Detroit United Railway for 12 years.

Charles A. Piper, for ten years superintendent of the Key System Transit Company, Oakland, Cal., died suddenly in that city, Oct. 26. Mr. Piper was identified with the Key System ever since its establishment in Oakland. During the first ten years of the company's existence he served as general superintendent. He was 57 years old.

F. J. Frey, division superintendent of the Fresh Pond division of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., died recently, after an illness of several months. Mr. Frey started in as a motorman with the Brooklyn Company twenty-nine years ago. He was appointed division superintendent. Mr. Piper was 57 years old.

William Gray Evans, a pioneer of Colorado and the man who took a conspicuous part in the organization of the Denver Electric & Cable Company, now the Denver Tramway Company, died Oct. 21, after an illness of three weeks. For many years he was president of the latter company, but resigned that office in 1913. Mr. Evans was the son of John Evans, who founded Northwestern University at Evanston, which is named after him. John Evans was appointed Governor of Colorado by President Lincoln. William Evans inherited many of the sturdy characteristics of his illustrious father, so much so that the son was characterized at one time as the most dominating personality in Denver life. He was interested in several banking institutions and at one time was head of the local Republican organization in Denver. It was Mr. Evans who had the idea of the Moffat tunnel through the Continental Divide. When the story of the Denver & Salt Lake Railway (Moffat Route) is told, his name will be linked with that of David H. Moffat.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

$7,000,000 Spent at Los Angeles for Equipment

During the present year the Pacific Electric Railway management has contracted for varied freight and passenger equipment the cost of which entails an outlay of $4,377,000, all of which will be delivered and available for service during the current year. For its local lines 50 new 600 class cars, of the new type used in the Hollywood service, are now being built by the Brill Company of Philadelphia. Delivery at the rate of six cars weekly is scheduled to begin within 60 days, and following their arrival will be sent to the Torrance shops of the company, where electrical equipment will be installed. These cars, seating 65 passengers, have proved highly satisfactory both to the public and management and were so designed as to be capable of being operated in three-car units, which will be done upon the completion of the Hollywood-Glendale-San Fernando Valley tunnel now in course of construction.

To augment its freight equipment, 1,350 assorted freight cars were ordered several months ago, approximately 33 per cent of which have been received in recent months and complete delivery of which will be fulfilled within the next few months. With these cars available the Pacific Electric, which is the third largest carrier in point of freight volume handled in California, will be in a position to meet any demand made upon it by Southern California shippers. This lot of 1,350 freight cars cost approximately $3,000,000 and is the largest freight equipment order ever placed by the Pacific Electric.

Additional power will be supplied through five 60-ton freight locomotives, material and equipment for which is now being assembled for construction at the Torrance shops of the company. The railway's shops were the lowest bidders on the construction of this equipment and the work was awarded to its own mechanical department. These locomotives are the largest and most powerful type ever built on the Pacific Coast and cost approximately $45,000 each.

Both single and double deck motor coaches have been delivered or ordered during the present year to the extent of $150,000. Several double-deck buses will be delivered soon and will go into service on the lines of the Los Angeles Motorbus Company, jointly owned and operated by the Los Angeles and Pacific Electric Railways.

The foregoing equipment represents rolling stock ordered during the present year, but does not include 50 600-class cars and 50 1,100-class interurban cars ordered during 1923 on which delivery has been made recently. This lot of equipment represents an outlay of $2,850,000, which, together with that ordered during the present year, makes an aggregate outlay of $7,227,000 for equipment, all of which will be delivered during the present year.

Railway Modernization in Java

The Java State Railways is buying modern cars and trailers for suburban passenger service in the section that includes the cities of Batavia and Meester Cornelis. The General Electric Company is electrically equipping 10 of the cars and the Westinghouse Electric & Manufacturing Company 5. The other 15 of the 30 cars on order are trailers. The Electric Storage Battery Company is furnishing Exide batteries and the J. G. Brill Company the car seats. The pneumatic door-opening mechanism is manufactured by the Consolidated Car Heating Company and the rubberoid by the Standard Paint Company. The all-steel bodies are being built in Holland.

The trolley voltage is 1,500 d.c., and each motor car will carry a motor-generator set to supply 65-volt current for operating the control mechanism and air compressors, supplying the lights and charging the storage batteries. The so-called subway type of ceiling fan will be used in motor cars and trailers.

Free Nation-Wide Employment Service Urged

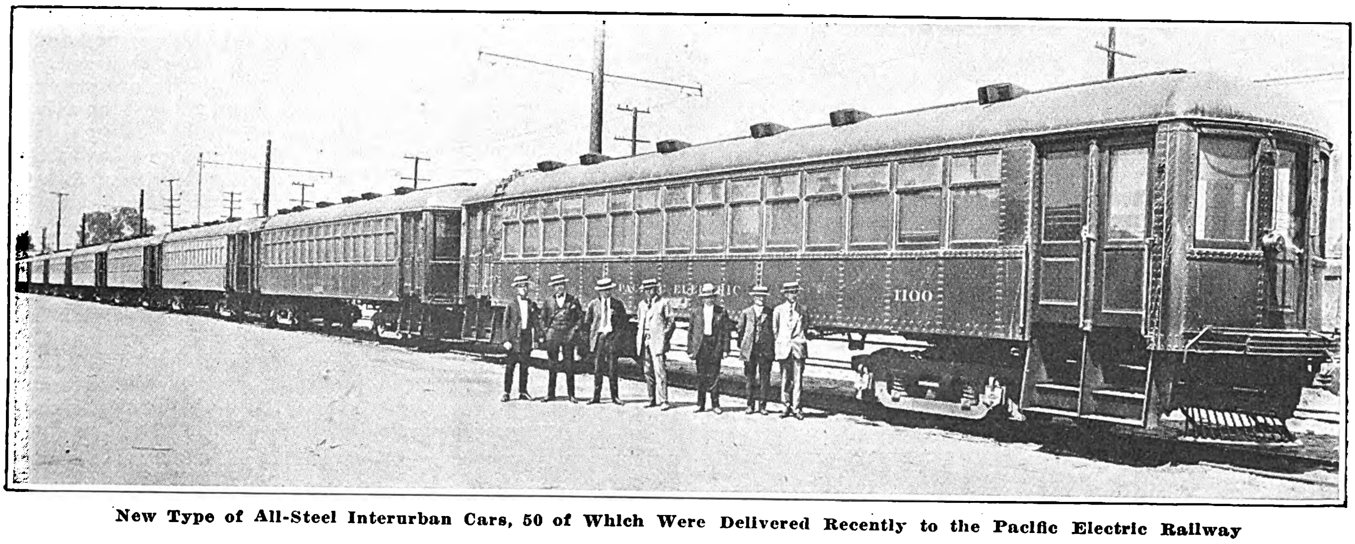
The establishment of a free nation-wide public employment service, to be maintained by the states in co-operation with the federal and local governments, for the benefit of men, women and juniors in all walks of life, is recommended by the Russell Sage Foundation in a 600-page report on employment methods, needs and agencies which was made public on Oct. 20 as the result of a five-year study which took the foundation's investigators into more than 70 cities of the United States and Canada.

The full report is being submitted to President Coolidge and to the governors of the states. The outstanding facts in the foundation's findings and its recommendations will be brought to the attention also of municipal and county officials, employers' associations, labor organizations, civic and social agencies and the executives of other organizations concerned with the general problems of employment or unemployment. The importance of the foundation's studies in this field becomes apparent when it is recalled that a preliminary statement made public several weeks ago showed that unemployment is no longer an occasional problem, but a constant phenomenon affecting large numbers of workers in every community.

Shelby M. Harrison, director of the department of surveys and exhibits of the Russell Sage Foundation, was in charge of the studies on which the report is based.

In conclusion the report says:

> Whichever proves finally the more desirable, an exclusively federal or a federal-state-local employment service, it is commonly conceded that the former is not at present feasible, and with this we are in agreement. To think that Congress, either now or in the immediate future, would appropriate $10,000,000 for an employment service, an amount estimated as necessary to provide an adequate basis is an idle dream. Expediency demands combined federal-state-local administration. We must begin with what we have.



New Type of All-Steel Interurban Cars, 50 of Which Were Delivered Recently to the Pacific Electric Railway

Metal, Coal and Material Prices

Metals—New York	Nov. 4, 1924
Copper, electrolytic, cents per lb.	13.375
Copper wire base, cents per lb.	15.125
Lead, cents per lb.	8.65
Zinc, cents per lb	6.575
Tin, Straits, cents per lb.	53.00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.475
Somerset mine run, Boston, net tons	2.05
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.375
Central, Ill., screenings, Chicago, net tons	1.125
Kansas screenings, Kansas City, net tons	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N. Y., cents per lb.	17.75
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.115
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.152
Turpentine (bbl. lots), N. Y., per gal.	0.875

Rolling Stock

Long Island Railroad, New York, has placed an order for 40 electric cars, to cost approximately $1,200,000. This represented the 1925 allotment for new equipment. The Westinghouse Electric & Manufacturing Company has received the contract for the electrical equipment in the new cars, which will cost about $450,000.

Toledo & Indiana Railroad, Toledo, Ohio, has placed seven new cars built by the Cincinnati Car Company in service between Toledo and Bryan. The cars are 45 ft. long, weigh 30,000 lb., seat 50 passengers, and have a maximum speed of 55 m.p.h. The new equipment includes white dome lights, electric foot warmers, and standard green plush automobile type cushion seats.

International Railway, Buffalo, N. Y., through its subsidiary, the International Bus Corporation, has ordered 16 double-deck buses for the Delaware Avenue line and 12 single-deck buses for the Delaware Avenue line. The double-deck buses will cost $176,000 and the single-deck buses $106,000.

Wisconsin Public Service Corporation, Green Bay, Wis., plans to replace the present four 25-hp. motors and trucks on its four interurban cars on the Green Bay-Kaukauna line with new trucks and 35-hp. motors.

Philadelphia & Western Railway, Norristown, Pa., has put in service a new light-weight interurban car built by the J. G. Brill Company with Brill light-weight trucks. The car weighs 57,000 lb. It is 50 ft. long by 9 ft. 6 in. wide and seats 65 passengers. The equipment consists of four Westinghouse 535-Bl motors, each of 60 hp. capacity. The control equipment is Westinghouse panelboard type with modifications so that this equipment will operate in trains with two other types of equipment now used by the Philadelphia & Western road. Westinghouse air brakes are used.

Track and Line

Boston, Mass.—The Boston Transit Department announces that bids will be open on Nov. 25 for the first section of trackage and incline 1,300 ft. long to connect the Boston Railway tunnel line at Andrew Square with the New Haven track grade. This is in line with the Shawmut branch electrification.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., plans to build an electric freight line from its Lakeside power plant to connect with the Chicago & Northwestern Railway.

Philadelphia Rapid Transit Company, Philadelphia, Pa., has announced its readiness to build an extension of its tracks from Fifth Street and Olney Avenue to Fifth Street and Green Lawn, with a loop at the latter point.

Inter-City Terminal Railway, North Little Rock, Ark., has been given the right to extend its lines along East Second Street to the city limits and along East Seventh and East Eighth Streets to B Street, according to an ordinance passed recently by the City Council by a vote of 7 to 2. The ordinance requires the company to pave between the rails and for 18 in. on each side of the track.

United Railways, St. Louis, Mo., has just completed the double tracking of Franklin Avenue for a distance of more than a mile at a cost of $230,000. When Easton Avenue between Twenty-eighth and Thirtieth Streets is widened it will be made a double-track street.

Southern Public Utilities Company, Charlotte, N. C., has started work at Winston-Salem on the rehabilitation of the line to Southside. The work, including a large amount of paving, will cost approximately $6,000.

Trade Notes

Combustion Engineering Corporation, Detroit, Mich., announces that James Cleary, formerly manager of its Philadelphia office, will assume management of the Detroit and Cleveland territories, with headquarters in Detroit. Frank Henderson will continue in charge of the Cleveland office. Joseph Lappin, formerly in charge of the Detroit office, has been assigned to New York for special work. The Detroit office has moved from the Penobscot Building to the Book Building.

Cameron & Barkley Company, Charleston, S. C., have been appointed district representatives for the Central Iron & Steel Company's Charleston district.

Hubbard & Company, Pittsburgh, Pa., manufacturers of pole line hardware, will erect a plant at Emeryville, Cal., to supply better the Western trade. It is expected that this plant will be completed and in operation by the middle of October. R. M. Kerschner, formerly sales manager of the electrical department, has been made Pacific Coast manager and has taken up his new duties.

Frank A. Wilch, who has been associated with the Cleveland office of the Triumph Electric Company of Cincinnati, has been placed in charge of that territory. He succeeds Edward S. Ford.

Economy Electric Devices Company, Chicago, Ill., announces that it has been appointed Central Western sales representative for the Chausse Oil Burner Company's kerosene burning torches and burners. These burners are used in connection with Babbit melters, enameling ovens and baking ovens.

Electric Service Supplies Company, Philadelphia, Pa., is now occupying new and larger offices in the Hudson Terminal Building, 50 Church Street, New York. The room number is now 1581.

Thomas K. Scott has been appointed Mid-West sales manager of the Taylor-Wharton Iron & Steel Company, Easton, Pa. He will be located at Denver, Col., in charge of the sales district of which Denver is headquarters. Mr. Scott has had a wide and profitable experience in mining. He entered the Columbia School of Mines in 1904, but left before completing his course in order to take up work for the Cumberland Ely Copper Company, Nevada. In 1908 he re-entered Columbia and completed his course, receiving the degree of engineer of mines. He has lately been chief engineer of Miami Copper Company.

New Advertising Literature

Ohio Brass Company, Mansfield, Ohio, has issued a new pamphlet giving information on the installation of its arc weld bonds.

Ramsey Chain Company, Albany, N. Y., has issued an interesting treatise "Power Transmission with Ramsey Silent Chain."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently issued Leaflet 20,190, including ten sheets, one each devoted to illustration and specific weights, dimensions and ratings on locomotives which have been built for the Pennsylvania Railroad, New York, New Haven & Hartford Railroad and Chicago, Milwaukee & St. Paul Railway.

Nichols-Lintern Company, Cleveland, Ohio, has issued a new catalogue, "File of Products by N-L." They give information and data on ventilators, indicating signals, stop-signals, lanterns and all other N-L products.

Shepard Electric Crane & Hoist Company, Montour Falls, N. Y., has issued a 60-page illustrated booklet entitled "Floor-Operated Electric Hoists." The pamphlet gives information regarding capacities, heights of lift and prices, as well as a description of each type of floor-operated hoist made by the Shepard Electric Crane & Hoist Company.

Griscom-Russell Company, New York, N. Y., has issued a new bulletin on Russell U-tube storage heaters. One of the features is the completeness, logical arrangement and legibility of the tables. These tabes cover a large number of steam pressures as well as initial and final water temperatures, and include complete details of tank sizes, capacities and dimensions for a wide range of storage capacities. Besides a complete description with details of construction and specifications of the Russell U-tube storage heater, the bulletin also contains a valuable table of data which has not hitherto been published on hot water requirements for various industrial and domestic uses.

Crouse-Hinds Company, Syracuse, N. Y., has issued Folder No. 17, on arktite circuit-breaking plugs and receptacles.

New York, Saturday, November 15, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 20

Machine Tools Will Be Developed Only if Electric Railways Buy

ONE of the most common deficiencies of electric railways is the glaring inadequacy of their shop equipment. Some 40 per cent of their machine tools are more than 20 years old. Many improvements in machine tools have been made, the benefits of which are not being shared to any extent in our field. These improvements should be given careful consideration as a part of their modernization program.

Some of the machines of late design which are particularly suitable for electric railway shop conditions include lathes, drill presses and planers, with provision for increased speed and capacity of the drive and feed mechanism to give greater production. Another marked improvement in machine tool equipment is in the new methods used for lubricating bearing parts. Many recent machines have forced-feed lubrication of all bearings and an oil bath for gearing. Rapid developments have been made in grinding machines, and many electric railways are obtaining definite economies from substitution of grinding operations for the machining methods previously used.

There has also been considerable activity in the design of smaller tools and general utility machines. These are very useful for small electric railway properties where the amount of work of one particular class is insufficient to warrant the investment in a special machine for a particular type of work.

Machine tool manufacturers have developed a number of new designs of machine tools particularly adapted to electric railway work. But these tools have not actually been constructed pending the receipt of orders. The manufacture and future development of machines especially designed for the electric railway thus depends to a large extent on whether electric railway men show signs of desiring such improvement by actual purchases.

An Amateur Watch Repairer Is a Poor Man to Imitate

THE story of the amateur watch repairer who after taking a clock apart and tinkering with it put it together again and had a number of wheels left over is familiar to all of us. It is a classic example of what happens when an unskilled workman undertakes a difficult job.

But what of the railway trackman who tears up the pavement to repair a joint and has a quantity of paving material left over after he has completed the work? Such things occur with greater frequency, perhaps, than some managements realize. The reason that there is a surplus of paving material, of course, is that the pavement has not been put back properly. It is a great deal more difficult to restore the surface as it should be than simply to fill up the hole with dirt and stones and to dispose of the excess material. Slipshod track maintenance methods of this kind, however, are as great a reproach to the railway which permits them as are the tinkering methods of the watchmaker who has extra parts left over.

Since the automobile has come into as widespread use as it has at the present time, the quality of the street paving is a matter of interest to a far larger number of people than it used to be. Coincident with this the electric railways have undertaken on a large scale to cultivate public good will in the communities they serve. But it is of little avail to talk of "friendlyizing" the public while continuing to do things that are a source of irritation to large numbers of people. It is certainly a mistake to economize on track maintenance to the extent that the pavement in the railway area contrasts unfavorably with the pavement elsewhere in the street. The money saved in making cheap pavement repairs is a poor economy if the finished surface is rough and unsightly, and a source of annoyance to the general public.

Using Railway Labor More Efficiently

THE problem of stabilizing the work done by the maintenance forces of an electric railway is rendered more important now that higher wages are being paid. Nearly all railway companies are using all the rolling stock they have available during the rush-hour period. Consequently it is necessary to make repairs during the off-peak interval. Usually, cars cannot be placed in the shops until 9 or 9:30 in the morning, and they must be released by 4 o'clock in the afternoon. The real problem of stabilizing labor is to provide something for the men to do before the cars are placed in the morning and after they are released at night.

There is much work which can be done during these times, but unless a careful program is laid out in advance, there is a tendency for the men to loaf or work inefficiently. One large railway with a number of inspection shops uses the men in the mornings, before the cars are placed, for making up and repairing stock of the particular class that the men are familiar with. Thus the controller inspectors make contact tips,

This is the issue in November that is devoted essentially to maintenance subjects

put new springs on controller fingers, remove carbonization from arc deflectors which are suitable for use to replace defective parts, etc. The motor inspectors look over carbon brushes that can be cut to smaller dimensions for reuse, and they repair brush-holder parts and the like. Oilers sort waste, look after its soaking with oil and get the day's supply ready. Other inspectors do similar work.

Still another part of the problem of stabilizing labor is to provide for uniform employment of forces at different periods of the year. The practice of releasing men at certain seasons and hiring new ones at the period of greatest need does not work out efficiently, since the railways lose the benefit of retaining men of experience. Among shop forces, a schedule of painting and general overhauling can be so laid out as to fill out the period when men will not be required on other work, and so they will work more efficiently and at the same time a uniform force will be kept through the year.

The track and way departments of steam roads have found that new rails can be laid almost as efficiently during the winter as during the summer season, and so many steam roads are placing their orders for rails during the latter part of the year with the idea of using their forces on this work during the winter season when they could not work on other track maintenance repairs. As an example of this, it is reported that three-quarters of a million tons of rail already have been ordered since Sept. 1. This tonnage is much larger than has been ordered in the same period for many years past. Interurban electric railways might follow this practice to advantage.

Hiring men when work is heavy and laying them off when it is light has been found to produce serious losses to the companies as well as being unsatisfactory to the employees. The methods suggested here would be a step in the direction of overcoming the loss which necessarily accompanies a frequent turnover of labor.

Better Maintenance at Lower Cost

THAT no maintenance situation is so bad that it is without hope was brought out forcefully in a paper by W. C. Bolt at the recent meeting of the New England Street Railway Club, which was abstracted in ELECTRIC RAILWAY JOURNAL for Nov. 8. Four years ago the situation on his road, the Eastern Massachusetts Street Railway, was deplorable. In July, 1920, a midsummer month, there were 1,489 equipment failures requiring removal of the car from service, or one pull-in for every 1,400 car-miles. The leading cause of trouble was hot bearings, with 339 failures, while air-brake troubles followed with 222 failures. Armature failures were altogether occurring at the rate of 500 per month.

Certainly such a record must have seemed almost hopeless. It represented a situation that had continued for years and had come to be considered in the same light as was the yellow fever by the inhabitants of the Canal Zone before American engineers got on the job—something that couldn't be cured and had to be endured.

While it must have been a huge task to overcome precedent and prejudice, the attempt was made, with the result that in September of this year there were only 104 maintenance pull-ins from all causes, or one for 14,500 car-miles—a record ten times as good as that in 1920. One large division even bettered this good record by running 75,000 car-miles per pull-in.

The skeptic can argue that any one can make such a record by spending enough in maintenance to keep the cars in first-class condition. The most surprising part of the story is that this good record has been obtained with a reduction in cost of maintenance per car-mile from 6.2 cents in 1920 to 3.54 cents this year —a total saving of more than half a million dollars.

Part of the saving has been due to the purchase of new cars with modern equipment, but a great deal has come from a better understanding of the work and the use of improved practices. Inspection is now made by meter inspection dials instead of in a haphazard manner, modern methods of armature and field coil repairs are used, and better oiling practices have been adopted. Welding is used for many important jobs. Painting is done frequently, but paint spraying has cut down the cost. The shop forces have been greatly reduced, the number of shop men dropping from 447 to 188 in the four years.

The record of this road is exceptional, but it is something that can be matched by any other road that is suffering from the same troubles. The use of modern practices, which is continuously being advocated by this paper, will give a like result wherever applied. It may even be bettered, for Mr. Bolt says that there is still room for improvement on his own property.

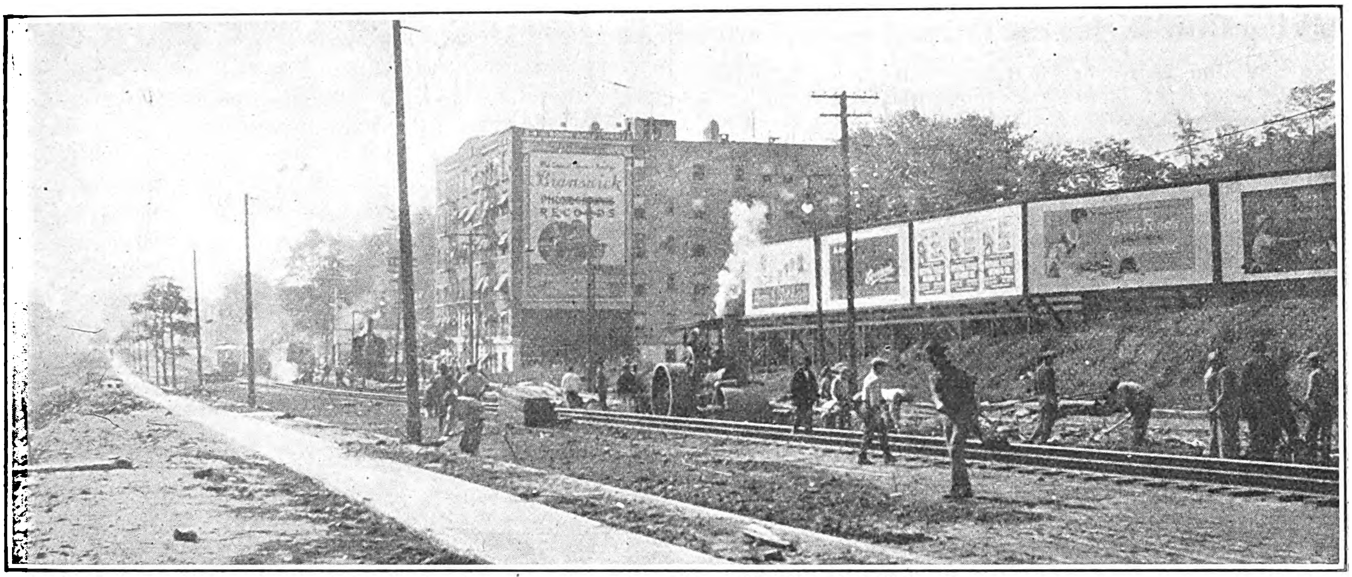
California and Washington Reject Government Ownership of Utilities

WHILE the defeat of Senator LaFollette in the national contest was decisive, it is reassuring to know that his schemes of public ownership were not the only ones rejected by the voters last week. Government ownership was an issue at several of the state elections, notably in California and Washington.

The referendum in California was on a measure to bond the state for $500,000,000 to permit it to acquire, construct and operate hydro-electric generating and transmission systems. But the electorate spoke in no uncertain voice, turning down the measure by a vote of considerably more than 2 to 1. This is the second time within the last two years that such a plan has been voted down by the people in California—a good indication of common sense in that commonwealth.

In Washington, which was another state to declare itself in favor of private initiative for utility operation, the measure under consideration was known as the Bone bill, and its purpose was to permit the cities and towns in the state to buy and sell electric current both within and without their corporate limits and to acquire and construct electric generating and distribution systems. Naturally, those who realize the danger of such a policy pointed out its defects, and the vote was decisive against it. Even in the city of its birth, Seattle, the measure was lost. The voters in that city have already had a taste of what municipal ownership of utilities means and wanted to preserve the state at large from a similar experience.

Altogether, considered not only from the national point of view but also from the local point of view, there is not much in the results of the last election that should give encouragement to the advocates of government ownership.



Careful Planning Made Possible the Completion of This Job in a Short Time. The Steam Shovel, Steam Roller, Track Layers, Joint Welders, Grinders, and the Paving Gang Followed One Another in Close Order

Rapid Track Reconstruction with Butt-Welded Joints

Third Avenue Railway Tries New Butt-Weld Method of Making Joints on Large Replacement Job on Upper Broadway—Designed by Manufacturer to Facilitate the Work—This and Careful Organization Made Speedy Progress Possible—Easily Moved Crossovers Aided in Avoiding Interruption to Service

ON A RECENT reconstruction job, the Third Avenue Railway, New York City, has been using the new electric butt-weld type of joint developed by the Lorain Steel Company. Prior to this installation by the Third Avenue Railway, butt-welded joints made under pressure were tried in Boston and in Philadelphia. About 500 joints were made in each place. In Philadelphia, the welding was done at the side of the street and long lengths of welded rail were then moved over into place in the track structure. In Boston, the procedure followed was substantially the same as that of the recent job in New York City, described here.

The reconstruction of 1½ miles of double track on Broadway from 242d Street to the Yonkers city line was undertaken when the city decided some time ago to repave the streets. The street here is part of the famous Albany Post Road and carries extremely heavy vehicular traffic. It was therefore desired that the period during which the street was torn up and closed to traffic be as short as possible. Railway traffic along this route also is heavy and the company wished to carry out the work with a minimum number of interruptions to service.

The old track structure consisted of 9-in. grooved girder rail L. S. Co. No. 323 on untreated wood ties with bolted joints. The new construction is with standard A.E.R.E.A. 7-in. 122-lb. grooved girder rail on new creosoted ties spaced 2 ft. on centers. It is estimated that the total cost of the work will be approximately $180,000.

On this section of upper Broadway the old track had been in service for many years and for some time the company had been considering its replacement. Actual work was not undertaken, however, until the city decided to repave the streets. The reconstruction was very carefully organized in order that it might proceed with the least possible delay. Work was carried on simultaneously from two points on the job, in the following manner:

The first step in the reconstruction was to cut the old rail by an oxyacetylene torch every 20 ft. throughout its length. This cut was made down to within a short distance of the base of the rail. After this had been done, cars continued to operate over the cut rail until the time came for it to be taken up.

Then a sliding crossover was placed at each end of the strip of track to be torn up. Special importance attaches to the use of sliding crossovers, because they permitted the operation of cars past the reconstruction work on a single track on comparatively short headway. The design of these crossovers is such that they can be moved easily from one location to another. This is done by fastening each side of the crossover to the rear of a work car. The cars are then moved simultaneously in the same direction, pulling the crossover behind them. Unless there is some obstruction in the center of the right-of-way between the tracks, the crossover can be moved without being taken apart. This process is much simpler than that of taking apart the usual bolted crossover, loading the pieces onto a car, conveying them to the new location, unloading them from the car, and putting them together again. The process of moving a sliding crossover is so simple

that the plan called for moving these every night and thereby made it possible to keep down to a minimum the length of single-track operation.

The old pavement and rail were taken up by steam shovels and loaded on to automobile trucks. Behind the steam shovels a gang of men with picks and hand shovels completed the job of preparing the subgrade, which was then thoroughly compressed by steam rollers. On account of the large number of small stones mixed with the soil in this locality, the ground after rolling has practically the qualities of a ballasted track foundation.

New creosoted ties were placed directly on the rolled earth. The new rail was then laid on the ties and loosely spiked. Because the rails are squeezed together during the welding operation, it was necessary to leave the rails loose enough so that they could be drawn into position for making the weld.

A powerful pressure clamp which is shown in an accompanying illustration was supported on rollers running on the heads of the rails. In making a weld the clamp was placed over the two rail ends and wedged firmly to them. The ends of the rails were kept separated about ⅜ in. and clay molds placed around them. These molds had previously been formed and then baked in an electric furnace located in one of the grinding cars. Into these molds was poured molten borax heated in another furnace in the welding car. Low-voltage electric current sent through the joint keeps the borax boiling and brings the rail ends to the temperature necessary for welding.

When this temperature is reached a pressure of 5,000 lb. per square inch is obtained by hand-operated hydraulic jacks, and the rails are pulled together with sufficient force to upset the ends and give a thorough weld. This process produces an excellent joint with only a small amount of superfluous metal to be removed from the head of the rail. The appearance of such a joint is shown in an accompanying illustration. Although there are bolt holes in the rail, these play no part in the process. The Third Avenue Railway customarily buys rail with such holes already made, and the usual rail was used on this job regardless of the fact that the bolt holes were not needed. All joints were post-heated before grinding. For this purpose an oil torch was used, operated by air pressure from the welding car.

The grinding of the joints was done in three steps. First, a large rotary grinder, that was virtually a planer, was used to make the head of the rail smooth. This was followed by another car specially designed by the Lorain Steel Company to remove the surplus upset metal from the groove of the rail. Finally, a workman with a small electric hand grinder went over the joint and put the finishing touches to it. One welding and two grinding cars were used and they followed one another in close order as the joints were made. Two sets of pressure clamps were used, one on each rail, the first being adjusted to position while the second was used in making a joint. Immediately behind the welding car came the first of the grinding cars to smooth the head of the rail. A short distance behind the second car came the third, equipped to grind the groove of the rail. To this third car was attached the hand electric grinder.

After the joints had been made, the space between the ties was filled in with the same mixture of dirt and rock that was used for the foundation. Tamping and back ramming of this material were all done mechanically by means of Ingersoll-Rand tie tampers.

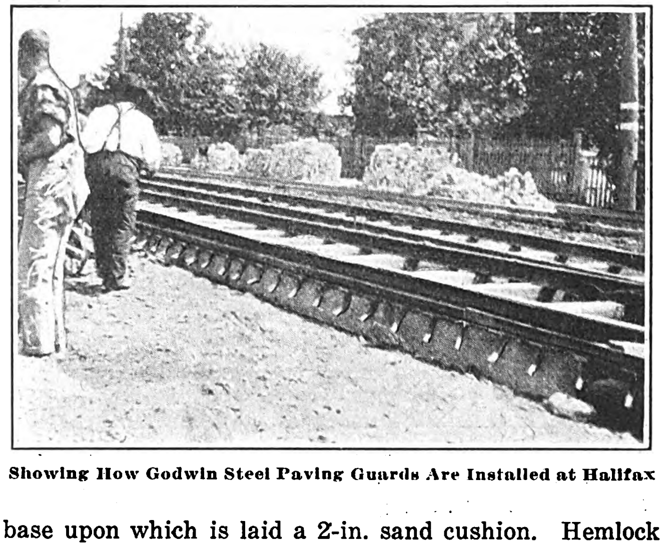
The railway company's contract with the Lorain Steel Company called for an average of 18 joints per day, but on several days 30 joints were made in less than 9 hours. With 60-ft. rail this means close to 1,000 ft., or four city blocks, of track per day.

Under the laws of New York State, the railway company has the option of itself paving the area for which it is responsible or of allowing the city to do this work. In this case the city is paving the entire street from curb to curb, and the railway company employed the city contractor to excavate and prepare the railway area ready for laying the ties. Some hesitancy was felt by the municipal authorities in allowing the railway and the contractor to close the street altogether to vehicular traffic. It was pointed out, however, that by having the use of the entire area during the period of reconstruction it would be possible to perform the work much more quickly than could otherwise be done, and thereby reduce the total amount of delay to vehicular traffic.

Paving Guards Used in Halifax

AN INTERESTING type of track structure has been used for the past two years by the Nova Scotia Tramways & Power Company, Ltd., Halifax. In streets where there are car tracks the city paving area extends to the end of the ties. At this point Godwin steel paving guards have been installed to separate the city paving from the railway paving, and to prevent the disintegration which in the past has occurred along this line.

The track structure itself consists of a 6-in. concrete base upon which is laid a 2-in. sand cushion. Hemlock ties 6 in. x 7 in. x 7 ft. are used. The rail is 60-lb. T Lorain section 263. Joints are of the continuous bolted type with six special hard carbon steel bolts per joint. Similarly a 6-in. concrete base is used for the paving with a 1-in. sand cushion. The surface is a 3-in. layer of asphalt.

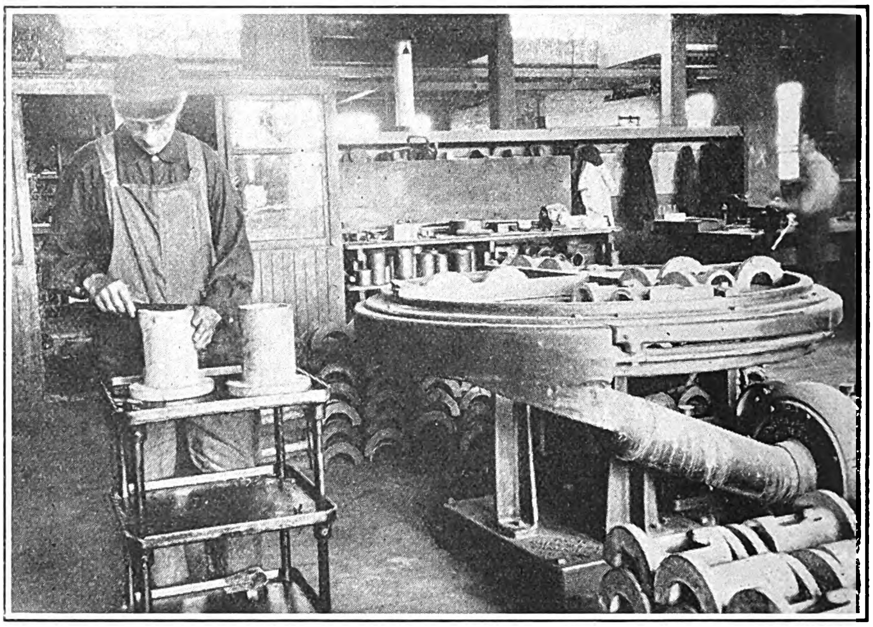


Showing How Godwin Steel Paving Guards Are Installed at Halifax

The use of paving guards in Halifax has proved satisfactory and economical. Neither the action of the severe winter weather nor the pounding of heavy traffic has destroyed the edge of paving where these guards have been installed.

Special Tools Facilitate Machining of Bearings

By the Development and Employment of Many Special Tools the Twin City Rapid Transit Company Has Applied Production Methods to the Various Operations of Finishing Bearing Shells



The Joining Surfaces of Axle-Bearing Shells Are Finished on a Surface Disk Grinder at the Rate of 180 Half Shells per Hour

APPLICATION of modern production methods to the various operations connected with machining of axle and armature bearings offers many opportunities for substantial savings in time and costs. In the mechanical department of the Twin City Rapid Transit Company these various operations are laid out with a view toward the efficient use of special machine and tool equipment.

Both solid bronze and babbitt-lined malleable-iron axle bearings are used on this property. In general, it is the practice to use the babbitt-lined malleable type of axle bearing on those motors where the axle and bearing housing diameters are such that the thickness of the metal in the bearing shell is not less than $\frac{7}{16}$ in. to $\frac{1}{2}$ in. With this type of bearing, the malleable shell is lined with about $\frac{3}{16}$ in. thickness of babbitt, and the outside face of the bearing flange is also babbitted. When the motor and axle design do not permit the use of a bearing shell thickness of at least $\frac{7}{16}$ in., the solid bronze type of shell is used.

SPECIAL TOOLS PLAY IMPORTANT PART

In machining both the solid bronze and the malleable shells, the operations are carried out by similar methods, with only such changes as are required by the difference in the materials and the design of the shell. In both cases the various processes are designed to give maximum production with minimum lost motion and handling.

The first operation in machining bronze axle-bearing shells consists in facing off the joining surface on each half of the shell. This is done on a No. 19 Besly surface disk grinder having a disk diameter of 53 in. Across the top of the machine frame two right-angled crossbars allow four groups of shells to be placed on the grinding disk simultaneously. Thus, as two halves are ground against each of the bars, a total of eight halves can be put on the machine at one time. The bearings are simply placed on the face of the grinder and their own weight is sufficient to dress down the flat joining surfaces. The man in attendance keeps the machine filled with bearings and checks the dimensions of those that have been ground so as to make them each as nearly a perfect half as possible. This operation is completed by one man at the rate of 180 half shells per hour, or 90 complete bearings.

After the joining surfaces are finished the next operation is to bore out the interior of the shell. This is done in a horizontal boring mill. A split fitting fastened to the bed of the machine is arranged so that the two bearing halves are securely held together when the cap bolts shown in an accompanying illustration are pulled down. A through boring bar is used and the operation is completed in one cut. The bar is adjustable vertically in the heads of the machine, and by this adjustment the cut is taken exactly in the center of the shell.

TWO HALVES STAMPED TO CORRESPOND

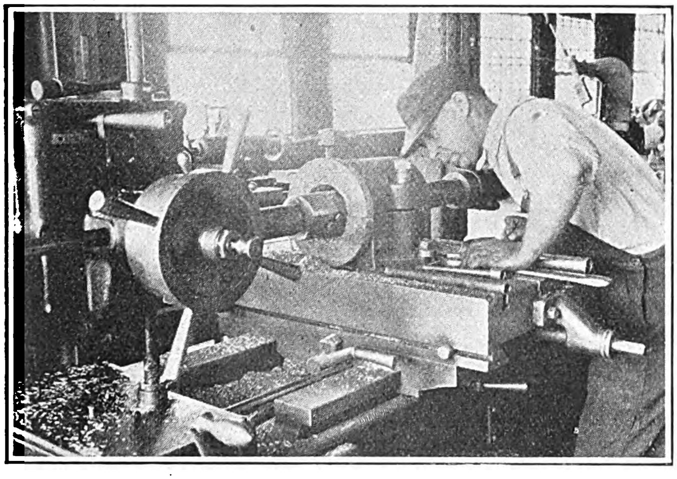
Before the bearing is removed from the boring jig, the two halves are stamped with corresponding numbers, so that they will be kept together during subsequent operations. The next of these is the operation of facing the outside of the flange and rounding the edge connecting this face and the inside bore. This is done in a Warner and Swasey 2A turret lathe. The two halves of the bearing are held together on a mandrel by means of an outside clamp ring. The solid ring is slipped over the bearing, and the two halves are held tightly against the mandrel by means of a setscrew. To accommodate bearings of various sizes of internal bore, special sleeves to fit each different size of bearing are provided for the mandrel. The set-up for this operation is shown in an accompanying illustration.

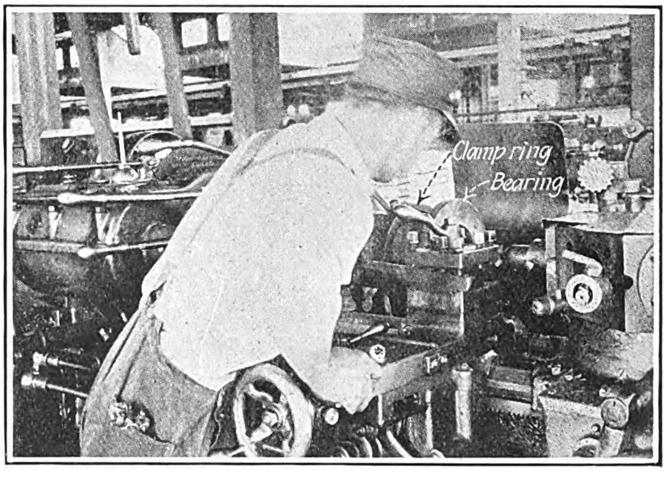
In the next operation the remainder of the outside of the bearing is finish turned. The two halves are again held on an arbor, but in order to allow the outside circumference to be finished without turning the bearing around to complete the cut, the arbor is arranged so that a clamping nut forces a disk against the end of the bearing and clamps it tightly against a collar on the end of the arbor. Both the disk and collar have knife edges which are forced against the bearing, so that these edges grip the shell and effectually hold the two halves in place. The collar at the flange end is large enough so that its knife edge clears the fillet and bites into the face of the flange. The edges on the disk at the small end of the bearing bite into the metal at the end of the shell. The collar at the large end is a permanent part of the arbor spindle, while the disk at the small end is free to slide on the spindle as the nut on that end is pulled up.

The fifth and last operation in finishing these shells consists of drilling and countersinking the dowel-pin holes. These are located by means of a jig which consists of a large sleeve into which the two bearing halves are placed, so that the split between the two halves corresponds to a scribe mark on the jig. This brings the dowel-pin holes in their proper location.

SIMILAR OPERATIONS ON MALLEABLE SHELLS

Malleable-iron shells are finished in the same general manner as the split bronze type, except for such variations as are incident to the difference in material and design. The joining surfaces of the two halves of the malleable shells are finished on the surface grinder in the same way as described for the bronze shells. The malleable-iron castings, however, have babbitt retaining grooves cast into the inside surface, and this requires an additional operation of grinding the fins from the edges of these grooves.


While the Two Halves Are Held in a Split Jig, the Interior Bore of Axle Bearings Is Finished in One Cut



A Clamping Ring on the Outside Holds the Two Halves of Axle Bearings on an Arbor While Facing the Flange

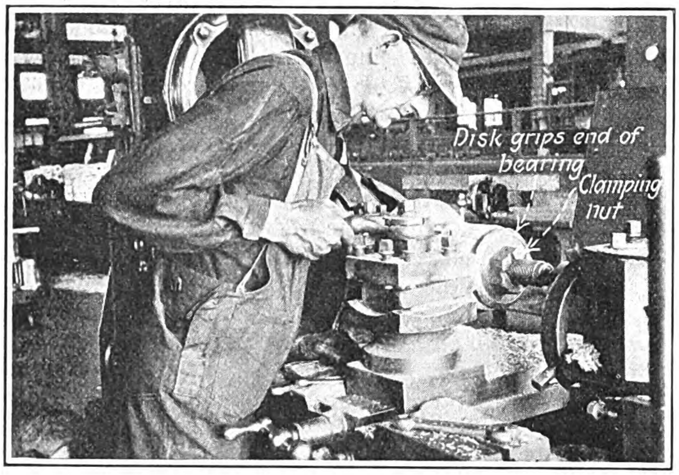
The operation of finishing the face of the flange, and rounding the inside edge, is carried out similarly to the corresponding operation on the bronze shells. In addition, however, a dovetail groove is turned in the face of the malleable flange, to help in retaining the babbitt that is put on this face to take end thrust wear.

After this is done, the small end of the bearing is faced off to remove the fin and square up the end surface. The same type of arbor and clamp that was described for facing the flanges on bronze shells is used for this operation, except that a pin on the arbor projects through the bearing window and helps to drive the casting. This pin is found necessary to keep the shell from slipping on the arbor due to the drag of the heavy cut that must be taken from a rough malleable casting. The pin is not used for finishing the bronze material, as in that case the grip of the outside clamp ring is ample to prevent the bearing from turning on the arbor.

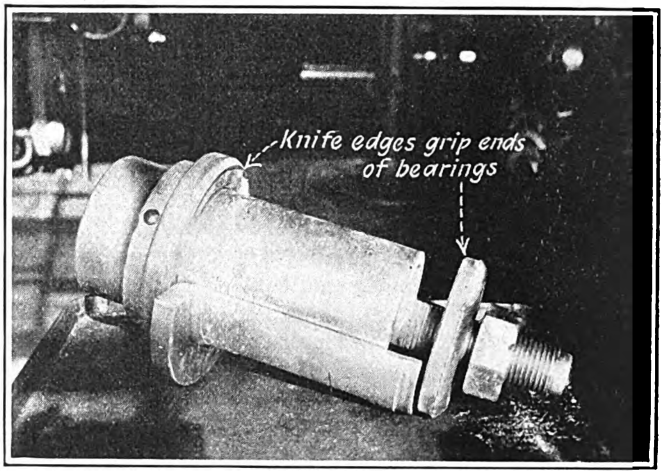
Turning the outside of the bearing to make it fit in the motor housing is the fifth operation on malleable shells. This work, together with that of finishing the inside face of the flange, is performed in the lathe while the bearings are held in place on an arbor by gripping disks on the ends in the same way as was described for bronze bearings. In order to get a firm grip on the harder malleable material, the loose disk is pulled up as tightly as possible with the nut on the arbor and is then rapped with a small hand mallet and the nut again pulled up tight. The next step is to bore out the inside to the proper size after babbitting.

First the surplus babbitt is removed with a coarse file and the mating surfaces are carefully smoothed up so that the bearing will fit into the boring chuck. This is an eccentric clamp chuck and was specially designed for this boring operation. The construction is shown in an accompanying illustration. It will be noted that the body of the chuck consists of a solid steel cylinder. Four heavy pins pass through this cylinder near each end, and are spanned on the outside by two clamping rings, arranged with tapered surfaces in contact with the outside ends of the pins. When the rings are turned through a short distance, the pins are forced in against the bearing and hold it securely in the chuck. The design and arrangement is such that the bearing is accurately centered, thus insuring that the finish bore through the babbitt will be exactly concentric with the shell. The far end of the chuck in the illustration is threaded to fit the headstock spindle of a turret lathe.

With the bearing thus mounted in the turret lathe, the interior bore and the facing operation on the flange are performed at one setting. The short boring tool is carried in the turret, and the facing tool is mounted in the tool post. This facing tool is carefully squared up with the flange, so that the finish cut is made by simply bringing the tool against the face of the flange with the longitudinal hand feed on the machine. The end of the facing tool is hook-shaped as shown in the accompanying sketch, and by moving



The Outside Is Turned and the Inside Face of the Flange Is Finished in This Set-Up



Above, Arbor for Set-Up Shown at the Left. The Two Halves Are Held by Disks Which Clamp Against the Ends

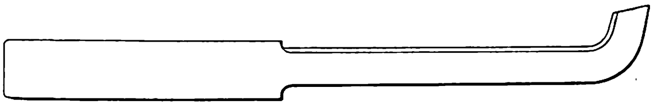
the tool out with the lateral hand feed, the inside edge is quickly finished in practically the same operation as that of facing the flange. The inside bore is finished so that the bearing will just fit a standard plug that is used for checking the size.

On the malleable bearings, as in the case of the bronze shells, the last machining operation consists of drilling the dowel-pin holes. This is done in a jig which is very similar to that described for drilling the bronze shells.

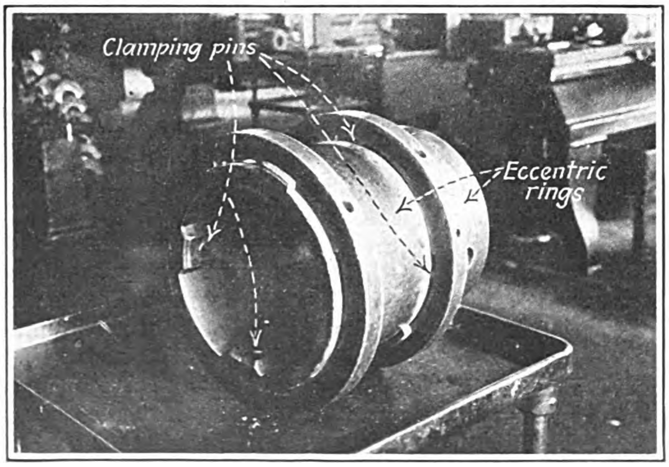
ARMATURE BEARING OPERATIONS SIMPLIFIED

All armature bearings consist of bronze shells cast in one piece, which in some respects lend themselves more readily to efficient machining than is the case with the split shells used for axle bearings. The casting is first chucked by the small end in an independent jawed chuck, which allows the piece to be readily centered in a lathe. With this set-up in a turret lathe, the interior is bored and the outside face of the flange is finished. A ring 1/16 in. deep and 3/16 in. wide is cut into the inside bore of the bearing shell about ½ in. from each end, to help hold the babbitt lining in place.

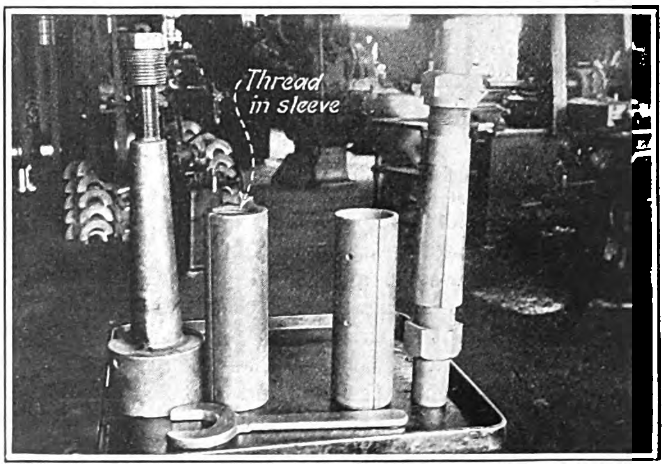
The bearing is next slipped on an expanding mandrel for finishing the outside. This special tool consists of a center spindle having a taper of 1¼ in. per foot, and an expanding sleeve that grips the inside of the bearing. Cast-iron sleeves are made up in various sizes to fit the different-sized bearings. A longitudinal slot about ⅛ in. wide is cut clear through the sleeve on one side, and two slots about 1/16 in. wide are cut into the outside face to within about ⅛ in. of the inside bore of the sleeve. The three slots are equally spaced about the circumference, so that the sleeve can expand when it is forced onto the tapered spindle of the mandrel. A large nut on the small end of the spindle is threaded right hand on the inside and also has a long shoulder which is threaded in the same direction on the outside. Although both the inside and outside threads on this nut are right hand, those on the inside, which fit corresponding threads on the end of the mandrel spindle, are pitched 12 to the inch, while those on the outside are pitched six to the inch. These outside threads fit corresponding threads on the inside of one end of the expanding sleeve. Consequently, when the nut is screwed to the left it forces the sleeve up on the tapered spindle at a rate corresponding to the difference in pitch between the inside and the outside threads, and when the nut is screwed to the right it pulls the sleeve off the taper at the same speed.



The Hook on the End of This Facing Tool Finishes the Inside Rounded Edge Immediately After the Babbitt on the Face of the Flange Is Finished



This Special Chuck Centers the Finished Malleable-Iron Bearings So that the Final Bore in the Babbitt Can Be Made. The Outside Rings Force Pins Against the Shell and Hold It Securely



Expanding Mandrels of Two Types Are Used for Holding Armature Bearings While the Outside Is Being Finished. Left, Mandrel Used in Turret Lathe. Right, in Engine Lathe

A short keyway extending for about 3 in. from the shoulder near the small end of the spindle forms a guide for a short pin projecting from the inside face of the sleeve, and serves to keep the latter from rotating as the nut is turned in either direction.

This expanding mandrel has a large head at the opposite end from the adjustment nut just described, and is threaded on the inside to fit the threads on the turret lathe headstock spindle.

ALSO DESIGNED FOR ENGINE LATHE

When the available turret lathes are crowded with work, it is sometimes necessary to finish armature bearings in an ordinary engine lathe. Under these conditions the work must be done between the centers of the lathe, and a somewhat different type of expanding mandrel is used to hold the bearings. In this type of mandrel a nut is provided on each end, one to force the sleeve on the tapered spindle, and the other to force it off. A keyway the entire length of the spindle keeps the sleeve from turning as it is forced on or off. Although the construction of this type of mandrel is somewhat simpler than the one previously described, the turret lathe method is used whenever machines are available, because it is necessary to remove the mandrel from between the centers of the engine lathe each time a bearing is to be put on or taken off. The entire outside surface of the bearing is finished on one or the other type of mandrel in one operation.

Dowel-pin holes or keyways, depending on the method of holding the bearing in the motor head, are next put in.

After the shell has been babbitted, the last operation consists of boring the babbitt lining to size. This is done on an engine lathe equipped with a universal chuck and a special tool post, which enables a boring bar to be used in the lathe.

New Chicago Multiple-Unit Cars Have Automatic Exit Doors

These New Type Cars of the Chicago Surface Lines Are Designed to Give Maximum Flexibility Either as Single Units or in Two-Car Trains — They Are Arranged for Double-End Operation and Are Equipped with Two 65-Hp. Motors per Car Mounted on Maximum Traction Trucks

A GROUP of 100 new cars for the Chicago Surface Lines on which preliminary specifications were announced in the issue of ELECTRIC RAILWAY JOURNAL of April 12, 1924, are rapidly nearing completion. Some of the cars have already been put in service and it is expected that the entire lot will be on the street in regular operation before the Christmas holiday period.

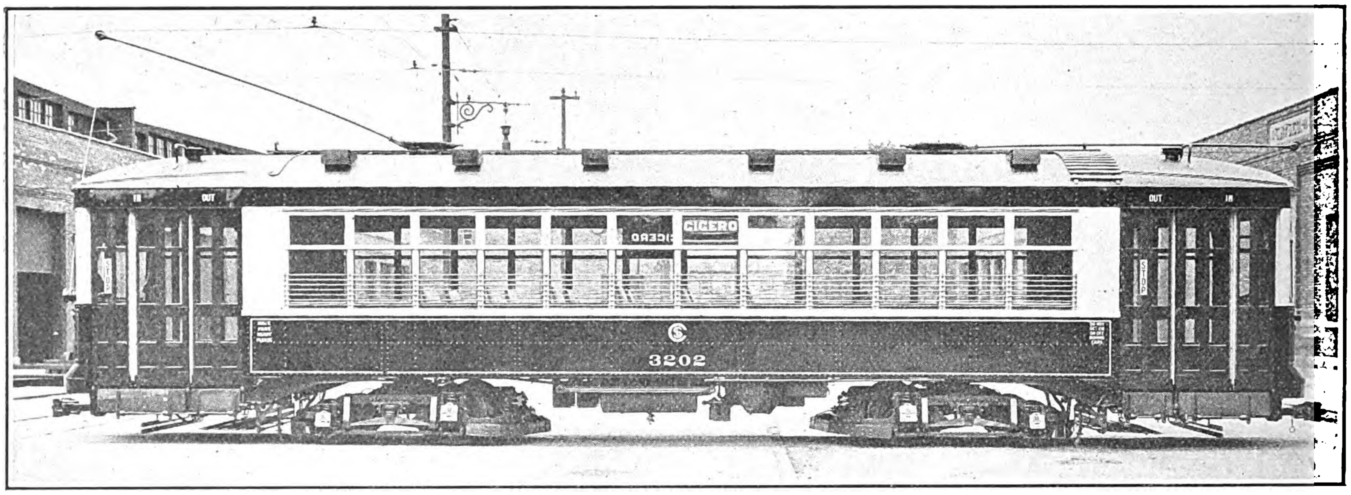
Although the design of this latest addition to the rolling stock equipment of the Surface Lines utilizes many structural features common to other groups of cars built by that property within the past few years, a number of interesting innovations are also incorporated. These include the use of G.E. type M multiple-unit control with two motors per car and maximum traction trucks, and an unusually flexible arrangement of pneumatic door control in which the exit doors are automatically operated by alighting passengers. A similar type of automatic exit door control was installed on a group of 45 double-truck, one-man cars described in the ELECTRIC RAILWAY JOURNAL of Sept. 30, 1922, which have now been in service for a period of more than two years. This latest design, however, represents an extension of the use of the automatic device to cars for service in congested districts either as single units or in multiple-unit trains.

A substantial saving in weight and cost in comparison with four-motor equipment was obtained by the use of two GE-275, 65-hp. motors per car mounted on Brill 39-E maximum traction trucks. The selection of this type of motor equipment instead of four smaller motors per car was also influenced by the desire to obtain rugged, comparatively low-speed machines for the severe service conditions encountered in Chicago. Such equipment gives large-size armature shafts, gears and pinions, and makes the motor parts interchangeable with those used on other groups of cars constructed within the past few years.

Multiple-unit control gives these cars maximum flexibility and permits single units to be operated during non-rush periods and to be readily coupled on the street into trains for rush-hour service without serious delays. Double-end equipment permits them to be operated on lines having stub terminals. Tomlinson automatic car and air couplers facilitate coupling and uncoupling on the street, but the electrical connections between cars are made with flexible jumpers. This application of multiple-unit control marks a further extension of train operation in Chicago, which for a number of years has been carried out with motor cars and center-entrance trailers.

MAXIMUM SPEED IN LOADING AND UNLOADING

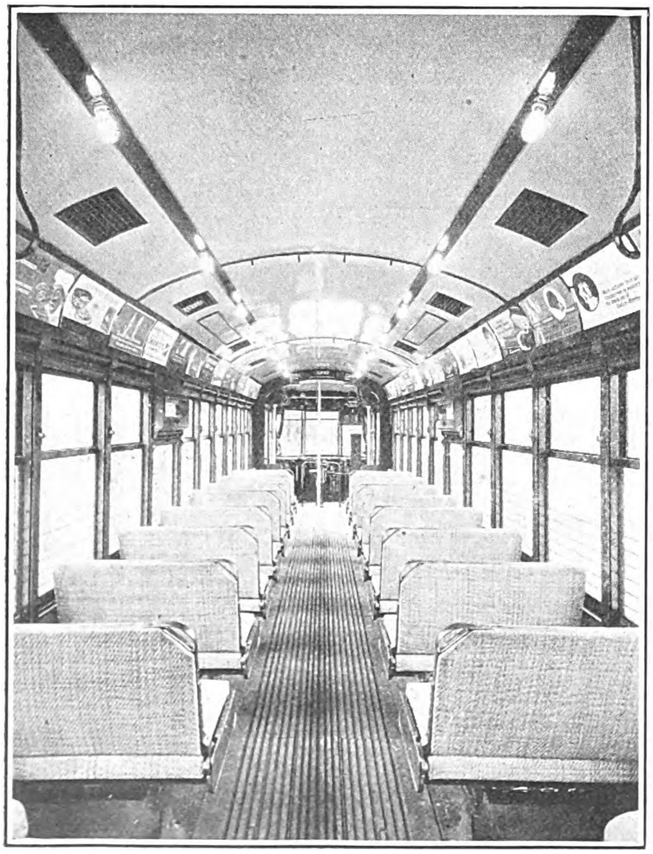
National Pneumatic door-control equipment is arranged to give maximum speed of loading and unloading in either street or subway operation. The door and car control are interlocked to prevent starting with the doors open, and full Safety Car Devices apparatus is also used. Single-car units will be operated by two men. In trains of two cars there will be three men, two on the front car and one on the front end of the rear car. In either direction of operation, the doors at the rear end of each car may be con-



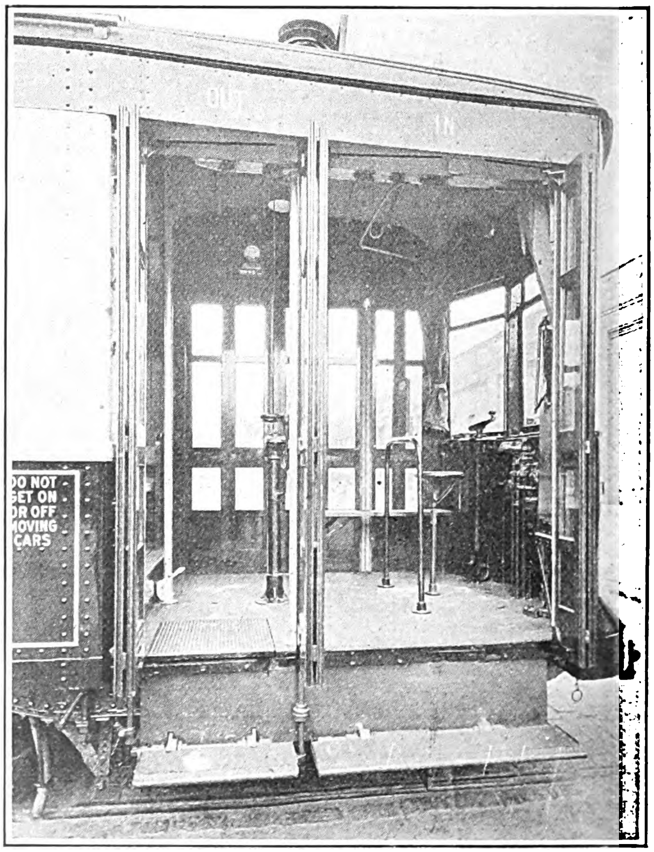
The New Chicago Surface Lines Cars Have Multiple-Unit Control and Are Arranged for Operation Singly or in Trains of Two Cars. Streamline Effect in the Body Gives It a Graceful Appearance

trolled by an operator on either platform, or by street collectors. This allows the rear door of the second car in a train to be opened and closed by the conductor stationed on the front platform of that car or by a man on the street supplied with a key to fit the door-control valve located on the outside near the rear door. The automatic exit doors are located on each platform as shown in the accompanying plan drawing, and those at the front end of each car are operative when the train is moving in that direction.

One of the principal features of the arrangement of doors when the cars are operated in trains is the grouping of the entrances at the center of the train. In other words, passengers enter the front car at the rear end and leave this car at either the rear or the front end, while they enter the rear car at the front end and leave at the same end. When street collectors are available, passengers may also be allowed to enter or alight from the rear end of the second car. This arrangement for loading both the front and rear cars at one point in the center of the train is expected to give more uniform distribution of passengers between the two cars than is obtained where the points of boarding the two cars are separated, as in the case of a rear loading motor car and a center loading trailer. In addition, this design is expected to avoid the delay and confusion resulting from passengers trying to board the train at two different locations.



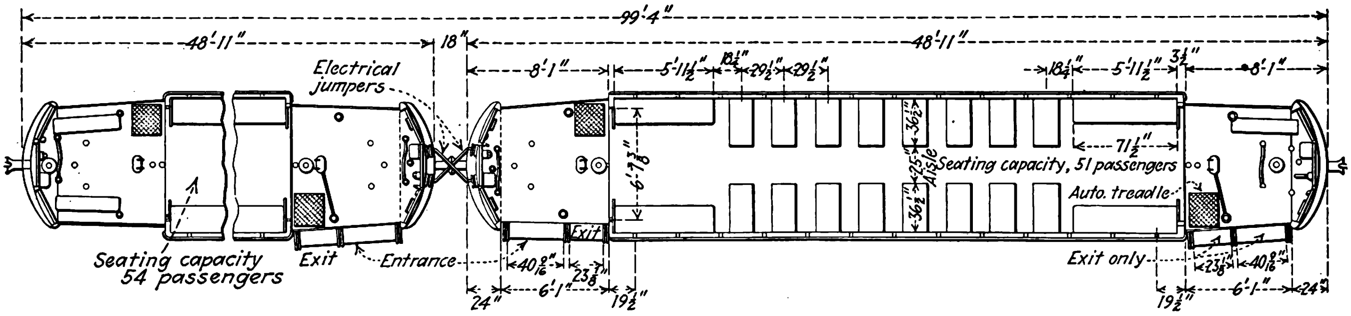
Simple Lines and Smooth Curves with the Dull Finished Cherry Trimming Feature the Interior of This Car. The Wide Aisle Facilitates Passenger Movement.



The Automatic Exit Doors Are Controlled by a Treadle in the Platform Floor. Passengers Board Through the Door at the Right and Leave Through the Automatic Exit.

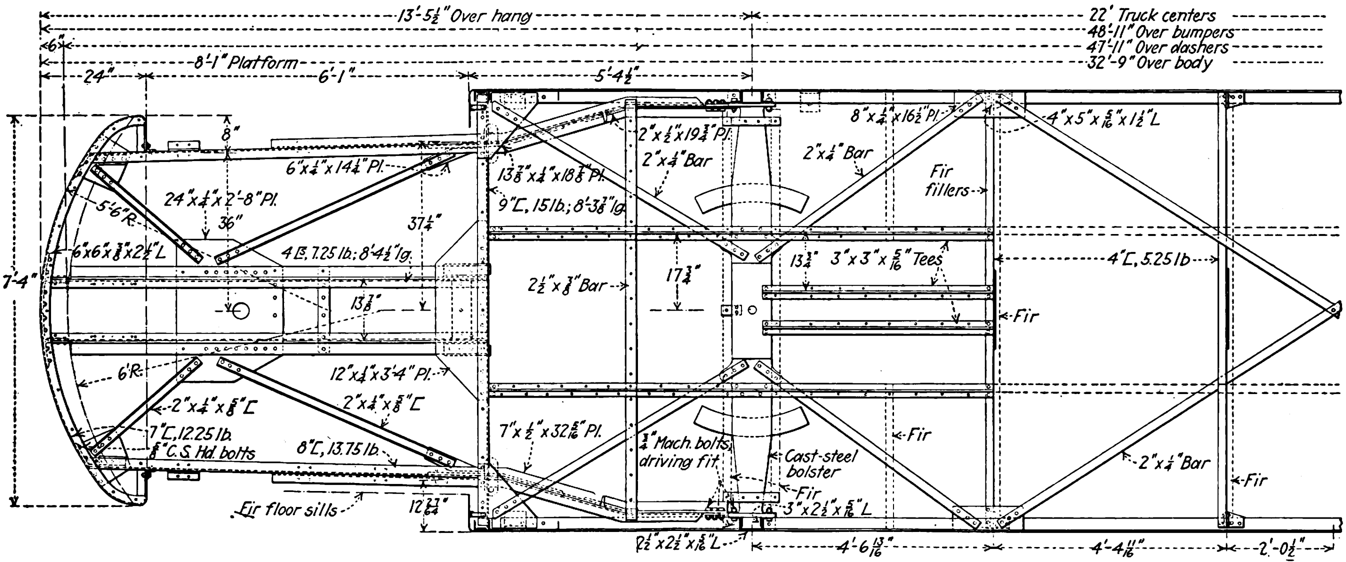
The new cars were designed completely by the engineering division of the shops and equipment department of the Surface Lines under the direction of H. H. Adams, superintendent of shops and equipment. Fifty cars are being constructed in the West Shops of the company and the remaining 50 are being built to Surface Lines specifications and drawings by the Light-Weight Noiseless Electric Street Car Company in St. Paul, Minn. The two groups are identical in construction and all parts of the equipment and structure are being made as nearly interchangeable as possible to facilitate maintenance and repair. The general appearance corresponds with the arch-roof cars now in service on the Surface Lines and, as in former groups of cars, careful attention has been given to the matter of improving the appearance by giving the body a streamline effect.

Minimum weight consistent with the severe service conditions encountered was another objective in the design. The complete cars weigh 41,000 lb. each. This weight is distributed between car structure and equipment as follows:



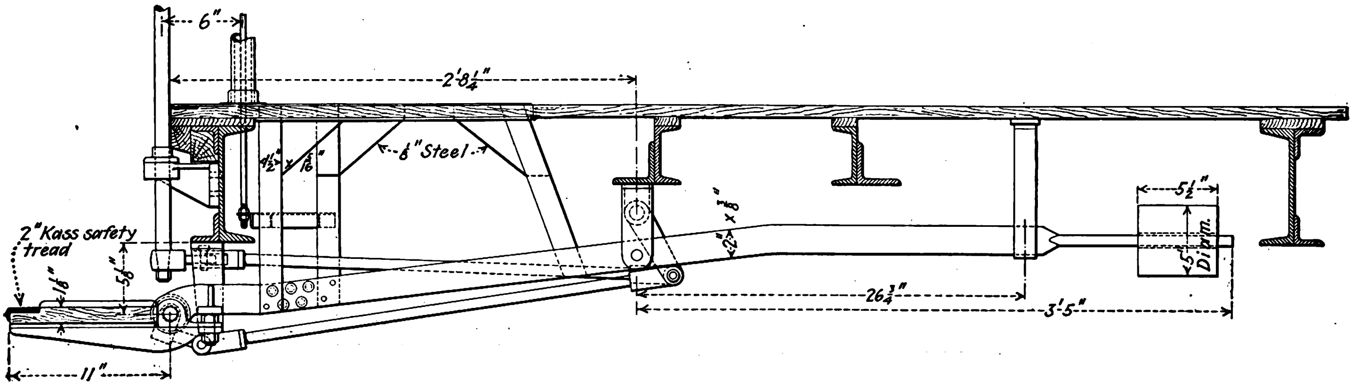
99'-4"
48'-11"
18"
48'-11"
Electrical jumpers
8'-1"
5'-11½"
18¼"
29½"
29½"
18¼"
5'-11½"
3½"
8'-1"
6'-7⅜"
36½"
25"
36½"
Aisle
7½"
Seating capacity, 51 passengers
Auto. treadle
Exit
Seating capacity 54 passengers
Exit
Entrance
Exit only
40 9/16"
23⅛"
24"
6'-1"
19½"
19½"
23⅛"
40 9/16"
6'-1"
24"

The Front Car of a Two-Car Train Seats 51 Passengers and the Rear Car Seats 54. Automatic Couplers Connect the Air Line, but the Electrical Connections Are Made with Jumpers



13'-5½" Over hang
22' Truck centers
48'-11" Over bumpers
47'-11" Over dashers
32'-9" Over body
6"
8'-1" Platform
24"
6'-1"
5'-4½"
7'-4"
8"
6"x¼"x14¼" Pl.
24"x¼"x2'-8" Pl.
36"
5'-6" R.
6"x6"x⅜"x2½" L
37¼"
4 [, 7.25 lb.; 8'-4½" lg.
13⅞"
6' R.
2"x¼"x⅝" [
7" [, 12.25 lb.
⅝" C.S. Hd. bolts
12"x¼"x3'-4" Pl.
2"x¼"x⅝" [
8" [, 13.75 lb.
Fir floor sills
12 21/64"
2"x½"x19¾" Pl.
2"x¼" Bar
13⅞"x¼"x18⅞" Pl.
9" [, 15 lb.; 8'-3⅞" lg.
2½"x⅜" Bar
17¾"
7"x½"x32 5/16" Pl.
¾" Mach. bolts, driving fit
Cast-steel bolster
Fir
3"x2½"x5/16" L
2½"x2½"x5/16" L
8"x¼"x16½" Pl.
2"x¼" Bar
Fir fillers
4"x5"x5/16"x1½" L
13¾"
3"x3"x5/16" Tees
4" [, 5.25 lb.
Fir
Fir
2"x¼" Bar
Fir
4'-6 13/16"
4'-4 11/16"
2'-0½"

The Underframe Is Designed to Withstand the Severe Conditions Encountered in Chicago Service and Also to Meet the Requirements of Train Operation



6"
2'-8¼"
4½" x 5/16"
⅛" Steel
2"x⅜"
5½"
5" Diam.
2" Kass safety tread
1⅛"
5⅛"
26¾"
3'-5"
11"

The Treadle Mechanism for Controlling the Automatic Exit Door Is Connected with the Step so that the Door Remains Open Until the Alighting Passenger Steps Off to the Street

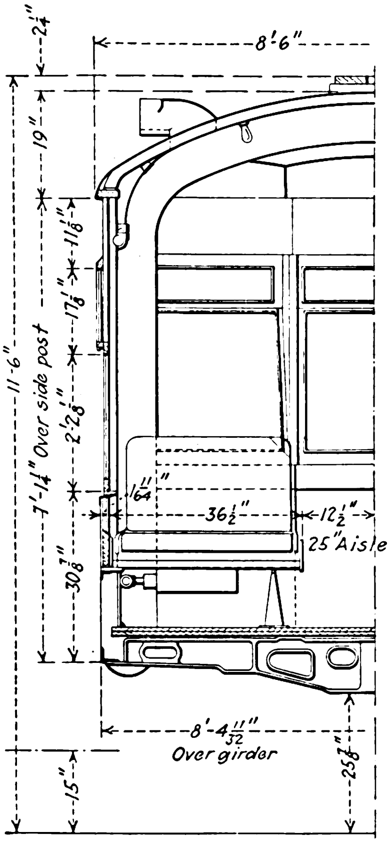
	Pounds
Car body	14,100
Trucks without motors and gears	11,280
Motors and gears	5,000
Electrical equipment	3,100
Air brakes, hand brakes, door equipment, couplers and piping	5,250
Body and vestibule seats	1,350
Sign boxes, register equipment, curtains and miscellaneous accessories	920
	41,000

The general dimensions are shown in the tabulation below:

Length over bumpers	48 ft. 11 in.
Length over corner posts	32 ft. 9 in.
Width over all	8 ft. 6 in.
Seating capacity, first car	51
Seating capacity, second car	54
Width of aisle	25 in.
Door opening in clear, rear entrance of front car and front entrance of rear car	40 in.
Door opening in clear, rear exit of front car and front exit of rear car	23½ in.
Door opening in clear, front exit of front car	62 in.
Height, rail to trolley board	11 ft. 6 in.
Height, rail to floor	37½ in.
Height, rail to side sill	31½ in.
Height, rail to step	15 in.
Height, step to platform	13⅞ in.
Height, platform to body floor	8⅝ in.
Side-post centers	29½ in.
Truck wheelbase	4 ft. 10 in.
Truck centers	22 ft.

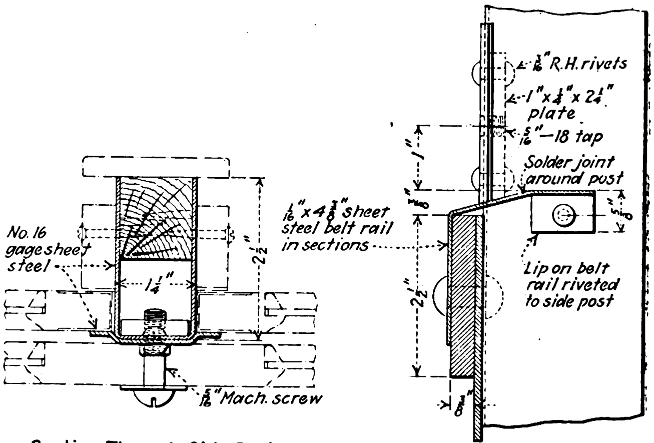
American Electric Railway Engineering Association standard parts and recommended dimensions have been used as far as possible throughout the body structure and equipment.

The side girder plates are made of No. 12 gage steel. Each side is reinforced at the lower edge with 3-in. by 2-in. by ⅜-in. angles and at the top edge by the belt rail, formed of $\frac{1}{16}$-in. sheet steel and further reinforced with a 2½-in. by ⅜-in. bar. Seat support angles 1½ in. by 1½ in. by ⅛ in. are placed longitudinally half way between the bottom and top edges of the girder and are cut for the side posts. These are formed of $\frac{1}{16}$-in. sheet steel and correspond in design to the side posts used in the group of 45 one-man double-truck cars described in detail in this paper, issue of Sept. 30, 1922.



Cross-Seats Are 36½ In. Wide, and for an 8-Ft. 6-In. Over-all Width an Aisle Width of 25 In. Is Obtained by Making the Wall Thickness Below the Belt Rail Only 1 11/64 In.

Drop-type platforms are carried on 8-in., 13.75-lb. channel platform knees, reinforced at the point of greatest stress by web plates and angles. Bumpers are 7-in., 12¼-lb. channels with the flanges turned in. The end sills consist of 9-in., 15-lb. channels secured to the side structure with gusset plates. Channels are used for the main body cross-sills and are of 4-in., 5¼-lb. section. The underframe is rigidly braced with diagonal members, as shown in the accompanying drawing of the construction of this part of the framing.



Section Through Side Post

Section Through Belt Rail

Pressed-Steel Side Posts Are Used. The Belt Rail of Pressed Steel Is Reinforced with a Flat Bar at the Upper Edge of the Side Girder

A combination of flat steel and wood carlines is used to support the roof in a manner similar to that which has been standard construction with the company for several years. The roofing material is ¼-in. Haskelite and the headlining is ¼-in. Agasote. Other details of the body structure and framing are very similar to a former group of 169 cars described in this paper for Sept. 8, 1923.

Car wiring both for control and auxiliary circuits is carried in "Duratube" except where exposed to abrasion or direct wheel wash, where it is put in aluminum conduit. The main motor cables are inclosed in "Duratube," cleated under the center of the car floor. The floor is carried continuously between trapdoors for a space about 8 in. wide, and this allows the cables to be carried past the trapdoor openings with no special provision for extra protection at this point. Aluminum motor junction boxes are used, and the heater wiring

SPECIFICATIONS FOR THE NEW CHICAGO MULTIPLE-UNIT CARS

Air brakes	G.E. CP-27, 16 cu.ft. capacity
Compressor	G.E. Type
Control	G.E. Type M light-weight
Trucks	Brill 39E-2x, maximum traction
Roof, ¼-in Haskelite covered with No. 8 National prepared roofing	
Headlining	¼-in. Agasote
Interior trim	Cherry, stained dark with rubbed finish
Signal bell	Consolidated single stroke bells
Buzzers	Consolidated
Trimmings	Statuary bronze
Center bearings	Surface Lines standard plain type
Side bearings	Stucki
Conduits	Duratube and aluminum
Couplers	Tomlinson automatic car and air
Curtain material	Fabrikoid, double faced
Curtain fixtures	Railway Supply & Curtain Co. No. 30 "Duquad"
Destination signs	Hunter illuminated
Door-operating mechanism	National Pneumatic with interlocking control and automatic exits
Wheelguards	H-B Lifeguards
Hand brakes	Pittsburgh No. 35, drop handle
Hand straps	Rico sanitary No. 7
Heater equipment	Consolidated
Headlights	Trolley Supply—Surface Lines standard
Meters	Economy
Motors	Two G.E.-275, 65 hp.
Paint	Chicago Varnish Company and vitrolite enamel
Rails and stanchions	Aluminum
Registers	International R-7 and B-13 backs
Sand traps	Electric Service Supplies
Sash construction	Wood with brass channel on stiles
Sash fixtures	O. M. Edwards with lock on one side of sash and compression brake on opposite side
Seats	St. Louis
Step treads	Kass
Thermostat	Railway Utility
Trolley catchers	Trolley Supply
Trolley base	US-14
Trolley wheels	Railway standard 5-in.
Ventilators	Railway Utility with compensating intakes
Wheels	28-in. and 21-in., rolled steel
Window wipers	Railway type, hand operated

along the truss plank on the interior of the cars is carried in aluminum conduit.

In one sample car of this group "Romex" cables and wiring were used. In this installation the insulated conductors are inclosed in fabric covering woven directly over the conductors and then coated with flameproofing and waterproofing compound. This type of wiring was put in to obtain more experience with this material, which is believed to come within the tentative rules for car wiring presented by the 1924 A.E.R.E.A. committee on car and carhouse wiring.

Complete specifications for materials and equipment used on these cars are given in the table on the preceding page.

Thermit Process Gives Good Results in Youngstown

This Method Is Used in the Installation and Repair of Crossings, Switches and Mates, Compromise Joints and Other Special Work—It Has Been the Standard of the Company Since 1916

By D. J. Graham

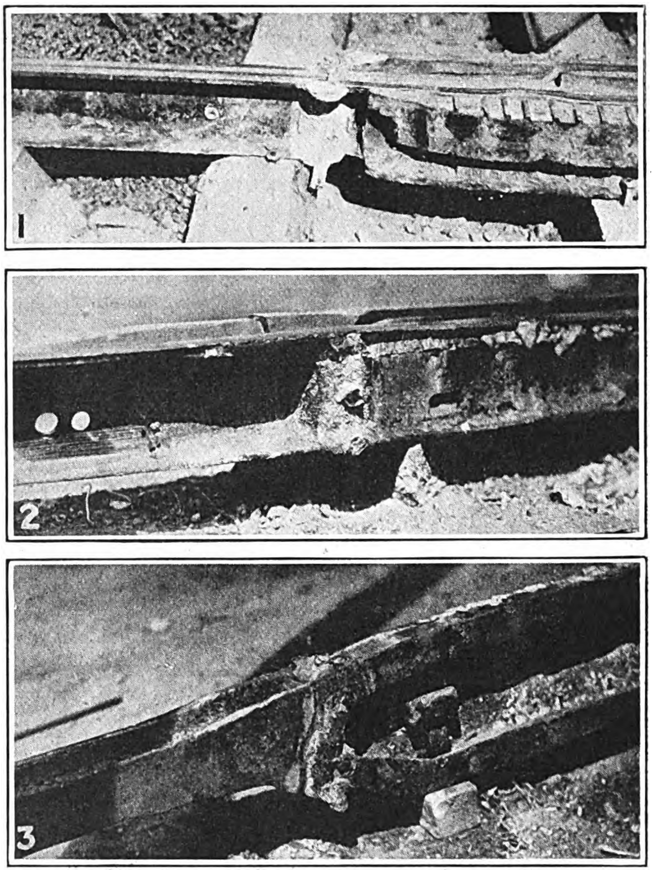
Engineer of Maintenance of Way Youngstown Municipal Railway, Youngstown, Ohio

DURING the past eight years, approximately, 8,000 thermit-welded joints have been installed by the Youngstown Municipal Railway and to date only seven joints have failed. From investigation of the failures it was found that in most cases the break was due to faulty pouring, improper preheating of rails, or neglect in setting the mold boxes in the center of weld. In 1916 thermit-welded joints were adopted as standard practice for all types of new track construction. At first this method of welding was used for joints only, but gradually it has been developed to a point where it is used for other purposes, such as repairing switches, crossings, compromise joints, and other special trackwork.

An example of its efficiency in this respect is the repair work recently performed on a mate of solid cast-steel construction. A 12-in. piece of guard rail on the point end of a mate broke out, and as the mate itself was only partly worn, it was decided to make repairs on the job. The mate was cut off back of the break and a new piece of guard rail butted against the remaining end and welded to it by the thermit process. This was done during the night when service was suspended and was completed at a very reasonable cost. An additional life of approximately 5 years resulted. The accompanying itemized tabulation of the cost of the job shows the economy of performing this work in the street.

COST OF REPAIRS

Labor (One foreman, 70 cents per hour; one helper, 66 cents per hour; one truck driver, 50 cents per hour)...	$ 7.00
Welding, sand and wax	.45
Thermit metal	13.85
Gasoline for preheating	.30
Power for preheater and grinding	.85
Gas and oxygen for cutting	.35
Brick, sand and cement	1.85
18 in. of second-hand guard rail	.65
Total cost	$25.30

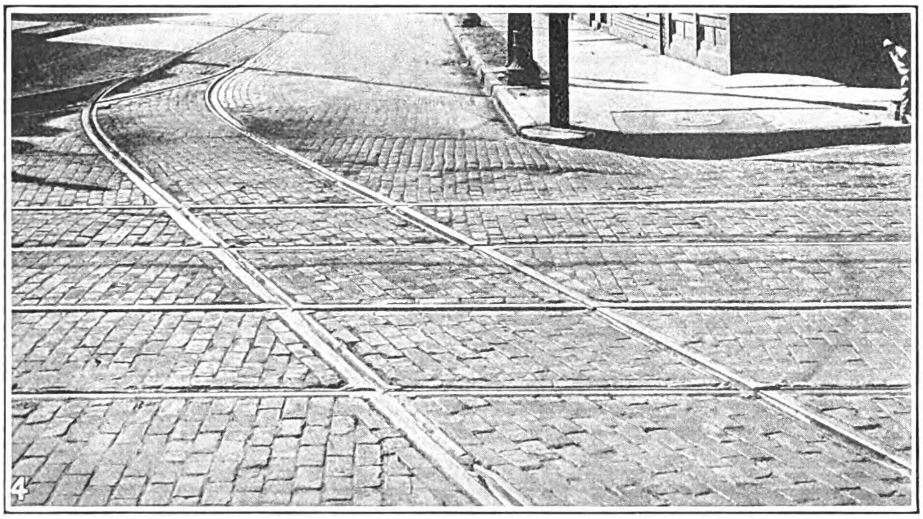


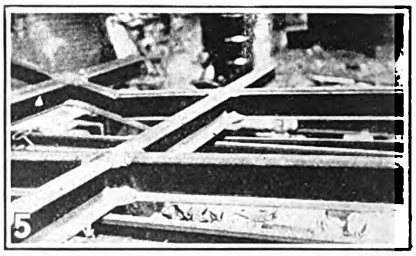
How Switches Are Repaired

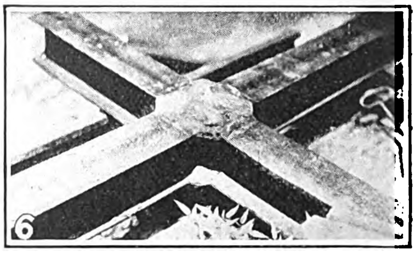
No. 1. Broken switch repaired with thermit weld.
No. 2. Side view of switch casting repaired with thermit.
No. 3. Bottom view of the same switch casting showing filled out break in casting.

This type of reconstruction work is used in repairing frogs and switches with the same economical results. Fig. 1 shows a switch that was taken out of the scrap pile, repaired with the thermit weld, and placed in a diamond turnout where the old switch went to pieces. This repaired switch is now in service and will probably last for two or three years. Other examples of special applications of thermit welds are shown in Figs. 2 and 3, which illustrate the side and bottom views of a switch which was broken through the casting. These indicate how the weld was placed at the break uniting the two ends and making the switch casting as solid as originally. Ordinarily this piece of special work would have been scrapped, but instead it was repaired in the shop and placed in use at another location.

In addition to repair work, thermit welds are used on all new crossing work. On a double-track crossing made



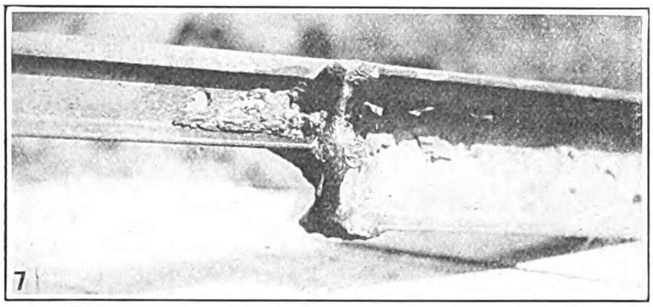


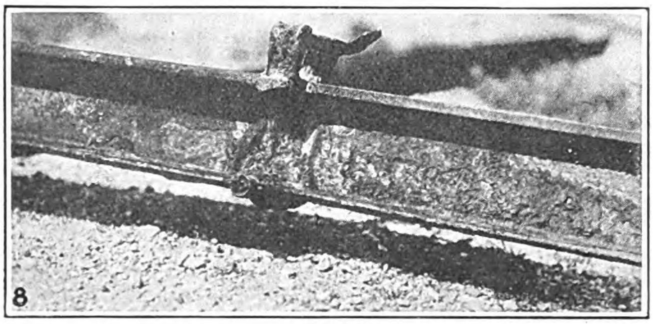


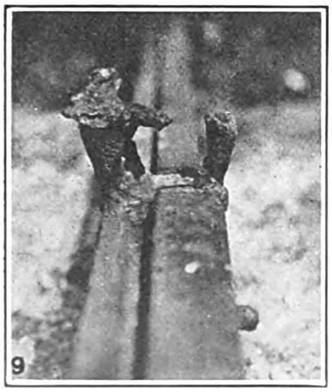
Examples of Thermit-Welded Special Work

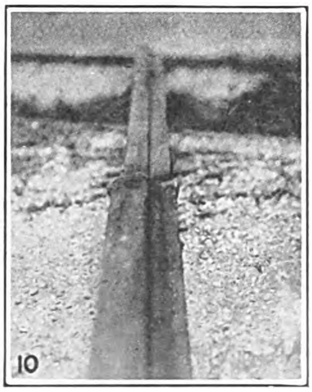
No. 4. Thermit-welded frogs installed at single-track double-track crossing. No. 5. Top view of crossing, showing weld at rail intersection and flangeways built in by arc welding to give continuous flange bearing. No. 6. Bottom view of same weld showing continuity of joint and clean appearance.

with Lorain Steel Company's rail section 132-440, the frogs were welded into position by means of thermit metal. Intersections of the flangeways were built up with an electric arc welder and ground with a rail grinder so as to make a taper flange bearing over the intersection. A crossing of this kind installed more than three years ago is in perfect alignment and rendering good service today.









Compromise Joints Made by Thermit Process

No. 7. Compromise joint from L. S. Co. 90-206 to 70-lb. A.S.C.E. T-rail.

Nos. 8, 9, 10. Compromise joint between L. S. Co. rail sections 103-478 and 73-291.

A similar crossing was built of Lorain Steel Company's rail section 103-478 with the frogs built up of thermit metal. In this case the flangeway of the crossing was built up with arc welding in order to make a continuous flange bearing over the entire crossing. Figs. 5 and 6 show a top and bottom view of this crossing, illustrating the manner of welding and the uniform appearance of the bottom and top of the rail.

All compromise joints are made by means of the thermit process. This type of construction is shown in Fig. 7. Other illustrations of compromise joint welds are shown in Figs. 8 and 9. A finished joint which has not been ground and needs no grinding on account of the perfect surface and gage alignment retained in making the weld is shown in Fig. 10. Renewing plates, tightening of bolts, broken bonds, and building up cups, are items of expense that do not exist with welded compromise joints, but which are important where other methods are used. The original cost of the two types of joints is approximately the same.

CAREFUL INSTALLATION IS IMPORTANT

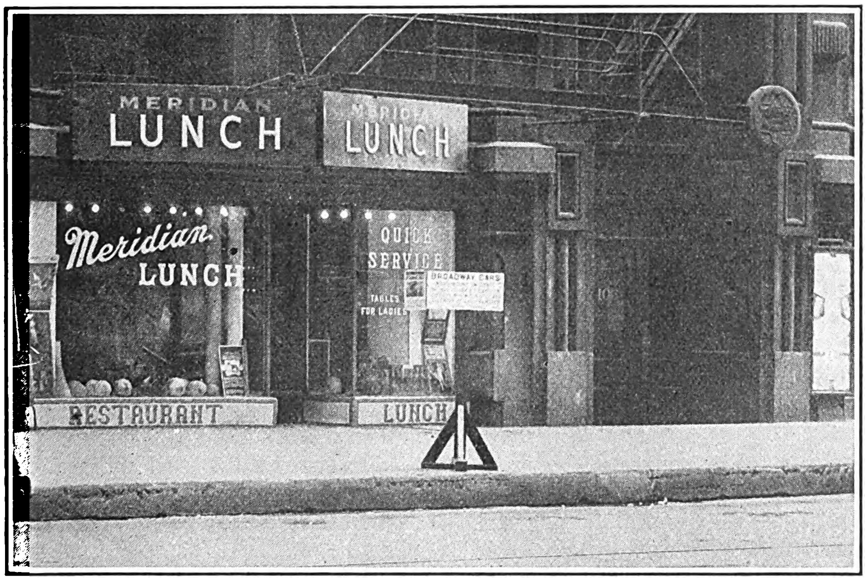
Thermit welds are used on both Lorain Steel Company's rail sections 132-440, 9-in. rail and on 103-478, 7-in. rail. An inspection of joints installed seven years ago which had developed a few small cups afforded an indication of how faulty workmanship in placing the metal has a detrimental effect on the life of the joint. On this particular piece of track, the regular man doing the original grinding had been replaced by another. After grinding through the cupped section, it was discovered that improper grinding had been done at the time the joint was installed. This was thought to be the cause of the failure of the joint. Where the work of preparing and welding the joint and finishing is carefully done long service may be expected.

Of the 4,500 buses owned by the London General Omnibus Company about 7 per cent are normally out of service—5 per cent for the daily inspection and greasing, and 2 per cent for accidents and annual overhaul.

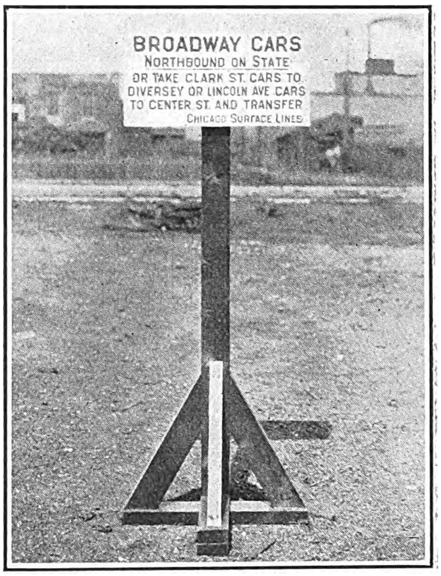
Chicago Surface Lines Reroutes 1,600 Cars

Widespread Changes in Schedules and Operating Routine Required by Adoption of New Plan to Relieve Congestion — Public Advised by Liberal Use of Paid Publicity

TAKING the lead in the attempt to relieve the notoriously congested conditions in Chicago's business district, known generally as the "Loop," the Chicago Surface Lines has put into effect a complete rerouting plan for its cars. This plan, which was described and discussed in detail in the ELECTRIC RAILWAY JOURNAL of May 3, 1924, page 683, is the result of more than a year of study on the part of engineers representing the city, the companies and the Illinois Commerce Commission. The detailed plan was submitted to the local transportation committee of the Chicago City Council in the form of a report by its transportation engineer, Major R. F. Kelker, Jr. The final rerouting by the Surface Lines was put into effect by an order from the Illinois Commerce Commission and was carried out a month in advance of the requirements of the order.



Type of Sign, Mounted on Standards, Used at Important Intersections to Advise Passengers of Changes in Routes


BROADWAY CARS
NORTHBOUND ON STATE
OR TAKE CLARK ST. CARS TO
DIVERSEY OR LINCOLN AVE CARS
TO CENTER ST. AND TRANSFER
CHICAGO SURFACE LINES

Close-Up View of the Sign and Stanchion Used in Chicago

Approximately 1,600 cars on 35 different lines are affected by the changed routing. Sweeping revisions of schedules, transfer of cars between terminals, increases in the number of cars assigned to some terminals and decreases in others, transfers of men between terminals, changes in switches throughout the loop district, more than $100,000 of additional trackwork in the form of new loops to eliminate stub terminals and instruction of men to make them familiar with new routes have been some of the widespread operating problems to be solved in connection with the change.

In general the new routing is based on the elimination, as far as practicable, of traffic interference due to the turning movement of street cars in the business district. Left-hand turns were considered to be most objectionable, since each such turning movement temporarily interferes with traffic in both directions. Right-hand turns were considered next objectionable because such turns temporarily interfere with two lanes of traffic. Straight crossings, of course, offer the least interference.

The new plan combines certain lines so as to furnish additional through routing, removes unimportant lines from the business district and eliminates turning movements in this district by bringing cars in on one street and out on another, completing the loop outside the business district. North-and-south lines are carried through the business district before making loops. Not only are turns in the business district eliminated in this way, but a largely increased service is furnished between the north and south boundaries of the business area.

Dearborn Street, which has never been a through street for north-and-south lines, has been made a turning street for lines to and from the west side of the city. This has made necessary the use of a walking transfer between these west side lines and the north and south lines on State Street.

In addition to the track changes outlined in the previous complete description in the JOURNAL of the proposed new routing, many changes in switches in the loop area were required. This included changes to approximately 100 mechanical switches, the removal of 25 electric switches and the installation of 21 electric switches in new locations. Lever type switches were installed at all points facing crossings with straight track.

Trainmen were supplied with maps and folders some time in advance of the change and were told that it would be necessary for them to be able to pass an examination on the new routes, so that they would be qualified to answer questions on the part of the public. In addition, those men who were assigned to new through-route runs which would take them into unfamiliar sections of the city were required to ride over the proposed new route and to sign registration books at the terminals at the far end of the line, indicating that they had completed the trip. Special instruction was given to men newly assigned to service on runs making trips through the tunnels under the Chicago River, in order to make them familiar with the rules for such operation.

Approximately 140 men were voluntarily transfered between stations because of changes in car assignments. Under the labor agreements existing in Chicago, this meant the sacrifice of seniority rights for picking run assignments, on the part of these men. Schedules on all the affected lines were completely remade and were placed in the hands of division superintendents in time to allow men to pick new runs and receive proper instruction relative to the new routes.

Three million folders giving the details of the new routes were distributed direct to the public through folder pockets in the cars, hotels, banks, department stores and large industrial and commercial institutions in the city. Printed maps showing in detail the exact routing of each line through the business district were supplied to trainmen and other employees, to traffic officers of the city and to others interested in the details of the new routes. These maps were also furnished to the public on request.

In addition to this directly distributed material, cards were carried in all cars calling attention to the proposed changes in routing. A list of the changes was published in paid advertising space in all the metropolitan newspapers and in the daily foreign language press.

Thirty standards carrying conspicuous signs were placed at important intersections in the business district to direct passengers who had not become familiar with the changes through the other publicity material issued.

A total of 5,847 right-hand turns in the business district per day have been eliminated. Also, 5,381 left-hand turns and 988 stub terminal movements have been done away with. It is estimated that intersection interference between street cars has been reduced 27 per cent.

The complete change-over was made at midnight on Sept. 13. Plans had been carefully laid in advance and all instructions issued so as to make the changes with the minimum confusion. At this time the necessary changes in the connections of electric switches were made.

The final success of the new routing in reducing traffic congestion depended on subsequent regulation of other traffic movement. The Chicago Association of Commerce, as the result of studies made by its traffic committee, took official action in favor of eliminating both turning movements and parking of automobiles within the congested area in the business district. It has been pointed out by the Surface Lines that its cars constitute only 10 per cent of the number of vehicles using the streets of the business district, but that they carry more than 75 per cent of the people who ride in this area. It was contended, therefore, that the full benefit of the new plan in improved service, as well as the elimination of congestion and danger to pedestrians, could only be realized with the similar scientific routing of other vehicles using the streets.

A short trial period with the new routing of cars convinced the city authorities that an even greater improvement would be obtained by the elimination of turns in the congested district by other vehicles. Regulations eliminating left-hand turns entirely at most of the important intersections within the Loop were consequently adopted and put into effect. This has improved the conditions to such an extent that the Surface Lines are now engaged in a further study of the resulting effect on street car movement, looking toward a revision of schedules that will take advantage of the reduction in congestion to effect a saving in time for the 75 per cent of Loop passengers who ride the street cars.

The Readers' Forum

Say In Situ Treatment Is Used on 250 Miles of Track

MESSRS. C. P. SANDBERG
Consulting and Inspecting Engineers
40, Grosvenor Gardens,
LONDON, S. W. 1

Nov. 3, 1924.

To the Editors:

The Foreign Report Number of the ELECTRIC RAILWAY JOURNAL of Sept. 20, 1924, contains the advance publication of the report of the American Electric Railway Association committee on foreign operation. The observations of the committee, as expressed in the summary and also in the main report in regard to the operation of British tramways, are both cogent and intimate, and form a valuable record of the opinions of the managements of the undertakings dealt with. The report is discriminating and, as is only to be expected in a document of this kind, prominence is given throughout to the special features which obtain on the several tramways visited. On the whole the committee is to be congratulated upon its presentation of the situation in each tramway district visited, and there can be no doubt that the information published will be quite as interesting to British tramwaymen as to their confrères in the U. S. A.

It is only to be expected that minor errors have not been avoided, and our attention has been called to the observations of the committee in regard to the Sandberg *in situ* rail hardening process. In the summary it is stated that the *in situ* treatment of rails is still in the experimental stage, and in the body of the report the article on *in situ* treatment of rails expresses the opinion that British "experience is not yet of sufficient amount to provide any definite opinion as to its merits . . . and the best that can be said for it up to date is that the results have been sufficiently good that some of the tramways are making further installations as a means of gathering further data." It would appear that these observations are based solely upon the limited amount of rail treated to date on the tramways within the London area which, owing to the destructive effect of the magnetic track brake, has been, as stated, on an experimental scale.

The Sandberg *in situ* rail hardening process has, however, long since passed the experimental stage. Since its introduction six years ago over 250 miles of track have been treated in Great Britain. The process is now being developed on the Continent and in the Dominions. A number of important British tramways have adopted the process as part of their regular maintenance operations, and it will be of interest to observe that the Leeds, Liverpool and Manchester Tramways have had 25, 30 and 46 miles of track treated respectively, and a number of other systems have each placed repeat orders for the treatment of upward of 10 miles of track.

The resistance of treated rails to wear is very much greater than that claimed in the committee's report, as is shown by the following calculation based upon the average results of 30 sets of gagings taken upon representative tramways in the United Kingdom, after the passage of 2,400,000 tons (English) of traffic in each instance:

Average wear on untreated rails, 0.0398 in. per 2,400,000 tons (Eng.)
Average wear on *in situ* treated rails, 0.0173 in. per 2,400,000 tons (Eng.)
Average wear on untreated rails = 2.3 times that on *in situ* treated rails
With a $\frac{3}{16}$ (0.1875 in.) depth of *in situ* treatment at the above average wear (0.0173 in.), treated rail would last .... 10.83 years
At the above average wear (0.0388 in.) $\frac{3}{16}$ in. untreated rail would last .... 4.71 years

Severe tests were carried out by the London County Council Tramways over a period of about 3 years in order to ascertain the resistance to corrugation of rails treated by the Sandberg *in situ* process. During this period the test rails both treated and untreated were traversed by 2,092,000 cars (33,000 lb.) or approximately 31,000,000 tons (English), and corrugations were removed on three occasions from the untreated rails while the rails treated by the Sandberg *in situ* process remained free from corrugations throughout the test. Similar proof of the resistance to corrugation of the treated rails has been obtained from numerous other undertakings. It will be seen from this information that very definite advantages are being derived from the Sandberg *in situ* process and that it is now extensively established in Great Britain.

C. PETER SANDBERG.

Mitten Management Considers Changing Philadelphia Wage Basis

PHILADELPHIA RAPID TRANSIT COMPANY

PHILADELPHIA, PA., Nov. 10, 1924.

To the Editors:

Your editorial in the Nov. 1 issue, regarding the method of determining street railway wages, is a heartening indication that the industry is awakening to the importance of its most vital problem. It occurred to me that you might be interested in having the viewpoint of Mitten Management on this subject.

Wages will never be properly adjusted in any industry so long as the primary object of the employer is to receive the utmost service which he can coax from the employee for the lowest possible wage; nor while the only aim of the employee is to receive the highest possible wage for the least possible work. There must be a just recognition on the part of each of the rights of the other, and a joint appreciation of the rights of the consumer, who pays both dividends and wages.

Mitten Management believes that it has found the solution of the wage problem, basing its belief on the fact that it is now rendering in both Philadelphia and Buffalo a strike-proof service, with a satisfied body of men who recognize that higher wages can only come through greater effort on their own part. This is accomplished by a plan with which you are no doubt familiar, under which the men are made partners with the management. The latest step in the plan as applied in Buffalo is contained in the inclosed Tulley Talks No. 21, which is issued today. (Published below.)

The wages of P.R.T. employees are based on the average of those prevailing in Detroit, Cleveland and Chicago. We have long recognized the inadequacy of this method of arriving at a base, because each of these cities determines its wages upon successive strike-threats and arbitration. We have now under careful consideration a plan to base the wage in Philadelphia on the purchasing power of the dollar, continuing our policy of giving the men full opportunity to secure, in higher wage, the benefit of their greater effectiveness, which is further encouraged by the investment of this added wage in the securities of their company, whose value and dividend-paying ability is thus practically underwritten by them.

J. M. SHAW,
Editor *Service Talks.*

How I. R. C. Employees Can Best Lend Their Aid

(From "Tulley Talks" No. 21)

Mitten Management is deeply grateful for the offer of support from I.R.C. employees in meeting the financial burden of the recent Niagara Falls high-speed accident, but does not feel that such sacrifices will be necessary at this time. There is a way, however, by which I.R.C. employees can aid the management without calling upon funds which are necessary to meet the needs of their adequate living and saving.

I.R.C. employees are already partners with I.R.C. management, by virtue of the investment of part of their 1924 wages in I.R.C. bonds and stock. The wages of the men are now 57½ cents per hour, 2½ cents of which is paid into the co-operative wage fund administered by elected trustees and invested in the company. The full wage agreed upon for 1924 will be paid, and the management plans, with the continued co-operative effort of I.R.C. employees, to make possible a further increase in the basic wage rate.

Mitten Management now suggests that the basic wage rate for 1925 be continued at 57½ cents per hour, and that 2½ cents of this amount be used, as now, for the purchase of I.R.C. securities by the trustees of the wage fund, and further that after I.R.C. earns and pays the 5 per cent interest on its I.R.C. bonds, an additional wage of 3 cents per hour be then added; the full amount of this added wage—a total wage of 60½ cents per hour—to be paid during 1925, or as soon thereafter as the company's financial condition makes such payment possible.

What is done with this added wage will of course lie entirely with the employees, but the management strongly recommends that it be placed in the co-operative wage fund, and that it be invested in I.R.C. bonds and stock, in furtherance of the policy of employee-ownership which has so far helped keep International on an even keel, and will, we are confident, eventually put I.R.C. upon a safe and dividend-paying basis.

This proposal is to be now placed before the general committees, and if approved by them will be submitted for the signed approval of all employees. By accepting this proposal and thus underwriting the payment of the interest on I.R.C. bonds, and by directing their trustees to invest in I.R.C. bonds and stock the 10 per cent added wage over the 55-cent rate now being paid, I.R.C. employees can best lend their aid, and bring themselves into still closer partnership with the management.

A Suggestion About Whistles

THE OHIO BRASS COMPANY

MANSFIELD, OHIO, Oct. 31, 1924.

To the Editors:

We have received a letter from one of our customers (J. C. Schade, manager railways Wisconsin Public Service Corporation, Green Bay, Wis.), asking if we can furnish some kind of a chime whistle to replace the shrill whistles now on their line.

This incident suggests a thought that you might feel worth passing on to the industry. Place in the car a blank on which passengers are requested to write any criticisms that they may have on the service, stating what if anything connected with the ride is annoying, uncomfortable or distasteful. I know from personal experience that one interurban company has its cars equipped with whistles that will give one a headache within a 30-mile ride. There are other discomforts on many lines that could be eliminated and would be, if the management knew how they unconsciously move the patron to avoid riding on the traction lines.

JAMES H. DREW,
Manager Line Material Division.

Equipment Maintenance Notes

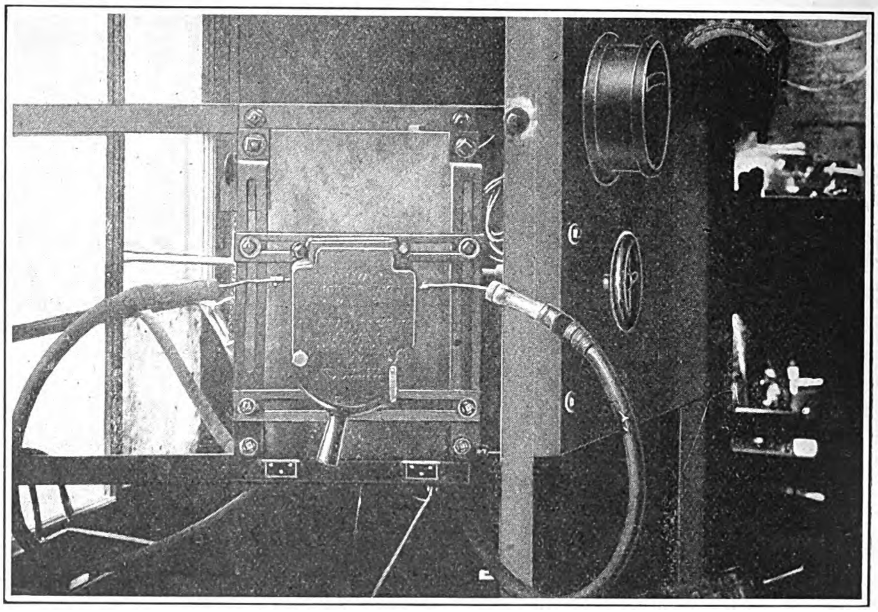
Shop Testing of Circuit Breakers

By F. C. Lynch
Shop Supervisor Kansas City Railways

IT IS the practice of the Kansas City Railways to set car circuit breakers at 150 per cent of the full load rating of the motors. In the past it has been found that unless these settings are carefully checked in the shop, there is a tendency on the part of operating forces to screw the settings up so high that the breaker does not operate even on severe overloads. This condition causes very high maintenance on electrical equipment.

A general mechanical department order issued to all maintenance departments shows the correct setting for each type of equipment in service. The divisions are not permitted to change the settings of breakers in service, but are instructed to return those thought to be incorrectly set to the shops, where all adjustments are made.

To do this work accurately in the shop, the test panel shown in the accompanying illustration has been provided. In addition to the panel itself, containing the various instruments required to check the setting at which the breakers open, a special type of mounting frame is provided for supporting the breakers in a position corresponding to their mounting on the various types of cars.



It Is the Practice of the Kansas City Railways to Make All Circuit Breaker Adjustments in the Shop. The Mounting Rack Shown Is Arranged so that the Breaker on Test Can Be Supported in Either a Vertical or Horizontal Position, Corresponding to the Position in Which It Is Mounted on the Car

The mounting frame is shown in the center of the illustration, with a circuit breaker in position for testing. It will be noted that vertical and horizontal straps contain long slots, so as to allow different types of breakers to be mounted readily. In addition to this, the board on which these straps are carried is hinged at the bottom and held by a catch at the top, so that the breaker can be supported for testing, in either a vertical or horizontal position.

The settings used for breakers on the various types of electrical equipment in service in Kansas City are shown in the accompanying general maintenance order issued by the mechanical department to cover this detail of practice.

KANSAS CITY RAILWAYS COMPANY
MECHANICAL DEPARTMENT

Subject: *Circuit Breaker Setting*

General Order No. 77

All circuit breakers will be adjusted and set at the shops, and will be pinned so that the setting cannot be changed.

The settings will be as follows:

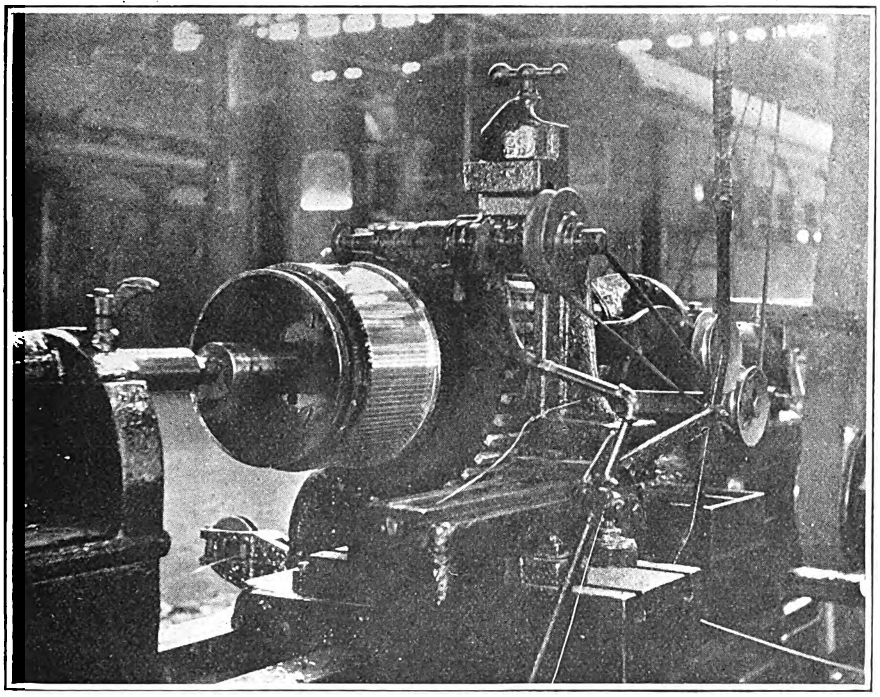
Type of Motor	Number of Motors	Circuit Breaker Setting	Full Load Current	Per Cent of Full Load Current
GE—57	4	550 Amp.	92 Amp.	150
GE—67	4	425 Amp.	72 Amp.	147
GE—67	2	210 Amp.	72 Amp.	145
GE—70	4	425 Amp.	70 Amp.	150
GE—80	4	425 Amp.	71 Amp.	150
GE—202	4	425 Amp.	74 Amp.	145
GE—247	4	315 Amp.	52 Amp.	151
GE—258	2	150 Amp.	37 Amp.	200
WH—306	4	550 Amp.	88 Amp.	155
WH—508	2	150 Amp.	37 Amp.	200

The Divisions will not attempt to change these settings. Any breakers that are found improperly set will be returned to the Shops.

This General Order Shows Correct Setting of Circuit Breakers on Each Type of Car Equipment Used in Kansas City

Commutator Slotter on Banding Lathe

IN THE Decatur shops of the Illinois Traction System a home-made commutator slotting attachment has been rigged up on a modified engine lathe. The attachment consists of a vertical standard mounted on the former tool post guide at the rear of the lathe bed. This upright slides longitudinally parallel to the axis of the lathe and carries at its upper end the milling spindle, which can be raised or lowered by means of a hand screw on top of the upright. The spindle carries a small milling cutter at one end and a 5-in. grooved pulley at the other. Two idler pulleys mounted beneath and to one side guide the raw-hide driving belt which takes power from the overhead line shaft. This arrangement permits the apparatus to be moved back and forth. Compressed air from the shop supply is used to blow



Home-Made Commutator Slotter Also Serves as a Banding Machine in the Decatur Shops of the Illinois Traction System

the particles of mica and copper away from the cutter, being fed through a rubber hose, with a regulating valve for the operator.

In operation, the milling cutter is lined up with the axis of the armature, which is then revolved until the mica is in line with the cutter. After moving the vertical screw adjustment to get the necessary depth of slot, the cut is made by sliding the tool back and forth on the ways of the tool post guide.

The entire outfit was made in the shops from materials at hand. The three pulleys are brass trolley wheels and the upright with screw adjustment is a portion of an old lathe, while the spindle shaft and housing were made up in the machine shop.

This lathe is also used when banding armatures, so that preparation of the rewound armature for service is all done on one machine.

Wheel Grinding Practice in Twin Cities

FOR a number of years the Twin City Rapid Transit Company's mechanical department has been grinding the treads of rolled-steel wheels, using a Norton grinder for the purpose.

This practice is followed in all cases where wheels require attention, except when a thin flange develops to a point where the wheel must be turned. In this event the entire tread, as well as the flange, is turned.

One interesting feature in connection with this grinding is the practice of cutting a groove in the throat of the wheel where the flange joins the tread. This is done to prevent the corner of the grinding wheel from chipping when it comes in contact with the fillet at this point.

Speed in handling wheels to and from the machine is an important element in obtaining maximum output per day. In the Snelling Avenue shops an overhead electric hoist, traveling on a track at right-angles to the machine, has enabled one man to handle wheels and operate the machine. With these facilities, one man grinds an average of between 30 and 35 pairs of wheels per working day.

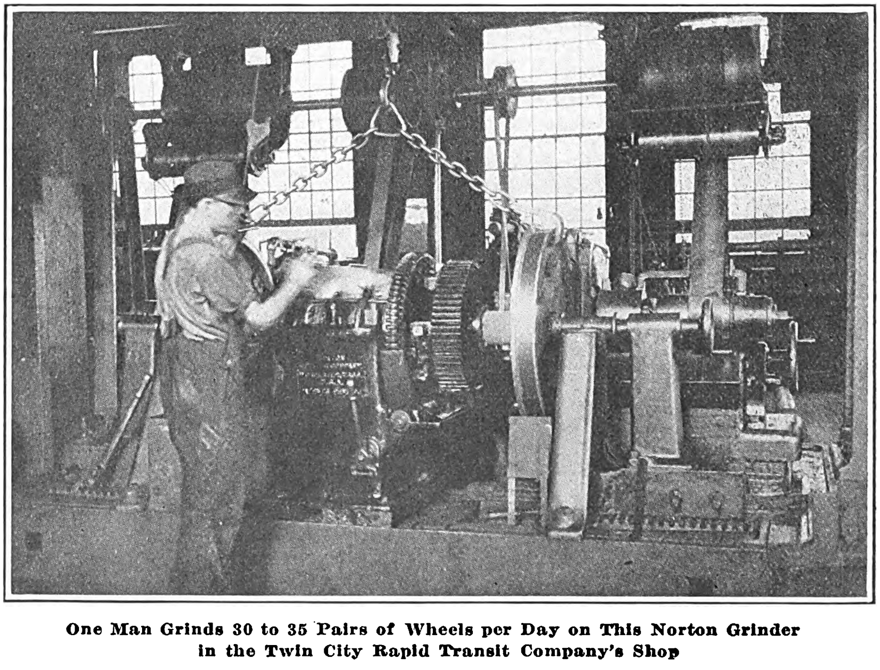
A liberal flow of plain water is used to cool the grinders. This is fed by means of a centrifugal pump delivering the water from a tank under the machine. After passing over the grinding wheels, the water drains back into the tanks and is recirculated.

Wood for Crossing Pavement

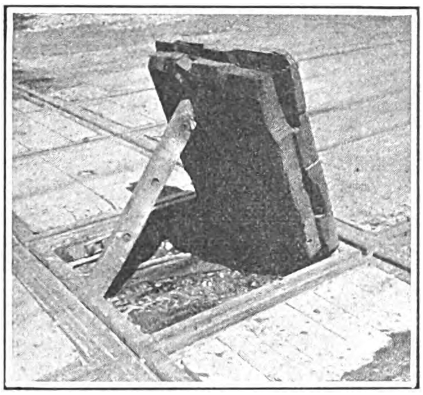
AT THE heaviest crossing in Fort Wayne, the double-track Calhoun Street line of of the Indiana Service Corporation crosses the three-track route of the Nickel Plate Railroad. As Calhoun Street is the main street of the town is was necessary for the street railway to provide a suitable pavement between the rails and between the tracks of its line. It was imperative that this pavement be of such construction that it could easily and quickly be removed and replaced when repairs to the crossing became necessary.

The type of pavement used is made up in sections which fit between the rails of the crossing. These sections are constructed of 3-in. planking laid in two layers, one layer being laid at right angles to the other, and the two are fastened together by means of ⅝-in. bolts with washers. The lower layer is roughly cut away to fit around the irregularities and bolt heads of the crossing. The top layer is nicely fitted to the head of the guard rail.

In the center of each section is



One Man Grinds 30 to 35 Pairs of Wheels per Day on This Norton Grinder in the Twin City Rapid Transit Company's Shop



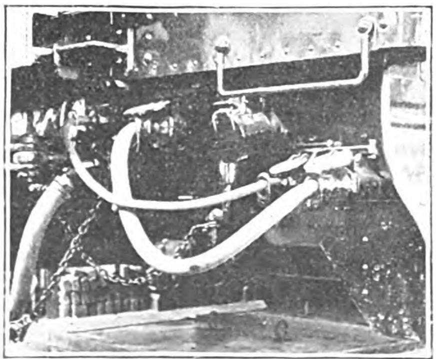
Section Raised, Showing How Lower Layer Is Hewn to Fit Bolt Heads, While Upper Layer Is Cut to Fit Head of Guard Rail

a 3-in. diameter iron ring securely fastened through the double thickness of planking with an eye-bolt. It is possible to remove the section a small derrick or by hand.

This type of crossing pavement is economical to construct and has met with the approval of the authorities of the city.

Permanent Jumpers Reduce Maintenance

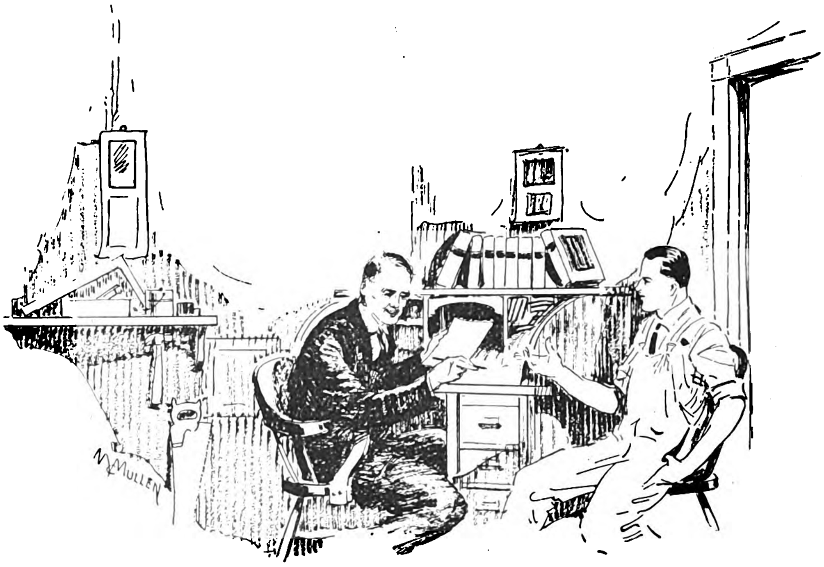
THE New York, Westchester & Boston Railway uses two jumpers between cars of each train. Both are for 32-volt circuits, a 12-point train-line jumper being used for the control equipment while a 5-point jumper is used for control of the electric brakes. The company is now fastening these jumpers permanently in position in one pair of receptacles and is providing dummy receptacles for holding the loose ends. The dummy receptacles consist of the standard casing without contacts and they are being mounted on the end step support as shown in the accompanying illustration. The maintenance forces report that troubles and the maintenance of the jumpers have been reduced more than 90 per cent since this change has been undertaken.



Permanent Jumpers Used on the Cars of the New York, Westchester & Boston Railway

Dick Prescott Discusses Plans

And Prepares for the Trip with Steve



TO DICK'S delight, Steve White, the carpenter shop foreman, was selected to accompany him on the trip of inspection to gather ideas before starting in on his new work of organizing an engineering department in the shops of the Consolidated Railway & Light Company. Steve himself brought this additional good news when he returned from the office of Thomas Mullaney, general foreman.

Thus these two men, although young in comparison with some of the other men in the shop, were selected to initiate the new program of improvements. In recognizing the ambition, vision and initiative of Dick and Steve, by this selection Mullaney proved himself a capable executive despite his many years of obstinate devotion at the shrine of precedent.

"Well, Dick," said Steve, after their first burst of rejoicing had subsided, and they found themselves seated in the little carpenter shop office discussing their plans for the trip, "we're going to have a pretty stiff job getting an engineering department under way, and most of it will be up to you. From what I gather, the old man wants me to kind of follow along and give you what advice I can from the practical standpoint, and I'll give you all the help I can—you know that.

"But, as you must appreciate, the real work of organizing this new department and getting it working in harmony with the rest of the shop will be your job. That's not going to be easy, for although the old man has made up his mind that something's got to be done, you'll have to sell him your ideas every step of the way and it'll require lots of patience and courage."

"I think you're right, Steve, and I'm certainly glad to have your experience and knowledge of the shop conditions to help me over the rough places. I want to start things slowly and to demonstrate by actual performance the service an engineering department can render. Once Mr. Mullaney and the foremen are convinced that we can save them a lot of lost motion and be a real help in getting out their work, it will be easy sledding. I intend to feel my way along at first and study conditions carefully, rather than try to make a big showing at the start."

"That's the idea, Dick, and you can depend on me to help you all I can. I see where you can help my department a lot and I know the same conditions apply in other departments. When we get back from this trip I'll try to tell the advantages of the new plan to the other foremen so as to get them interested in giving you their co-operation."

"I'll certainly appreciate your help very much. There are several things that we can get started on as soon as we return. For instance, it seems to me that the shop badly needs some way to standardize maintenance practice. Maybe we can issue a uniform kind of maintenance order giving the exact practice to be followed. Such items as limits of wear for bearings, oiling periods, procedure on inspection and many other details like that could be definitely covered by such orders. That would cut out the guesswork and ought to improve our methods. My idea would be to have these standards we propose freely discussed at foremen's meetings, so that each order would actually represent the combined opinions of the department staff rather than the idea of a single individual."

"Good dope, Dick, you're thinking along the right lines. That's an instance of some of the things we can get under way when we get back. Now we ought to start out and make up an itinerary for this trip. The old man says we can have three weeks, and we want to make the most of the time. Suppose we start in and make a list of the properties we want to visit and note some of the things we want to see in each shop."

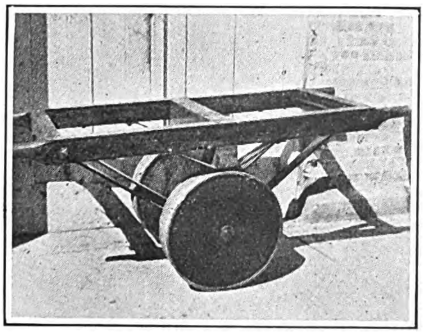
Sheet Metal Roll Smooths Armature Laminations

WHEN armature cores require rebuilding in the Snelling Avenue shops of the Twin City Rapid Transit Company, a sheet metal pressure roll, manufactured by the E. W. Bliss Company of New York, is used for reclaiming bent laminations.

This pressure-rolling machine is power driven and is found to be very effective in smoothing out the laminations. Previous to the installation of the above machine this work was done by hand. The machine method now cuts the total cost of armature rebuilding by 50 per cent in comparison with the former hand operation. In addition, the laminations are smoothed out in much better condition than was possible by hand methods, and it is found to be much easier to get them back in place on the shaft. The sheets stack up evenly so that pressing the core together after assembling is made less difficult, and a better armature is obtained.

New Type Heavy-Duty Dolly Truck

FOR transporting heavy materials, particularly steel sections such as girders, angles or plates, a heavy-duty truck has been built in the Wheaton shops of the Chicago, Aurora & Elgin Railroad. This truck is of wood frame construction, braced and reinforced by steel bars. The frame consists of two 2-in. x 4-in. members approximately 4½ ft. long joined near the ends and at the center by means of three cross-sills of the same cross-section, but only 18 in. long. Below the center cross-sill is a wood bolster made up of 3-in. oak of sufficient width to allow the wheels to have clearance over the side sills.



Heavy-Duty Truck Used for Transporting Steel from the Storage Yard to the Blacksmith Shop

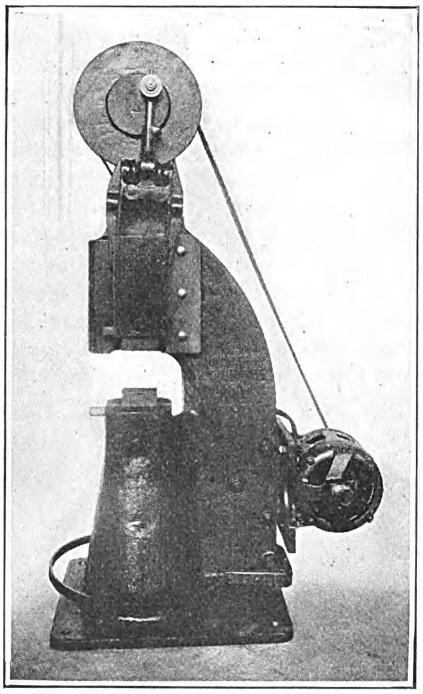
The wheels are of solid oak construction 2 in. thick and of 18-in. diameter with ¼-in. steel tires. The upper frame is braced to the axle on each side by means of two 1½-in. x ¼-in. steel bars. The framework is held together by means of long through bolts, and the upper surface is covered with 2-in. x ¼-in. steel. The side sills of the frame project beyond the end sills approximately 5 in. and are tapered and shaped in the form of handles. The axle consists of 1-in. steel shafting to which the wheels are held by means of washers and cotter keys on the outside end.

The truck is so well built that it is possible for one man to move ½ ton of steel over the concrete walk from the storage yard to the blacksmith shop. The entire truck was built in the blacksmith and carpenter shops, there being no machine work in conjunction with its construction.

New Equipment Available

Small-Sized Power Hammer for General Service

GENERAL service hammers designed particularly for shops where there is insufficient blacksmithing to warrant a large investment in a power hammer are being placed on the market by Beaudry Company, Inc., Everett, Mass. These hammers are built in three sizes with rams weighing respectively 25, 50 and 100 lb., and they may be operated by an overhead belt or can be equipped with individual motor drive.



Motor-Driven Hammer for General Service

The hammer is started, stopped and regulated through the treadle which throws a cone clutch in or out of the hammer pulley. The hammer head is of steel. Its travel is guided by external elliptical-shaped tracks. Two steel spring arms with steel rollers at the lower extremities and a helical spring at the top operate upon the curved track and lift and throw the ram, which with increased speed of hammer acquires increased travel and force of blow. Full strokes can be obtained on varying thicknesses of stock with no change of adjustment.

The ram operates in heavy V-shaped guides and has in addition an adjustable taper gib for taking up the wear. The hammers have long strokes and may be operated at high speed. Since the frame is self-contained and cast in one piece no extensive foundation is needed, and in some cases the hammers are bolted directly to the floor. These hammers may be worked to equal advantage from all sides, and as the anvil is offset long bars may be worked either way of the dies.

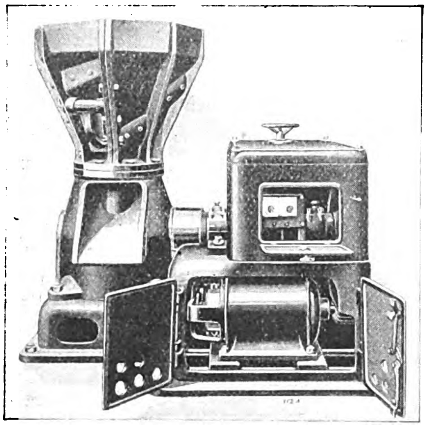
Connector for Temporary Work

A NEW line connector suitable for use where occasional disconnection is required and where particularly quick disconnecting is not necessary has been placed on the market by the General Electric Company, Schenectady, N. Y. It is recommended particularly for making temporary connections in construction work.

The clamp is of brass with the exception of the spring, which is of phosphor bronze, and the two set screws, which are of zinc-plated steel. A standard disconnecting switch hook is used to operate the device, which is so designed that the hook is held firmly to the connector while this is being attached or removed from a line. The connector has a current carrying capacity of 200 amp. and can be clamped to wires of diameters from $\frac{3}{16}$ in. to $\frac{5}{8}$ in. A $\frac{9}{16}$-in. hole is provided for soldering a lead to the connector.

Waste Metal Crusher

A NEW electrically driven machine, known as the American chip crusher, that reduces the volume of long, loose, bushy metal turnings has been placed upon the market by the American Crusher & Machinery Corporation of New York City. It is a low-speed machine for cutting, grinding and crushing metal turnings and similar scrap into coarse, granular pieces which can be handled with shovels, magnets, belts or conveyors.



This Crusher Reduces Metal Turnings to $\frac{1}{12}$ or Less in Bulk

The machine is simple, the only parts subject to wear, the cutters or knives, being removable and easily replaced. The metal turnings are forked into a hopper and the cutting action is accomplished by a number of spiral knives made of specially treated steel.

A Westinghouse 4-hp. motor drives the unit. The control apparatus is all built in. To prevent the accidental entrance of solid metal pieces too large to pass through the crusher, it is equipped with devices that protect it against the breakage of knives and the strains of overloading.

The economy of storage space, the saving in handling and shipping, and the increase in salvage value of waste metal turnings, made possible by this machine, have made it popular in machine shops and with waste metal dealers. The unit illustrated has a capacity of 5 tons of ordinary turnings per day.

Vertical-Horizontal Hydraulic Press

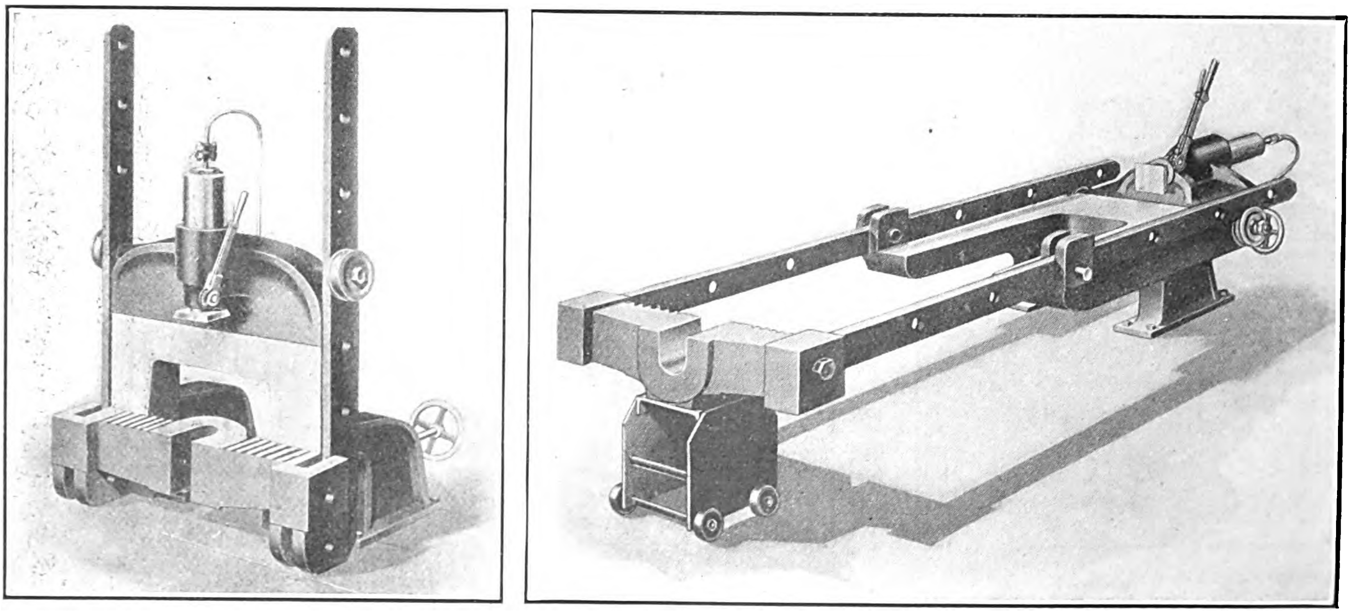
TO MEET a demand for a general utility shop press, the Watson-Stillman Company, New York, N. Y., has combined in one unit a vertical or a horizontal press for all operations which are ordinarily done in electric railway shops.

The machine may be converted from the vertical to the horizontal press by rotating the yoke by means of a hand wheel as shown in the illustration. The press is so balanced that the change from vertical to horizontal position may be made without the assistance of cranes or jacks. In the horizontal position it may be used for a variety of purposes, such as bending structural shapes, bars, pipes, etc., for forcing fittings, pressing gears on and off, forcing bearings into and out of housings, and like work. The bed of the press is planed smooth and the forcing tool on the end of the ram is supported on this bed.

For forcing long shafts, the abutment beam may be moved out a maximum of 7 ft. A four-wheel truck is provided to permit easy handling and also to support the beam when in the extended position. Hydraulic pressure is used only for the high pressure stroke of the ram. The idle portion of the forward stroke and the return movement is effected by a pinion which meshes with a rack in the ram. This rack and pinion device is of sufficient power to permit the use of this press for light arbor work without hydraulic power. The press is usually furnished with a hand pump, complete with hydraulic gage, pipe and connections. It may also be operated by a small two-plunger power pump. The press has a capacity of 60 tons and weighs 3,700 lb.

Apex CO_2 Recorder

AN ENTIRELY new and inexpensive CO_2 recorder known as the "Apex" has been introduced by the Uehling Instrument Company, Paterson, N. J. Inasmuch as the price of the new recorder is less than half that of other CO_2 machines, including the standard Uehling, it is believed that the new instrument will open up an entirely new field among the smaller plants, as it is stated that the anticipated fuel savings will warrant its adoption for boilers of 50 hp.



At Left, Press in Vertical Position. At Right, Same Press in Extended Horizontal Position or over. The pyro-porus filter and the standard Uehling gas drier and desulphurizer are used, insuring cleanliness of the gas line and interior parts of the instrument. There are no chemical solutions and no moving parts excepting the pen mechanism. As a result the manufacturer claims that the recorder will operate accurately without any attention or adjustment other than the changing of charts and renewals of dry absorbent, which should not exceed 10 minutes weekly.

This new type of recording instrument will be exhibited for the first time, in both recording and indicating types, at the Power Show which will be held at the Grand Central Palace in New York during the first week in December.

Automatic Circuit Breaker Can Operate Manually

THE Automatic Reclosing Circuit Breaker Company, Columbus, Ohio, has recently developed a circuit breaker which normally is full-automatic in its operation, but it may at any time be operated in the same manner as a manually operated circuit breaker by depressing the operating handle.

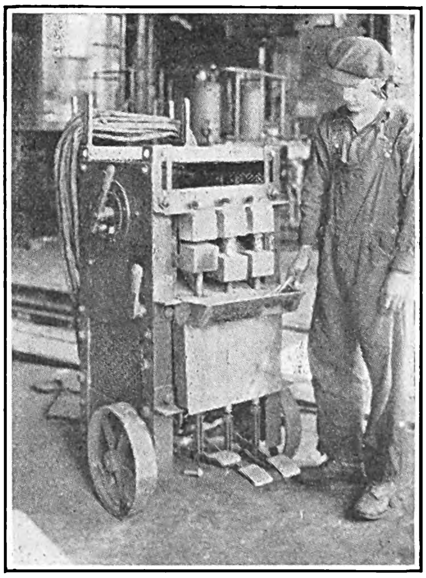
When operating as an automatic reclosing circuit breaker it is under the control of a double pole push-button switch. When this switch is in the "off" position all of the control circuits of the breaker are completely disconnected and the breaker remains open. When the switch is in the "on" position the control circuits of the breaker are connected and the breaker closes, provided conditions on the line are proper for it to close. On overload, it opens automatically, remains open a short time interval, regardless of load conditions, and at the expiration of that time interval recloses, providing the overload or short circuit which caused it to open has been removed.

When for any reason whatever it is desired to operate the circuit breaker manually, the control switch is thrown in the "off" position and the operating handle attached to the breaker. The breaker is then closed in the usual manner by depressing the operating handle. It will open on overload or voltage failure if provided with no-voltage release. The operating handle is removed when the breaker is again placed in automatic operation. Breakers of this type are available in capacities up to and including 2,000 amp.

Improved Rivet Heater

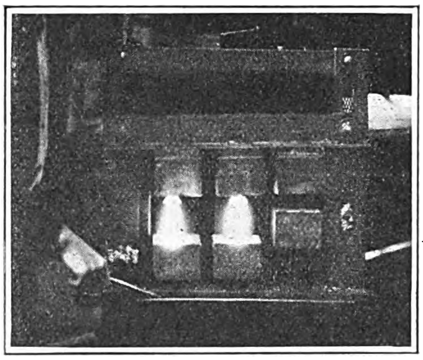
SEVERAL improvements have been made in the electric rivet machines manufactured by the Humil Corporation, New York City. The accompanying illustration shows one of the latest types as used at the Harmon shops of the New York Central Railroad. Rivets are heated by their resistance to electric current, so the heat is generated in the rivets themselves. The machine is of rugged construction and is built entirely of metal, asbestos and mica, so as to be fireproof. All coils are impregnated with high grade insulating varnish, to make them waterproof.

Particular attention has been given to provide safety for the operator. All live primary parts are shielded and the voltage at the heads of rivets is so low that it can hardly be felt, this voltage never exceeding 3 volts. Transformers are furnished for any primary voltage available, such as the a.c. lighting circuit. Recent improvements include a redesigned control mechanism which is of the interlocking type. This is so arranged that the main stop and start switch, which is shown in the lower left of the illustration, locks the controller against movement when load is on the machine. This prevents all arcing and burning of control contacts. The stop and start switch is also locked out until the controller brush is in the proper contact position. The control contacts are made of heavy plate copper, the movable one being of the laminated brush type. The current applied to the rivets is regulated by a five-speed controller which gives five different current values and so enables the operator to govern his production rate accurately. Rivets are removed and inserted by pressing the pedal for the contacts desired.



Improved Rivet Heater in the Shops of the New York Central Railroad

All of the coils are located around a separate center core. The secondary coils of heavy cast copper inclose the core completely except for a small gap at the top to provide the open circuit necessary. This design provides for the complete cutting of all magnetic lines by both primary and secondary coils. The primary coils are wound with bare strip copper insulated with asbestos and mica tape. This provides rapid dissipation of the heat to the vertical air spaces and at the same time eliminates high voltage between layers of windings.



Rivets Are Heated Uniformly in the Electric Machine

The small illustration shows the heat developed in rivets and that the rivets are heated evenly all over. This insures faster, tighter and cleaner riveting with less chance of loose rivets.

High Strength Cable

A NEW type of messenger or feeder cable for use in connection with railway electrification has been developed by the Bridgeport Brass Company, Bridgeport, Conn. It is intended for use in sustaining the contact wire through which current is carried to the electric rolling stock and at the same time to transmit the current from the power house. For this purpose it is necessary that the cable possess high electrical conductivity, great tensile strength, and non-corrodibility.

The cable is composed of an inner core consisting of seven strands of Phono-Hi-Strength wire, 0.11 in. diameter, and having a tensile strength of 130,000 lb. per square inch. This inner core is surrounded by 12 strands of hard-drawn copper, each 0.11 in. diameter.

Association News & Discussions

Regulators Must Avoid Competition*

Essential Railways Must Be Protected from Inroads of a Competitor Not Capable of Replacing Them by Regulation that Will Develop the Bus Along Sound Lines to Its Own Best Interest and to the Public's

By J. N. Shannahan
President American Electric Railway Association

I HAVE journeyed the 2,000 miles that separate Phoenix from my home upon Chesapeake Bay, in Virginia, because I believe it is of paramount importance that whatever can be done should be done to make clear the story of the electric railway to you gentlemen, who in your official capacity have so great an influence upon the fortunes of our industry.

It is no decadent, no obsolete, no dying industry. On the contrary, its preservation and its progression are as vital to the interests of the people of the United States as they have ever been, and there is as I see it no sign anywhere that the service performed by it will grow less essential in the years to come.

In 1922 the United States Bureau of the Census reports more than 15,300,000,000 passengers were carried on the electric railways of this country. This represents a gain in 5 years of more than 825,000,000 passengers, or nearly 165,000,000 a year. And it must be remembered that these 5 years saw the restriction of imigration, the migration of millions of our young men to the battlefields of France, the manufacture in this country of more than 8,000,000 automobiles and the intensive development of the motor bus as a common carrier.

Certainly, if statistics are needed to demonstrate the essentiality of electric railway service, this record of increased traffic, under conditions admittedly unfavorable to traffic growth, offer convincing proof that the electric railway industry is advancing and not falling back.

I make to you, therefore, no plea for the mollycoddling of a passing system of local transportation, the usefulness of which is gone, and the dying agonies of which you are asked to alleviate. On the contrary, I seek your co-operation in continuing, under conditions fair alike to the public which uses it and to the companies which furnish it, a service essential to the welfare of every community of any size in this country.

Service of the Bus Should Be Co-ordinated with Present Systems

Recently a new factor has appeared in the transportation problem. Without going into detail as to the merits of the motor vehicle as against the street car, it must be admitted that it has its place and its function. Certain territory in many localities can be best served by it. It is a flexible means of transportation. Many people like it. During the next few years thousands of motor vehicle routes will be laid out and franchises applied for. Instead of a deadly competition, should there not be a co-ordination of the present agency, the street car, and the motor vehicle? Instead of a situation where the street railway lines and the motor vehicle lines are straining every muscle to drive each other out of the field, why should they not blend together in order to perfect a transportation system to meet every need of the community which they desire to serve? In order that this co-ordination, this blending, this union, may be brought about several things are necessary:

First—There must be legislation which will set the motor vehicle in its proper place, on its own account and in relation to other means of transportation, as a common carrier, and on a footing with street car transportation in so far as franchises, penalties and restrictions are concerned.

Second — There must be legislation which gives the preference to the agency already serving the community to make needed extensions, whether they take the form of street railway or motor vehicle extensions.

Third—The regulation of such motor vehicle lines, whether urban, suburban or interurban, should be under the supervision of the public utility commissions of the various states, and certificates of convenience and necessity should in all cases be required.

Fourth—Where such extensions are necessary, and are demanded or requested, it should be within the power of the commission to designate what form these extensions should take.

Fifth—This legislation should be uniform, if possible, in all the states, particularly on account of the rapidly growing interstate business.

The electric railway managements of the country realize fully, I think, the advantages and the possibilities of the motor bus. According to the last available figures, 155 companies in the United States are operating 2,000 of them, and the number of companies and the number of buses are growing constantly. From the experience gained as operators, as well as from careful study and investigation, has come a conclusion, which is also borne out by the experience in Great Britain and other European countries where buses have been used in connection with electric railways for a much longer period than upon this side of the ocean. That conclusion is this:

In the handling of mass transportation, i.e., the carriage of great numbers of people within short periods of time; concretely, the carriage in our industrial centers of more than 40 per cent of all traffic in 2 hours of the early morning and 2 hours of the late afternoon, the electric car is the most efficient and most economical vehicle that can be used.

I think that this is an understatement of the situation, and that as applied to our larger communities it may with truth be said, that laying aside efficiency and economy, the electric car is the only vehicle that can perform the task at all. I reach this conclusion because the streets of few, if any, cities have sufficient area to accommodate the immense fleet of buses that would be required.

In cities that have subway or elevated systems for the operation of trains the field of the motor bus widens. It is conceivable that if such systems be extensive enough, the surface street railways may within a reasonable radius of such lines be superseded by buses, providing always that the operation of the two facilities be properly co-ordinated. But outside of New York, Boston, Chicago and Philadelphia there are no such subway or elevated systems, and so, to borrow the expression used in a famous opinion of the Public Service Commission of the Second District of New York, the street railway is the "backbone of any transportation system" in practically all of our large cities.

Competition Cannot Be Tolerated

The motor bus is, however, an efficient auxiliary to the electric railway and within its field should be given every possible encouragement. But I need not tell you gentlemen, who are the agents to whom the task of carrying out the great policy of regulated monopoly among public utilities, that competition between the electric railways and motor buses is as destructive of public welfare as is competition between telephone utilities, gas utilities or electric utilities; or that to injure, through competition, the ability of a common carrier to perform service is to work a wrong to the people who receive that service.

Competition upon any fair or equitable basis between electric railways and motor buses is impossible. The motor bus owes its existence as a carrier to a public subsidy, in the shape of a right-of-way, built and paid for by the taxpayers generally, and not included in the cost of service upon which its rates are based. Without good pavements motor bus operation would be impossible. Charge to the motor bus its share of the construction and maintenance of pavement and motor bus fares would be prohibitive.

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*Abstract of address before National Association of Railway and Utilities Commissioners at Phoenix, Ariz., Nov. 14, 1924.

I do not argue for the imposition of additional burdens of taxation upon the bus. I do not quarrel with the policy of providing proper highways out of public funds for use by common carriers. I do, however, submit that it is the part of folly to destroy or cripple an existing necessary transit agency which pays a large portion of its income into the public treasury, by encouraging the competition of a publicly subsidized carrier, which, if it should be finally successful in eliminating its competitor, would itself surely fail under the burden of furnishing complete service.

It is but a short time ago that the proposition to put the motor vehicle under the control and regulation of the public service commission seemed rather startling. Yet slowly, but none the less surely, the idea has gained ground that the principal thing to seek and find is the public good. A system which permits a reliable medium of service to be harassed and annoyed by multitudes of parasites constantly nibbling at its patronage and its sources of revenue can hardly be said to be conducive to the public good.

Experience warrants the statement that in the average community the transportation service should be permitted by authority to take the form of a properly regulated monopoly. In many activities competition is the life of trade, but it requires no particular discernment to set it down as a fact that in the urban, suburban and interurban transportation business competition is fatal to prosperity and efficient service.

RAILWAY SHOULD BE GIVEN FIRST OPPORTUNITY TO SUPPLY BUS SERVICE

In the average community the transportation system is very often the result of a consolidation of several lines, perhaps built at various times. The corporation owning these lines has expended large sums in bringing them to a state of efficiency; its stock has been distributed among the people of the community, and if the corporation has been properly managed a good will has been built up in the community which is worth much to the utility in its dealings with the public. It may be that for many years it has handled the transportation situation in its locality with satisfaction to its public. Such a corporation should have the first demand upon the consideration of the people of that community whenever new lines of transportation are needed, and such a community, where the existing agencies have given satisfaction, should extend first to such agencies the preference in new territory and in new franchises.

Commission regulation as a substitute for competition has worked well in the case of railroads, of electric utilities, gas utilities and, where it is still effective, in the case of local transportation utilities. I know of no movement anywhere toward a return to the old system, whereby franchises could be indiscriminately secured without sanction of a central regulatory body, only to be sold, with or without physical property to the existing utility, to increase capitalization and bring a consequent effect upon rates. But the advent of the motor bus as a common carrier has injected an element of competition into the local transportation problem, that is being controlled and regulated all too slowly for the good of the public and of the utilities. Railway men, as well as public officers, have been slow to grasp the real meaning of the movement, and have been belated in recognizing that the situation at the root of it requires the same treatment that has been successfully applied in the regulation of other classes of public utilities.

The situation is clearing up. The studies made by this organization and the principles set forth in the decisions of many of the commissions here represented are having their effect upon the public mind. We are, I hope and trust, returning to the sane and sound policy of regulation that has been successfully applied in the past, and by so doing we are going to preserve the useful service of the electric railway, and add to it the equally useful service of the motor bus.

The propositions that I have set forth in connection with motor bus operation contain nothing that is not generally applied by your commissions in connection with the regulation of other utilities; they confer no special privilege upon electric railways; nor do they impose upon motor buses any regulation that is not now imposed upon electric railways in their relations to each other. They encourage the extension of motor bus service, they conserve electric railway service and they provide a means of bringing together both services, so as to organize a complete car and bus service to meet public requirements.

In considering the motor bus problem we are not confined to city lines, or even to state lines. Interstate bus lines have become a reality, and a stern reality, to state agencies which attempt to deal with them. As long as a traffic system remains within the boundaries of a single state, it is a state problem and may be handled and dealt with as such. However, when a state line is crossed it becomes more serious and more unmanageable. State commissions can no longer lay down rules, and unless the Interstate Commerce Commission has power to deal with the situation, where does such power lie? If it does not have it, should it not possess it? It seems to me that just as the commissions in the various states must see to it that proper state legislation is enacted, so equally important and necessary is it that these agencies should inaugurate the movement to give adequate authority to the proper body to deal with a situation that may soon become serious.

I but voice the general sentiment of electric railway managements when I say that we look to the state regulatory commissions represented in this association for such public spirited and intelligent action as will solve correctly and expeditiously the problems that the competition of the motor bus has brought about. We feel sure that you recognize, as we recognize, the essentiality of electric railway service, the advantages of motor bus service, the destructive effect of competition between the two and the beneficial effect of co-ordination under proper regulation by commissions having state-wide jurisdiction.

Such legislation can find its way to the statute books more easily through the efforts, the initiative, the recommendation and the active support of the commissions themselves than in any other way. It will not be denied that the real function of a public utility commission is to see that the public receives satisfactory service and the utility a satisfactory return on its investment. In order to accomplish this there must be no duplication of service. Each territory should be served by the agency best adapted to its needs, whether it be street railway or motor vehicle, and these results can be best brought about by the preference suggested above in giving the utility which is prepared to render the proper service the first opportunity to serve.

The present attitude of the average public service commission toward the development and regulation of the various utilities has been the result of a growth. The whole body of the law has changed within a decade. The attitude of the public has changed. The idea of the man in the street that commissions were created solely to protect the people against the greed of corporations has been reformed, and if such man is keeping up with the times and has caught the modern spirit of fairness and service, he believes that the commission has other duties of a different nature altogether, viz.:

(a) Seeing that both the public and the utility get a square deal in matters of rates and regulations.

(b) Giving the public service, but insisting that it pay what such service is worth.

(c) Removing the utilities as far as possible from the uncertain and unsavory field of municipal politics, and placing them where the rule of reason and common sense regulates them rather than the whim of ward politicians and small-town regulators.

For the association of which I am president, I offer you full co-operation and assure you that its members realize the difficulties in your path and the splendid service that you render to the public, first, and the utilities, second.

Self-Ventilated Motors in Central Europe*

By E. Nier
Manager of the Municipal Street Railways of Dresden, Germany

The lighter street car service of earlier years kept back the wide adoption of self-ventilated motors, although Dresden, for instance, had 26 such motors in use as early as 1914. In these more strenuous days, every means of economizing power and cutting down upkeep must be exploited, so that there has been good reason to make greater use of the self-ventilated motor.

Out of 22 of the larger properties from which replies to a questionnaire were received, 10 reported no such motors at all. The remaining 12 did practically nothing in the war years, but in the year 1921 Berlin added 194 to a preceding 6 and now has 270; Dresden added 90 to the original 26 and now has 178; Hamburg began with 2 in 1922 and now has 108. Amsterdam has only 10, The Hague 74 and Vienna 72. The total number reported early in 1924 on the twelve properties was 860.

The fears that self-ventilated motors would suffer from the entrance of foreign substances, thus increasing their shopping time and upkeep, have not materialized in practice. Frequent sprinkling of the trackway is one method of minimizing the entrance of dust and other particles. Screens and filters cannot keep out dust entirely, but it is gratifying that the material picked up has not proved very harmful.

The Hagen Street Railway operated over such a dusty roadway that it arranged to take the air from the car interior through hose of 60 mm. (2.4 in.) to 100 mm. (4 in.) diameter. This hose did not last long because of the constricted space between car body and truck. Hence 54 motors were closed to operate in the ordinary way, but 32 were still run as self-ventilated motors. Vienna has also tried to use air from within the car. The Merseburg interurban railway has taken air from the roof through a pipe run through the partition between the second and third-class compartments.

A typical case of dust collection showed much dust blown out of a perfectly sound self-ventilated motor which had come into the shops after a run of 35,000 km. (21,700 miles) because of damage to some other part of the car. The motor itself apparently could have run for 50,000 km. (31,000 miles), to 60,000 km. (37,200 miles) without difficulty.

Examination of a self-ventilated motor before cleansing discloses that the deposits of foreign matter are not uniform. The commutators are usually very clean because their rotation throws off loose material. Not much more than a film of dust will be found on the upper parts of the armatures, the field coils, poles and brush-holders. Dust containing iron will be found drawn to the pole pieces without, however, causing damage. The bottom of the motor housing will contain more dust, some of it loose and the rest in the form of balls or other shapes up to the size of a small nut. These nuggets have a scaly structure and often have spiky projections. The various shapes are probably due to the mixture of the dust with oil or water and to the tumbling effect caused by the vibration of the car.

The value of internal cooling of the armature is considered questionable, especially, as the required ventilation channels weaken the armature both mechanically and electrically. Instead, the amount of air passing over the surface of armature and field coils can be increased.

The air inlets should not be so low as to suck up rain, sprinkling or puddle water from the trackway. Powdered or granulated snow, because of its entrance in quantity, may find some weak spot in the insulation, but ordinary snowflakes, rain or mist are usually vaporized before they can do any harm. The existing screens and filters cannot be considered as air purifiers but rather as catch-alls for large obstructions.

It is generally best to take air from inside the car, but as two motors require 10 to 15 cu.m. per minute, special means would be required to avoid uncomfortable drafts for the passengers. For motor-cooling, it would not be desirable in winter to draw warm air from the interior. Dresden is experimenting in the other direction by sending warm air from the motors into the car.

The companies replying stated that they overhauled these motors at their customary car-overhaul periods, which varied from 27,000 km. (16,740 miles) to 60,000 km. (37,200 miles). The only item stated by some as tending toward more upkeep was a slightly greater wear of the brushes. The best method for cleansing the motors was said to be that of blowing them out with compressed air at the time of regular overhaul. Intermediate cleansings were mostly unnecessary.

While the self-ventilated motor is not yet all it should be, it is, in the writer's opinion, the type most likely to be the street railway motor of the future.

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*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Track Standards in Central Europe*

By Paul Goetz
Manager Leipzig Street Railway, Leipzig, Germany

Although the replies to a questionnaire on track standards prepared by the writer were more than a year and a half old (owing to postponement of the 1923 convention) and often incomplete, it has been possible to present some interesting facts, which are summarized as follows:

Track Gage — The prevalent gage, particularly in the larger cities, is 1.435 m. (4 ft. 8½ in.) as shown by the fact that of the 5,857 km. (3,631 miles) of route operated by 42 replying managements in Germany only 1,689 km. (1,047 miles) was of narrower gage, usually 1 m. (39.4 in.). In Austria, the ratio in favor of standard gage was almost 10:1, four users operating 653 km. (405 miles) of standard gage against three undertakings with 64 km. (39 miles) of narrow gage.

In Czechoslovakia, only one operator with 15 km. (9 miles) had standard gage, the other five totaling 78 km. (48 miles) were of narrow gage. The one Danish property replying had 168 km. (104 miles) standard gage. The six Swedish properties totaled 273 km. (169 miles) standard gage. Three Norwegian systems totaled 37.7 km. (24 miles) standard, while one property had 11 km. (7 miles) meter gage. On the three Dutch lines totaling 298 km. (185 miles) only 2 km. (1.24 miles) are narrow gage. In Switzerland, however, nine roads totaled 184 km. (114 miles) meter gage, as the only standard gage route reporting was the cross-country Thurgaubahn with 43 km. (27 miles).

Rail Sections—The reports on rail sections gave 4,845 km. (3,004 miles) of route in grooved rail and 1,010 km. (626 miles) in T-rail, but this shows but a small part of the picture. The standard practice in all the countries included is to use grooved rails in paved construction. In Berlin and other cities new streets are parkwayed in order to permit open track, T-rail construction.

Light rail is going out, the former minimum weights of 20 to 25 kg. per meter (40 to 50 lb. per yard) being replaced by rails weighing 30 to 35 kg. per meter (60 to 70 lb. per yard) and more.

The unnecessarily large variety of rail sections is deplored. During the war the properties naturally were glad to get anything they could. They have, however, since failed to take advantage of the post-war possibilities in making use of adopted standards and consequently saving money. The non-German properties show a better realization of the advantages of standard rail sections.

A noticeable tendency is the preference for rails as high as 180 mm. (7 in.) as the most practicable for block paving as well as for asphalt and wood paving on concrete base. It is poor economy to use a lighter section on routes with sparse traffic, inasmuch as the weight of the rail should be determined more by the weight of the car and the depth of the paving.

Provided the rails are welded and on good foundations, there seems no good reason for going to sections of 200 to 210 mm. (say 8 in.) height. Short lengths of 200-mm. rail have been laid at Dusseldorf, Hamburg and Kiel; and of 210-mm. rail at Munich. The last construction, although using steel ties and concrete foundation, does not show better resistance to wear than track in other large cities. Berlin still has 160-mm. (6.4-in.) rail on 90 per cent of its routes, but since the beginning of 1923 it has been installing 180-mm. (7.2-in.) rail.

Another tendency is toward the use

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*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

of shallower and narrower grooves, which is helpful in securing more practicable special work. This is true on both German and non-German properties.

Welded Joints—In welding new rail the most common practice is to use thermit. Electric welding is preferred for old rail, although the same success would be obtainable on new rail. Electric welding is the only practicable method for "dutchmen" or similar heavy repairs. A pre-requisite for the success of welding is well-schooled labor. Welding is most common in Germany, Denmark, Switzerland and Norway. Hitherto the latter two countries have used thermit only, but the Swiss will use electric welding in the near future.

Special mechanical constructions have not found general acceptance, although the Melaun and Hesse joints respectively are in proponderant use at Berlin and Vienna. A summary of mechanical and welded joint practice shows that on the German properties 62 per cent of the joints were mechanical and 19.4 thermit, the rest being electric weld or special. Austria has 51.3 per cent mechanical and 2.8 per cent thermit, the rest being special. On the Czech properties the proportions were 87.8 per cent mechanical and 12.2 per cent electrical.

The following countries have been using thermit on all new work since 1912, so that their present ratio of thermit alone now stands: Sweden, 14.1 per cent; Norway, 43.85 per cent; Holland, 7.1 per cent; Switzerland, 40.1 per cent. All the rest is mechanical except 1.31 per cent electric welding in Sweden and 0.39 per cent in Holland.

Special Work—The standardization of special work has made great progress, the standard curvature for switches is on a radius of 50 m. (162 ft. 6 in.). In Germany, 74.4 per cent (43) of the reporting operators used the standards in varying degrees; in Austria, 87.5 per cent; in Czechoslovakia, Sweden and Holland, 66.6 per cent; in Switzerland, 80 per cent and in Norway 100 per cent.

Curved track usually ranges from 10 to 20 per cent of the total route length, except in the older cities which have many narrow and twisting streets. Heidelberg leads with 50 per cent, but even so large a city as Hamburg attains 30 per cent of curves. Munich has curves of as little radius as 13 m. (42 ft. 8 in.). The effect of curvature on life is not ascertainable because of the wide difference in conditions. Much of the trouble due to excessive curvature is said to have resulted from blindly following the original horse-traction layouts. The author believes that conditions can be alleviated if effort is made to secure the narrowing of sidewalks, the cutting off of corners, the right to lay tracks other than absolutely parallel to the curb, etc.

Retention of Block Paving in Rail Strip—There is a tendency toward monolithic paving, but there seems no reason why it should be necessary to use such paving between and alongside the rails. The asserted advantages of monolithic asphalt and wood block paving do not compensate for the greater difficulty of keeping the track structure well drained and free from upheavals due to freezing. In the first instance the demand for a concrete substructure means that the line is out of service for quite a period during the setting; and in the last instance, the upheaved substructure leads to excessive maintenance and a solid substructure transmits vibrations to adjacent houses. The elastic type of substructure, using well-drained broken stone and block paving, is to be preferred.

This discussion does not apply to all of the reporting countries, but rather to Germany, Austria, Switzerland, Denmark and to Zagreb, Jugoslavia. Norway, Sweden and Holland use block paving chiefly, while some Swiss cities have macadam. It is observed that quite a number of railways use but one layer of concrete into which the rails are bedded directly. It would be cheaper in construction, and also easier to replace rails, if they were set on a layer of concrete only 2 to 3 cm. (0.8 to 1.2 in.) thick in combination with an asphalt mixture around which a second layer of concrete would be poured. The use of cement to solidify the substructure is considered an unnecessary expense because careful work will produce uniform density with broken stone substructure and block paving.

The experience of a majority of operators is against the use of rigid track with concrete base. On the other hand, the Vienna Municipal Street Railway has had 10 years successful experience with absolutely rigid track, partly because of the excellent drainage. Of course, such construction requires exceptional skill and is doubtless expensive. In the first Vienna construction, the rails were set in reinforced concrete. The substructure was of a good mixture, but a still richer mix was used for the second layer which was carried to a height of 10 cm. (3.9 in.) above the base of the rails. Then followed a sand cushion and asphalt base for paving block 20 cm. (7.8 in.) high. In a later construction, the concrete was reinforced directly around the rail base because the rails were of greater height than the paving block. It is questionable whether such track could be readily built on pre-existing concrete substructure. In any case it is not believed that any known concrete construction can guarantee the undisturbed position of the rails during the period of their useful life.

The cost of maintaining the substructure and paving in the track strips and of street cleaning therein is almost universally borne by the street railways. Only three properties, all in Germany, reported the use of compressed-air for breaking up concrete. One Danish operator has ordered such equipment and one Swiss operator contemplates a trial.

Central Association Annual Meeting

THE annual meeting of the Central Electric Railway Association will be held at the Miami Hotel, Dayton, Ohio, Jan. 8 and 9, 1925. The program is being prepared and will be published in a later issue.

European Progress with Magnetic Track Brakes*

By Jörgen F. S. Barth
Manager Christiania Railway,
Christiania, Norway

THERE was a time when cars were so small and light that all braking could be readily done by hand. As vehicles grew larger and heavier, improved hand brakes such as the Ackley and Peacock types were adopted. (Short-circuiting brakes were also added.—Eds.) Next came the magnetic track brake which was free from the handicap of a wheel brake on slippery rail.

The first magnetic brakes appeared some 20 years ago. They were fed directly from the line through a separate switch and were used chiefly for emergencies. Their stops were so abrupt that one might say the place of danger had been transferred from outside to inside the car. To overcome this defect, most magnetic brakes are now wired into the short-circuit braking contacts of the controller so that they go into action gradually. The last braking circuit contact is arranged to take line current direct in order to permit emergency stops.

To obtain definite information a questionnaire was mailed to 244 members, but as only 29 replied, it may be assumed that no more than the latter number are using magnetic track brakes. These operators have a total of 5,342 motor cars and 3,607 trailers of which 1,113 motor cars have magnetic brakes and 141 trailers are so equipped. Only three operators use magnetic track brakes on all of their motor cars. The range of braking effort is between one-half and three-fourths of the car weight.

These brakes always are operated independently of the wheels. The gap between shoe and rail ranges from 3 mm. (0.12 in.) to 20 mm. (0.8 in. Maintenance is trifling as it consists chiefly in replacing worn shoes. Zürich was the only undertaking which reported otherwise. One operator gave his rate of shoe wear as 1 mm. per 1,000 km. (620 miles). Nine operators were of the opinion that the magnetic track brake was less injurious to the motors than a short-circuiting wheel brake the others expressed no opinion. Only five operators observed any rail-tread wear ascribable to the use of the magnetic shoes. Some operators who also use air brakes, said that the latter were satisfactory but cost more to maintain than magnetic track brakes.

On the Christiania Railway three-car (one motor and two trailers) trains totaling 51 metric tons loaded are standard. The following advantages of magnetic track brakes have been found:

1. Powerful braking without disturbance to passengers.
2. Failures are very rare.
3. Skidding (locked wheels) is impossible.

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*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

4. The chief maintenance is replacement of shoes; but the saving in wheel and wheel-brake shoe wear more than equals this upkeep.

5. Sand has been cut 50 per cent; and it is used only on up grades.

6. To assure this extra-powerful braking, the motorman need only move his regular brake handle somewhat faster.

7. The motorman enjoys the confidence of complete braking control.

8. Accidents are reduced and money saved thereby.

9. There is less strain on the motors.

10. Rail corrugation is perceptibly decreased.

Of course, these advantages are not obtained for nothing. The extra rail wear seems to amount to 1½ per cent of the track upkeep. There is also somewhat less braking current available for car heating compared with ordinary short-circuit braking, but it is hoped to improve this by some changes in connections. It may be added that the Christiania property is in a country requiring car heating some five months in the year. Fog, ice, snow and leaves also make the braking problem unusually arduous.

Correction of Headway Inequalities*

By Alexander Patz

Manager of the Budapest Street Railways, Budapest, Czechoslovakia

ONE of the important duties of the traffic director is to devise methods of keeping headway inequalities on combination routes within the lowest possible limits, aside from congestion or equipment defect causes. This subject requires the use of higher mathematics to show the relative positions of moving cars of different runs on a section common to all.

As an example, take Rakoczy Street which had been served by 12 routes having individual headways of 15, 12½, 12, 11, 11, 10, 10, 10, 9, 9, 8 and 8 minutes respectively. The combined service had cars bunched at some places and excessive spread at other places, giving an irregularity index of 74.5 per cent. By using 10 minutes as a base headway and dropping out cars here and there, the irregularity index was reduced to 34.7 per cent.

In rush hours, the service should be increased in even multiples by going to a 5-minute headway to double the service, to 3½ minutes triple the service, to 2½ minutes to quadruple the service, to 2 minutes to quintuple the service and so on. On the other hand, an even interval during hours of reduced service can be secured through dropping every eleventh car to attain an 11-minute headway, every sixth car to attain a 12-minute headway, every fourth car and fifth car alternately to attain a 13-minute headway, etc. A 10-minute base headway is recommended because it is also easier for the public to remember the local time points as being 1, 2, 3 or more minutes beyond 20, 30, 40 minutes, etc.

To minimize the piling up of cars through any cause whatever, delayed motormen are instructed to report immediately upon reaching a terminal whether trouble on other cars was responsible. These reports are treated as a check upon the report of the motorman whose car was at fault. A higher standard of care is necessary for those cars that are regularly run through congested districts. Pull-in records are divided according to the two chief types of cars inherited from the predecessor private and municipal properties.

A most helpful step toward minimizing breakdowns on the line is found in the practice of posting comparative delay records of the different carhouses every four weeks, the division of troubles showing whether the delay was due to defects in equipment or in operating methods. An efficiency bogey is set up for each type of equipment. Carhouses which exceed the average delays are termed "poor" and those which fall below the average are termed "good."

The operating points on which each depot is judged include the following: Deviation from schedule; man shortage and misses; collisions with own cars; collisions with other vehicles; damage to current collectors through taking switches improperly, etc.; accidents. The equipment defects are classified as follows: Motors; control and resistors; circuit breakers and fuses; current collectors; miscellaneous electrical equipment; wheels and axles; braking; bearings; draft rigging; fenders; miscellaneous mechanical equipment; car scarcity.

In consequence of this searching four-weekly comparison of personnel and maintenance standards, the original average of 16.5 minutes delay per car or train per diem has been lowered to 2.6 minutes.

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*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Midwest Association to Meet in St. Louis

ANNOUNCEMENTS have been sent out by Secretary J. A. Weimer, that the midyear meeting of the Midwest Electric Railway Association will be held in St. Louis, Mo., on Nov. 24 and 25.

Many questions of importance to the electric railway industry in general, and particularly to those properties in the territory covered by the association, will be discussed at this meeting. The detailed program of the two-day session will be announced later.

National Highway Traffic Association

THE annual meeting of the National Highway Traffic Association will be held in the new clubhouse of the Automobile Club of America, 12 East 53rd Street, New York City, on Tuesday, Dec. 2, 1924. Two sessions will be held, the first beginning at 2:30 and the second at 8 p.m. A dinner open to the public will be served at 6 p.m. in the Grill Room. Requests for dinner reservations should be sent to Elmer Thompson, secretary, Automobile Club of America.

The subjects to be considered include: "Solutions of the Parking Problem in Congested Districts of Municipalities"; "Enforcement of Traffic Regulations by Utilization of a Police Traffic Bureau"; "Methods of Increasing Traffic Capacity of Streets"; "State Fees for Commercial Motor Vehicles as Private and Common Carriers"; "Regulation of Pedestrian Traffic."

Engineers Will Discuss New York City Traffic Problem

A JOINT meeting of the New York section of the American Society of Civil Engineers and the Metropolitan section of the American Society of Mechanical Engineers will be held in the auditorium of the Engineering Societies Building, 33 West Thirty-ninth Street, New York City, on Wednesday evening, Nov. 19, at 8:15 p.m.

The traffic problem of the city will be the subject of the evening. Those who are on the program to speak are Mayor J. F. Hylan, Richard E. Enright, police commissioner; John Kenlon, chief of the New York City Fire Department; Major Elihu Church, transportation engineer Port of New York Authority, and C. W. Leavitt, consulting engineer.

Preceding the meeting the members of the sections will meet for dinner at the Building Trades Employers' Association, 34 West Thirty-third Street. Dinner will be served at 6.30, so that those attending can reach the Engineering Societies Building in time for the moving pictures which will precede the regular meeting.

American Association News

Metropolitan Section Has Enthusiastic Meeting

THE Metropolitan Community Section of the American Electric Railway Association met in New York on Nov. 7, with an attendance of more than 500. The principal speaker of the evening was E. F. Wickwire, vice-president Ohio Brass Company, whose subject was "Friendlyizing," and whose talk was enthusiastically received.

This was followed by motion picture films prepared by the New York Transit Commission, entitled "The Straphanger," and showing the crowded conditions of the subways and the problems confronting the companies in trying to solve the difficulties.

The membership committee reported a total enrollment of 569 members, but later it was announced that the membership committee's report was made up at 5 o'clock and that since then up to 8 o'clock the enrollment had increased to 650.

This is the second meeting of the Community Section and the enthusiasm seems to bear out the feeling of President Thompson that the membership will soon reach the 1,000 mark.

The News of the Industry

Commission Has Right Over Fares

Victory for Virginia Railway & Power Company in Decision of Commission Over-ruling City's Fare Plea

Objections of the city of Richmond to the fixing of rates and valuation of property of the Virginia Railway & Power Company by the State Corporation Commission have been overruled in an order entered by the commission. It was the unanimous opinion of the commission's members that that body has the right to value the power company's property and fix rates over the traction lines, despite franchise provisions.

The order over-rules the petition of the city to dismiss the recent request of the company for such a valuation in the Richmond division. It also over-rules the city's demurrer in the case.

The company has been ordered by the commission to proceed at once to submit facts and evidence bearing upon the value of its property for rate-making purposes and otherwise proceed in the case in accordance with its petition.

Of the importance of the case the commission said:

> The case is of great importance, and that it is not free from difficulty and doubt is manifest from the divergent views entertained by learned counsel on each side and the copious and able briefs filed, but we feel that, under the law, there is a plenary jurisdiction in the commission, and we feel confident that such a holding is conducive to the best interests of the State of Virginia and the people thereof generally.

Jurisdiction of the commission was challenged by the city of Richmond on four grounds, as follows:

> 1. That all of the four main franchises granted to the predecessor companies of the petitioner, and the extensions of these franchises, constitute inviolable contracts for the fixing of rates during the life of the franchises binding upon the State and protected by the federal and state constitutions.
> 2. That the General Assembly has vested the city with authority to prescribe such rates within the proviso of section 156 (b) of the Constitution.
> 3. That the matter is *res adjudicata* as between the city and the Richmond Passenger & Power Company, predecessor of the petitioner, and between the city and the Richmond Traction Company, predecessor of the petitioner.
> 4. That the company is precluded by estoppel or by waiver from litigating the question before Oct. 10, 1924.

The commission took up each of these contentions in turn and disposed of it. It said in effect that after very careful consideration of the constitutional and statutory provisions which seem to it to be pertinent and of the very able and comprehensive briefs filed by counsel, that it has jurisdiction to make proper investigation and to value the railway in Richmond as a whole, to determine whether or not the existing rates are just and reasonable, and if it finds them unjust and unreasonable, to fix rates which are just and reasonable.

In addition to disposing of the four contentions previously noted the commission set down the following general propositions:

> 1. The tendency of the decisions all over the country, including Virginia, has for some time been, and is, toward recognizing the police power of the States as to rates of public service corporations as largely inalienable.
> 2. A like tendency has recognized, and does recognize, the advisability in the interest of the public of a central, unified, uniform and general control as to rates.
> 3. As to rates of a city transportation company and rates of many other city public utilities, there is manifestly more definite interest in the people of the State generally in the former than the latter.
> 4. Every practical consideration, in view of the complicated situation in the city of Richmond, as well as considerations of convenience and public policy, lead to the conclusion that there should be a general and uniform control as to rates of transportation in the city of Richmond, and where reason clearly demands a certain course, the law, which is based on reason and exists for the general welfare and the best interests of all, will generally be found to follow. Certainly the law should be held to follow the dictates of reason and policy and the interests of all the people, unless it clearly is contrary to such dictates.

The petition of the company asking the commission to determine the "fair value for rate-seeking purposes of its transportation system in Richmond and extending into Henrico and Chesterfield Counties and to fix such rates and charges as shall be just and reasonable" was filed on April 17. The city filed a petition asking that it be made a party defendant on May 7 and a demurrer on the same date.

Jitneys Made a Political Issue

Springfield Operators Profess to See Opportunity to Return by Election of Mayoralty Candidate Favorable to Them—Railway Now Operating Buses and Is Prepared to Expand Co-ordinated Service

THE transit situation in Springfield, Mass., presents a picture of seeming contradictions. Not since last May have any buses been run in that city in local service except by the Springfield Street Railway. At that time Mayor Leonard put into effect his rule against jitney operation. A year ago he said that he would do this, so that the jitneys had lived only on sufferance since that time. A trial was made of operation on a plan of voluntary contributions, but this was merely a gesture. The jitney men felt that there was no hope for escape from the ruling of the transportation board, made up of five members of the City Council and the Board of Aldermen, but the jitney men were determined to compel resort to the law on the part of the city officials.

While jitney competition with the Springfield Street Railway was lively, it never reached proportions attained in some other cities. It is estimated that only about 5 per cent of the total number of passengers hauled in the city were handled by the jitneys. The jitney men contend, of course, that this business was largely created by them. Too many variable factors apparently enter into the case to determine definitely whether this contention is correct. In any event, even spokesmen for the jitney men admit that the service they gave was not all that could be desired either as regards headways or types of vehicles operated. Better buses, they say, would have been put into service except for the threat of their complete expulsion from the city, which, like the sword of Damocles, hung over their heads a year. Opponents of the jitney are not so sure of this.

The bus men made their fight before the Mayor and lost. Mr. Leonard proved obdurate. One thing has been established beyond doubt. The Mayor is determined. He is not contemptuous of public opinion, but he is a man of decided opinions. A minority, organized or unorganized, has no terrors for him. Both friend and foe pay him tribute on this score. On more than one occasion he has brought down upon his own head the scorn of a particular part of the public which he has opposed, but in every instance the general opinion is that his public acts have been grounded on the conviction that he acted in the best interests of the city. On the other hand, partisan politics is charged by the jitney interests against the members of the Transportation Board or a majority of the members of that committee. This charge is, of course, stoutly resented by the members of the board. The board merely concurred with the Mayor in his decision that "the competition of independent jitney buses must be eliminated for the public welfare."

Anyway, the whole matter has got into politics. The local election in Springfield does not occur until Dec. 2, but the events incident to the national election on Nov. 4 were in some cases overshadowed by the impending local primaries which follow closely upon that event. Mayor Leonard has no desire to remain in public office, so that as an issue his recent acts do not enter into consideration except in so far as his successor might be inclined to follow the course of action by him which has resulted in the elimination of the jitneys.

In the early stages of the campaign

there were three prospective candidates, Josiah Dearborn, present city solicitor under Mayor Leonard, and Fordis C. Parker, chairman of the Board of Public Works, both Republicans, and Richard J. Talbot, counsel for the jitney men, an independent in politics and at various times a Republican and a progressive follower of Roosevelt. Every one knows where Mr. Talbot stands. He is for the jitney, first, last and all the time. Necessarily, he is a partisan. He is probably not the radical partisan that some of his opponents are inclined to make him out to be. It is certain that he will run for office. He may run as a Democrat if he gets the indorsement of that party, but run he will in any event. He can run as an Independent, for he has canvassed the situation and has indorsements sufficient to assure him the right to run. If he runs independently, Mr. Talbot will make the issue one of better transportation, meaning, as he sees it, that the jitneys have a place in the transportation field of that city. He says the jitneys are willing to go back at a 6-cent cash fare with five tickets for 25 cents. The jitneys formerly charged 7 cents. This is the same fare that was charged by the railway, but since the increased pay was awarded to the railway men, the railway fare has been made 10 cents cash, with three tickets for 25 cents.

Mr. Parker has promised that in the event of his nomination by the Republicans he will have an expert appointed to look into the transportation situation, and that if a report is made to the effect that the Springfield Street Railway is not doing all in its power to afford proper service, he will favor the return of the jitneys. Mr. Dearborn, the other candidate, did not at first commit himself to any fixed policy with respect to transit matters, but in a speech which he made on Nov. 3 indicated that he believed in the necessity of preserving the railway. He thought that a city-wide committee should be appointed to determine the minimum number of additional buses required for reasonable transportation and that the railway should be afforded a chance to indicate its own willingness to meet the situation failing which licenses should be issued to the jitneys up to the number of vehicles regarded as necessary. At the Republican caucus on Nov. 11 Mr. Parker was nominated. The Democratic primary is on Nov. 14.

But the story isn't all one-sided. Stories of this kind seldom are. The province of the outside observer is to write about them dispassionately. In the eyes of the participants, however, this he seldom does, for either one side or the other and sometimes both sides see matters through a glass darkly. One thing is certain above all others, the spirit of civic consciousness in Springfield is very highly developed. In view of the controversy over the right to run jitneys, this statement might at first be regarded as a contradiction, but it is nevertheless true.

As the railway sees it, the bus prior to last May was sucking its life blood. The story of increased railway operating costs in recent years is an old one. As proof of the correctness its contention of the narrow margin which has been left to it on which to operate, the railway cites the verdict favorable to it by the State Department of Public Utilities permitting it to increase fares. This increase was put into effect on Sept. 21. Previous to that time the fare was 7 cents. Fares were advanced with the sanction of the state body only after an arbitration award had been rendered increasing the pay of trainmen. Riding has fallen off, but an opportunity has not yet been afforded to determine what the real results are likely to be. At any rate, the railway agreed a long while ago to put in buses, and this it has done. At the present time it is operating nine up-to-date buses (one Stewart, one Yellow Coach, one Selden, four Garfords, one Federal and one White) on four routes giving adequate service to territory in which the railway lines do not operate. A general system of transfer is in effect which permits riding in one general direction, and cars and buses alike exchange transfers. The fare on the buses is the same as on the cars.

The railway stands committed to an extension of this program of co-ordination. Its contention is that it does not fear competition, but that competition means operation of two systems of transport under the same conditions. It has about 195 miles of track. Practically all of the various lines are operated over a stretch of Main Street extending from Carew to State Street, a distance of about a mile. The scheduled running for this stretch through the center of the business district during the rush hours is 12 minutes, but this is seldom achieved, and on stormy nights 30 minutes is frequently taken to make this run. The railway would gladly reroute some of its lines, but as Main Street is the principal business artery, the commercial interests have frowned on any such proposal.

This is just one of the contradictions in the situation to which reference was made in the beginning. The general feeling is that the railway did well to continue for as long a time as it did on a 7-cent fare.

The attitude of Mayor Leonard and the Transportation Board must be taken as reflecting public opinion, the proponents of the bus to the contrary notwithstanding. Critics of both are to be found, however, in all walks of life. It is no reflection upon the bus as a vehicle of transport to say that many harsh words were said about that vehicle as independently operated. There is a supervisor of traffic to look after things in the interest of the city, but many of the buses were not up to date and they were generally operated indifferently. To this the spokesman of the jitney men, as said before, replies that the threat of compulsory suspension which hung over the heads of the jitney men militated against their doing much better.

Business men everywhere express the hope that the coming election will result in the matter being settled for all time. They are not optimistic of that outcome, but the general opinion is that the people are too well informed to permit the jitneys to return on anything like the basis upon which they were formerly run.

One-Man Car Issue at Dayton Before Court

District Judge Smith Hickenlooper on Dec. 1 will hear a motion filed by City Attorney J. B. Harshman of Dayton, Ohio, asking the dismissal of the case against the use of one-man cars in Dayton on the grounds that no federal question is involved.

The five railways operating the cars in Dayton secured a temporary injunction against the city in the federal court the latter part of January, 1924, and the case has been pending since.

At the election in Dayton on Nov. 2, 1924, residents of the city voted to discontinue the one-man car service in the city. An ordinance was immediately drafted giving the railways 90 days in which to organize the two-man car system. Another extension of 30 days was granted. This put off the date of the discontinuance to Feb. 1, 1924. Upon a petition filed in the federal court by attorneys for the companies a temporary injunction was granted restraining the city from enforcing the ordinance until the case was settled.

Rapid Transit Referendum Suggested for Chicago

A resolution for a referendum of Chicago voters in February on the subject of a city-built subway has been introduced in the Chicago City Council by Alderman Kostner. He expressed the belief that the administration would be unable to get any of its numerous transportation plans ready for the February ballot because of the intention to pass on all details first. He wants simply a vote which might be construed as a mandate to build some kind of tube system under downtown Chicago, and his preference is for one linking with the elevated and surface lines at the north and south ends of the loop.

Fares Cut in Fitchburg to Stimulate Riding

Officials of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., have announced that the fare reduction on the so-called Southside lines of the company has been approved by the Department of Public Utilities and has been put into operation. The same reduction has been put into effect on the Westside line in Leominister. Passengers still pay a 10-cent fare, but they receive a return check. If the check is used the same day it is issued patrons make the round trip for 10 cents, instead of 20 cents. No transfers are issued and the check is good only for that line. The reduction in fare is an experiment. It will not be continued if riding on the line is not stimulated.

New Fare in Force in Boston

The Boston Elevated Railway put its 6-cent fare into operation on Nov. 5 on its short-haul lines. On the bus lines operated by the elevated additional steps have to be taken to instal the 6-cent fare, it being necessary to obtain the consent of the municipalities in which the bus lines operate.

Bus Tax Amendment Fails in California

An amendment to the constitution of California designed to place bus companies in that state on the same basis of taxation as the other public utilities was defeated at the recent elections. The measure lost by a vote of 75,000 out of a total of 750,000. The amendment was sponsored by the California Motor Carriers' Association. Its defeat is attributed principally to the opposition of the farmers and local taxing bodies and to the vote of a section of the public that is said to have regarded the impost as insufficient.

"Amendment No. 1" as it was called, was officially designated on the ballot as "State Taxation of Highway Transportation Companies." It was presented by the association to the voters as a means of equalizing the taxes of bus lines and putting them on the same basis of taxation as the other public utilities that contribute the chief revenues of the State.

It provided for the substitution of a state tax on gross earnings for other taxes to which the bus lines are now subject but did not exempt them from the state gasoline tax. It would also have maintained the present state rate of 4 per cent on gross earnings until the rate was changed by the Legislature.

The Motor Carriers' Association now represents the interests of 677 motor transportation lines in California—substantially the entire highway transportation industry that has been built up in the state within the past two decades and which last year accommodated more than 29,000,000 passengers.

Pittsburgh Pass Puts Sunday Back on Traffic Map

Nov. 2 was the second Sunday of the "Sunday-only" pass of the Pittsburgh Railways. The results attained indicated that all that was needed was to give the public of so large a community a chance to understand what the privilege meant.

On Oct. 26 17,500 passes at 25 cents each had been provided, but so great was the demand that most conductors were sold out by noon. The number actually sold was 15,179. This was equal to 9.1 per cent of the receipts. On Nov. 2 pass sales amounted to 33,168, or 18.8 per cent of the receipts.

The company had already in operation a liberalized Sunday transfer costing 10 cents or 20 cents for just one round trip. The effect of the pass the first Sunday was to cut the sale of these transfers from a former average of 18,000-19,000 to 16,013. On the second Sunday, despite the enormous increase in the sale of 25-cent passes good for any number of rides, 12,258 specials were sold. This itself was double the number sold before the 10-cent transfer was liberalized to give a full 8⅓-cent ride on each side of the center. It may seem curious that so many persons would not pay an extra nickel for unlimited service, but it is likely that even if the number of specials decreases there will still be a market for this particular transport bargain.

The Sunday pass innovation has met with much praise from various elements of the public. Aside from the good-will effect, the revenue has shown a most gratifying increase. The second Sunday, which really gave the pass its first opportunity, produced $42,786. This was $4,230 in excess of the same Sunday last year and $2,500 in excess of the average of the four Sundays preceding Nov. 2.

Bus Bids Made in Indianapolis

After nearly three hours of arguments on the part of those who participated in a recent public hearing the Board of Park Commissioners at Indianapolis has indicated that if the Indianapolis Street Railway does not submit a definite proposal for handling transportation on Capitol Avenue north of Fortieth Street within two weeks, the proposal of the People's Motor Coach Company would probably be approved. Robert I. Todd, president of the railway, said a definite proposal will be submitted. Mayor Shank asked how soon each could begin operation on Capitol Avenue.

"I'll guarantee them in sixty days," Mr. Bowman answered.

"I'll guarantee them in thirty days," Mr. Todd retorted.

"This question of bus transportation is becoming serious," Mayor Shank said at one point. "Everyone knows that without a street car system the city wouldn't be worth a nickel. However, I think that Mr. Todd should promise to give relief immediately to people in the north part of Indianapolis who demand some method of transportation."

$25,000,000 Rapid Transit Program Outlined for Philadelphia

Plans for a Chestnut Street surface car subway and transit service over the Delaware River bridge were outlined on Nov. 10 at a special meeting of the city's Transit Commission by Thomas E. Mitten, chairman of the board of directors of the Philadelphia Rapid Transit Company, who suggested that the city finance its construction.

The plans provide for a subway under Chestnut Street from Fifth to Twenty-third Street, where it would continue as an elevated line westward over the Schuylkill River, and thence on Sansom Street to Thirty-seventh Street. There would also be underground sidewalks from Sixth Street to Nineteenth. Mr. Mitten estimated the cost of the subway at about $20,000,000 and the sidewalks about $5,000,000. He said if the city authorized the construction the transit company would undertake to pay the interest and sinking fund necessary to retire the $20,000,000 during the life of fifty years, bonds to be issued by the municipality.

On Nov. 13 the company offered to spend $500,000 to build tracks across the Delaware River Bridge and a loop in Camden, to maintain those tracks, to provide equipment and to furnish service to and from Camdem at the same rates of fare and with the same transfer privileges that may prevail in Philadelphia, provided it received exclusive operating rights.

Municipal Bus System Knocked in Head

New York City has no right to own and operate buses, Corporation Counsel George P. Nicholson stated in an official report to the Board of Estimate of that city, Nov. 10.

Comptroller Charles L. Craig, whose bills introduced into the Municipal Assembly recently to provide for city ownership and operation of buses were the reason for the corporation counsel's report to the board, declared that Mayor John F. Hylan and his supporters were attempting to intimidate the Municipal Assembly. He said that the corporation counsel's report was an effort to defeat his bus bills by convincing the members of the local assembly that they had no legal right to pass them. On Nov. 14 Mr. Craig again insisted that the city has the right to legislate on the bus matter just as the Legislature had this exclusive right before the passage of the home-rule act last winter. Another hearing is set for Nov. 17.

I. T. S. Line Renews Wage Agreement

Employees and officials of the St. Louis Electric Terminal Railway, a subsidiary of the Illinois Traction System, operating between St. Louis, Mo., and Granite City, Ill., via the McKinley Bridge, reached an agreement regarding wages and working conditions at midnight on Nov. 7. The settlement calls for a continuation of the wage scale that expired on Nov. 1.

The workers had demanded an increase from 58 cents to 61 cents an hour effective from Oct. 1. Company officials held out for a decrease of 5 cents an hour. It was finally agreed that the old wage scale and working agreement should continue in effect until Nov. 1, 1925.

$9,531,204 in Subway Contracts Awarded in New York

The Board of Transportation, which now is charged with responsibility for all new subway construction and routing in New York City, on Nov. 11 awarded three contracts, aggregating $9,531,204, for the construction of the extension of the Fourteenth Street-Eastern District subway from Boerum Street and Bushwick Avenue to Wyckoff Avenue and Halsey Street, 2.14 miles, in Brooklyn. The contracts, in accordance with the law, were submitted to the Board of Estimate for approval.

To expedite construction the extension is to be built in three sections. The first section, 0.7 of a mile, was awarded to the Underpinning & Foundation Company for $2,733,227. The second section, 1.85 mile, was awarded to the Oakdale Contracting Company for $3,595,038. The third section, 0.59 of a mile, was awarded to the Oakdale Contracting Company for $3,202,939.

Under the provisions of these contracts the route will have to be sufficiently completed for the operation of trains within twenty-eight months and finished entirely within thirty-three months from the time that work is commenced by the contractors.

First Railway Bus Line in St. Louis Opened

The St. Louis Motorbus Company, a subsidiary of the United Railways, St. Louis, Mo., opened its first bus line on Sunday, Nov. 9. The line operates on Natural Bridge Avenue from the end of the Natural Bridge division to Line Lawn in St. Louis County, intersecting the Union boulevard line and the Kirkwood-Ferguson division.

For a 10-cent fare passengers are furnished a transfer to the United Railways city street cars, while street car patrons who desire to transfer to the buses receive a transfer for an extra 3-cent fare, as the city car fare is 7 cents.

Four single deck buses constructed by the White Company have been installed on the line. Each bus holds twenty-nine passengers. The driver collects the fares as the passengers enter.

Electrification and Motor Haul Data Sought by I.C.C.

In its annual report form, to be sent out to all railroads about Dec. 1 and returned by March, 1925, the Interstate Commerce Commission will request data on the use of electricity for motive power, and information regarding gasoline-propelled railroad cars. The commission will also seek to find out the results attained with the use of motor trucks by the companies as supplementing regular service. Some of the country's railroads, including the Pennsylvania, utilize motor trucks on short hauls.

The most recent available figures of the commission show that the eastern part of the country has 286 electric locomotives in heavy railroad operation; the south has 17 and the west has 69. Most of the big railroads of the country have portions of their lines electrified now.

Joint Operation in Texas a Success

The Dallas-Denton line of the Texas Interurban Company has not produced the business expected of it by the management. This statement is based on returns for the first month of operation. According to General Manager Richard Meriwether, the combined traffic is barely enough to pay operating expenses, but the returns from freight and express have been good. He is quoted as follows:

> The first month the line has been in operation has demonstrated the practicability of using the same tracks for steam and electrically driven cars, but aside from that the results so far are rather disappointing. We hope the business will increase as the people of the territory become familiar with the service. There are enough people in that territory to produce a satisfactory business, and we are confident it will come to us when everybody along the line begins to use the interurban cars.

The Texas Interurban Railway is co-operating with the Missouri, Kansas & Texas Railroad in operating a joint line between Dallas and Denton. Joint operation was planned when the interurban company, in fulfilling a contract with the city of Dallas, decided that Denton was the best town in the surrounding territory to include in the network of connecting electric lines. A proposition was made to the railroad company to rent its track, obviating the construction of a parallel road.

A joint dispatching system, under the supervision of the steam line company, is maintained. Each electric passenger train and each steam passenger train is considered first-class, the electric express train second class and the steam freight trains third class.

The interurban company pays a stipulated rental monthly for the use of the track, and in addition pays a sum for the maintenance of the right of way, and its pro rata share of the dispatching cost.

Results with Trackless Line at Baltimore Disappointing

The United Railways & Electric Company, Baltimore, Md., is seeking a way to minimize the loss on the trackless trolley between Gwynn Oak Junction and Randallstown. When the trackless trolley was first proposed, Liberty Road residents made a contract with the railway in which they agreed to make up deficits in the operation of the line to the extent of $10,000 the first year, $7,500 the second year and $5,000 a year thereafter, until $37,500 had been paid.

The trolley was placed in operation in July, 1922, and the Liberty Road residents have had to pay the first two years' installments on the deficit guarantee. The contract has three years to run.

A statement by the railways says:

> The United Railways has been steadily losing money on this line.
>
> The guarantee has never equaled the deficit. Our officials have been conferring with officials of the Public Service Commission for some time in an effort to work out a satisfactory solution.
>
> The company has no intention of abandoning the territory. We will continue to give the people there adequate transportation service, but some way must be found to minimize our losses.
>
> Operating economies will have to be brought about. Perhaps that can best be done by substituting gasoline buses.
>
> The company has no intention of asking for an increase of fare on the line, nor an increase of the guarantee fund posted by the citizens there.

Buses Run by Railway at Sapulpa

Bus service has been substituted for railway service in Sapulpa, Okla., and started between Mounds and Okmulgee. Electric railway service in Sapulpa, a town of 11,600, could not be made profitable. Two short lines will be abandoned entirely and about 1½ miles of track probably will be removed. The Mounds-Okmulgee buses will be operated pending completion of the electric railway extension from Mounds to Okmulgee, after which the buses will be used as feeders to the electric line on such routes as offer possibility of developing business. J. A. Frates, vice-president of the Oklahoma Union Railway, states that the company expects to add buses as line feeders as rapidly as the electric line is extended until all tributary territory is given adequate service and annexed by interurban lines to the system being developed by that company. The bus service is being given in the name of the Union Transportation Company.

New Buffalo Bus Line Starts

Double-deck buses were placed in service on Delaware Avenue, Buffalo, N. Y., on Nov. 2 by the International Railway. The fare is 10 cents. This line will be extended to Kenmore Avenue at an early date, and the Delavan Avenue line will be opened as soon as buses can be secured. Free transfers are given with connecting street car lines in a forward direction.

Buses now in use are of the open-top type, seating 67 passengers, as now operated on Fifth Avenue—New York, and Roosevelt Boulevard—Philadelphia. These buses, however, are for temporary use, and will be replaced in the early spring by the Mitten-Management bus, which has a front exit, inside stairway, semi-enclosed top and electric drive. The company says:

> Traffic congestion is becoming more and more alarming in Buffalo. It will be greatly relieved by a proper use of the bus. Sixty-seven seated bus passengers occupy about the same street space as 4 private car passengers, and when the automobilist learns of the speed and comfort possible for a 10-cent fare, he will hesitate before assuming the cost of bringing his private car into the downtown traffic, and inflicting upon the public generally the delays caused by over-congestion in the city streets. A regular motorbus service will appeal to the economical motorist as well as the comprehensive city planner.

More One-Man Cars for Milwaukee

Following a series of hearings covering nearly a year before the Railroad Commission on the petition of the Milwaukee Electric Railway & Light Company to introduce one-man cars on its Clybourn Street line a permit has been granted to establish the service. Testimony introduced before the commission showed that the company has found it absolutely necessary to reduce operating expenses wherever possible in order to give car riders adequate service at a reasonable fare.

The equipment to be used on the Clybourn line will not be like that in use on the three other one-man lines in the city. The company proposes to equip the Clybourn Street line with cars of the rear-door type so as to facilitate the unloading of passengers, especially in the downtown section of the city.

As indicated in the ELECTRIC RAILWAY JOURNAL for Nov. 8, page 821, an application by the company to extend its one-man car service to the Walnut Street line is now pending before the Railroad Commission.

More Bus Permits Issued to Public Service

Permits have been issued by the Board of Public Utility Commissioners of New Jersey to the Public Service Transportation Company for the operation of 17 buses on the Passaic-Garfield-Lodi route. This route is about 4 miles long. It parallels on the same streets the tracks of the Public Service Railway, of which the bus company is a subsidiary. The rate of fare is to be 5 cents from Burgess Place, Passaic, N. J., to the end of the line in Lodi. The railway has discontinued its trolley service on the Main-Lodi line in Passaic, Wall and Main Streets and Passaic Avenue and on its private right of way from Main Street, Lodi, to Lodi Junction, and has substituted buses.

Co-ordination Proposed at Topeka

A. M. Patten, general manager of the Topeka Railway, Topeka, Kan., has admitted that plans have been discussed looking toward the establishment of a service with buses by his company in co-ordination with the railway lines. The tentative plans now being considered are for the buses to enlarge the trade territory of the North Topeka merchants by extending operation beyond the city limits.

Whether the buses are to be operated from the ends of the present lines or whether they should operate from the south side of the river, the street cars being eliminated north of the river, still is a matter to be decided.

It is stated that the railway officials are considering a plan whereby the street cars would be operated to the Union Pacific station and passengers for other than the trains, to be transferred there to buses.

The Topeka system is controlled by the Illinois Power & Light Corporation, which is successfully operating buses in co-ordination with its railways lines in other cities, notably Wichita, Kan., and Decatur, Ill.

Interurban Passengers to Go Into Detroit by Bus

Interurban cars of the Detroit United Railway will probably cease to operate at the Detroit city limits on Dec. 1 under a plan to put a system of buses into operation for transporting interurban passengers from the city limits to the company's main terminal station at Jefferson Avenue and Bates Street. The company's outbound buses will be reserved for interurban car passengers.

Incoming passengers will leave the cars at sub-terminals, to be established by the company, and there board buses. Outbound passengers will be transported in buses from the interurban station in the business center of Detroit to the city limits to board the cars at the sub-terminals.

After the new bus system is put into use the parlor cars of the railway will be the only interurbans to proceed over the city streets to the main terminal station.

At least 50 buses will be placed in service. They have been ordered from the Yellow Coach Company, Chicago, and are to be of the single-deck type.

The D.U.R. already has buses in service on its Trenton division covering the entire interurban route. A sub-terminal and transfer station on Gratiot Avenue is being completed and will be the first one used. It will be followed by two others so that the buses on the Pontiac and Mount Clemens division will not go farther than the city limits.

News Notes

$169,000 Spent in Grand Rapids.—Keeping pace with the development of Grand Rapids, Mich., the Grand Rapids Railway up to Nov. 1 spent $169,000 this year in improving its service. The largest projects were in the downtown section to relieve traffic congestion.

Fare Increase Sought for Interurban.—The Virginia Railway & Power Company, Richmond, Va., has petitioned the Virginia State Corporation Commission for an increase of fares on the Richmond-Petersburg interurban electric line. The company is not receiving a reasonable return, the petition alleges.

Wisconsin Town Bans Bus.—Acting on the conviction that street cars offer all the people the safest and cheapest form of transportation, the village board of Port Edwards, Wis., has passed an ordinance which it believes will protect the Wisconsin Rapids Street Railway, an 8.25 mile line, against unregulated bus competition. The ordinance requires the payment of $5 a day for each bus operating on the streets in the village. Violators of the ordinance will be fined from $1 to $100 for each offense, or may be sent to jail for 90 days.

North Shore Purchase Postponed.—The Board of Estimate of New York on Nov. 7 decided to put off the matter of approving the contracts for the purchase of the rights and interests in the New York & North Shore Traction Company for $50,000 and also the question of authorizing Controller Craig to buy the carhouse and yards on State Street, Flushing, for a sum not exceeding $15,000.

Extension of Franchise Sought.—A request for a 20-year franchise to operate cars in the city of Piqua has been filed with the city by the Western Ohio Railway. The company's franchise expires in two years.

Offices of St. Joseph Company in New Location. — The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has opened for business in its new quarters in the Tootle Building, Sixth and Francis Streets. The offices of the general manager, superintendent of railways, engineering, accounting, claim and publicity departments took up quarters in the new building some time ago. The company has occupied its present quarters since the old Tootle Building at Sixth and Francis Streets was destroyed by fire two years ago. In its new location the company will occupy all of the west half of the first floor, fronting on Francis Street, and the entire second floor. The salesrooms will be on the first floor.

School Buses Run by Railway.—Two morning and evening school bus runs for the exclusive use of pupils of the Fremont High School, Los Angeles, Cal., were started by the Los Angeles Railway on Nov. 3.

Deadlock on One-Man Car Operation.—The city of Quebec and the Quebec Power Company, Ltd., are deadlocked on the question of the number of men who will operate the street cars of the city. Unless the company meets the demands of the city the fare will, on and after Nov. 15, revert to 5 cents, the rate charged in 1919. At present the rate is 7 cents.

Electric Extensions Planned.—It is reported that a steam railway line, with electric extensions, is being planned to span the oil fields, east and west, of northern Oklahoma. C. E. Burlingame, Bartlesville, is head of the temporary organization. The company is to be capitalized at $1,000,000.

More Bus Permits Sought.—The Los Angeles Railway Corporation, Los Angeles, Cal., has applied to the Railroad Commission for a certificate to operate bus service along a portion of Florence Avenue from the city of Los Angeles to the city of Huntington Park.

Insurance Policies for Nashville Employees. — The Nashville Railway & Light Company, Nashville, Tenn., through J. P. W. Brown, its general superintendent, has announced that it had issued life insurance policies of from $500 to $1,500 to its 1,089 employees. At the same time, B. C. Edgar, vice-president and general manager of the Tennessee Electric Power Company, of which the Nashville Company is a subsidiary organization, announced that a total of 2,800 employees had been given similar policies totaling $2,000,000. Protection by these policies became effective on Nov. 1. The contract for this insurance was given to the Provident Life & Accident Insurance Company, which has its home office in Chattanooga.

Tells About Railway and Bus Operations.—Service to the public was stressed by the Altoona & Logan Valley Electric Railway and Logan Valley Bus Company in connection with the Better Homes Exposition staged by Altoona, Pa., merchants and corporations. The railway had a booth with company employees in attendance. The booth contained a large map showing the territory over which the company operates, giving the trolley lines and bus routes. Numerous placards contained company statistics and gave the salient features of traffic conditions. Other bulletins announced that the Logan Valley trolley cars and buses hauled 19,000,000 passengers in one year, the cars traveling 3,000,000 car-miles. The company used 21,000 tons of coal, employs 360 men and women, operates 132 cars on 576 miles of track, and it informed the visitors through a placard that wages have increased in the past ten years by 100 per cent, materials have increased 70 per cent and fares but 40 per cent.

Bridge Will Be Constructed.—The vehicular traffic and street car bridge across the New Basin Canal at Carrolton Avenue in New Orleans, La., will be built. The New Orleans Public Service, Inc., sought to have it erected, and offered to advance the cost of construction, estimated at $150,000, to be reimbursed subsequently by the city of New Orleans. Action on the matter was delayed by a ruling of the City Attorney's office, which has been removed. The bridge will have a double street car track, with ample space on either side for vehicles and two lines of traffic.

Financial and Corporate

Surplus Increased

Montreal Tramways Has Surplus of $548,695 Compared with $347,553 in 1923 and $187,947 in 1922

The thirteenth annual report of the Montreal Tramways, Montreal, Que., shows separately the results obtained from the operations under the contract with the city and the share of the gross revenue accruing to the company under the provisions of the contract and its disposition. The report of the president and directors was recently submitted to the shareholders. It is for the year ended June 30, 1924.

Operations under the contract show a gross revenue of $12,463,799, which included $12,131,181 for passenger earnings. The total operating expenses amounted to $8,875,224 and the net earnings were $3,588,574. After the distribution of the net earnings, the total revenue from the contract, together with the operating profit of $48,555, equaled $2,358,448. An amount of $181,431 was carried direct to "Reserve for Financing." To the city of Montreal for the yearly rental the sum of $500,000 was given, and for payment on account of accrued rentals unearned in previous years $548,695, which, added to the company's revenue from the contract and expenses for financing, makes $3,588,574. The city rental up to June 30, 1924, amounts to $3,192,694, of which sum there has been earned $2,809,056, leaving a balance of unearned rental payable as earned of $383,638.

The share of the gross revenue for the year accruing to the company, together with the miscellaneous revenue from other sources, shows a distribution of total revenue of $2,449,175 and total expenses of $1,885,621, leaving a net income of $563,554. Subtracting a dividend total of $400,000, the surplus for the year was $163,554. A sum of $592,979 is added to it for the surplus at June 30, 1923, giving a total of $756,533. There has been charged against this account $87,780 for the value of discarded property, leaving a balance in the general surplus account of $668,753.

	Year Ending June 30, 1923	Year Ending June 30, 1924
Gross receipts	$12,056,355	$12,463,798
Operating expenses and taxes	6,099,993	6,246,889
Operating profit	48,304	48,554
Maintenance and renewals	2,492,792	2,579,779
Total	8,641,090	8,875,224
Balance	3,415,264	3,588,574
Allowances due company:		
Six per cent on capital value	2,177,177	2,177,177
On additions to capital	164,973	175,918
Six per cent on working capital	2,530	5,351
Financing expense	181,431	181,431
Total	2,526,113	2,539,879
Balance Dr.	a889,151	a1,048,695
Payable when earned:		
City of Montreal rental	500,000	500,000
Contingent reserve fund	b41,597	....
Total	541,597	500,000
Deficit	....	....
Surplus	$347,553	$548,695

a Surplus.
b The contingent reserve fund is limited by the contract to $500,000

During the year the company expended on new construction $1,145,505 and has written off capital account for the value of property discarded $377,466, making a net addition to capital value of $768,038. During the year the company purchased 25 new motor cars and 25 new trailers.

The efforts of the company to meet demands upon its system is reflected in the large amount of new construction work carried on throughout the year.

A comparison of operation for the year ended June 30, 1924, with the previous year is given in the accompanying table.

The annual meeting of the company was held on Nov. 5. The directorate is now composed of Julian C. Smith, president; Howard Murray, Gordon W. MacDougall, George H. Montgomery, J. L. Perron, William C. Finley, Col. J. E. Hutcheson, Lorne C. Webster, Beaudry Leman, Senator Casgrain. Mr. Hutcheson, the general manager, was in addition made a vice-president.

Foreign Tramway Issue Sold in New York Market

Instances are being presented almost daily of the growing participation of United States investors in the work of helping to finance issues of foreign origin. In the past these operations have been confined very largely to government and municipal issues and to the securities of some of the better known steam railroads. On Nov. 10, however, announcement was made that investors at home had bought $1,400,000 of Christiania Tramways Corporation two-year 5 per cent gold notes. The subscription price was 100¼ and interest, to yield about 4⅞ per cent. The offering syndicate comprised White, Weld & Company, Blair & Company, Inc., and Brown Brothers & Company, New York.

The Christiania Tramways Corporation was organized on May 1, 1924, as a consolidation of the two privately owned companies. It does all the street railway business in the city, serving a population estimated at 260,000. Fifty-one per cent of the stock of the company is owned by the city, which is the capital and largest city of the Kingdom of Norway. The city unconditionally guarantees the note of the company by indorsement. The note to the bank is in the form of a single instrument. Certificates of participation in the denomination of $1,000 each are to be issued by the National Bank of Commerce, New York, trustee.

10.27 Cents per Passenger Is Cost on Staten Island Lines

Transit Commissioner LeRoy T. Harkness has made public the substance of a special investigation made by order of Controller Charles L. Craig of the city of New York which showed that some of Mayor Hylan's municipally operated trolley lines on Staten Island had sustained losses of $57,118 in eighteen months. It was disclosed further that the actual cost of every so-called "5-cent ride" on the routes examined was 10.27 cents.

The Craig report was prepared by R. B. McIntyre, a statistician of the Department of Finance. It states that from Oct. 14, 1921, to March 14, 1923, the total revenue earned by the lines was only $54,171, while the operating and maintenance expenses were $111,289.65.

Commissioner Harkness said that similar losses were now being incurred on the other municipal lines operating on Staten Island, despite the use of policemen to help in the task of loading at the ferry station, the help of trucks belonging to a city department and the aid of labor from other branches of the city government. He said:

> If a strict accounting were kept of what the city actually spends in maintaining these lines, the Department of Plant and Structures would show an appalling financial loss on all.

In commenting upon the assertion that the actual cost of every ride is 10.27 cents, the report says:

> In other words, every passenger paying 5 cents has been riding at the expense of the taxpayers of the City of New York to the additional extent of 5.27 cents.

Despite the excessive cost of operation, Mr. Harkness pointed out, the Staten Island service has been so inefficient and inadequate that residents are demanding the installation of bus routes and extension of a steam railroad. He said:

> The operation of the Staten Island trolleys by the city has been so extremely atrocious that, if it had been the performance of any private company under the jurisdiction of this Transit Commission, it would not have been allowed to continue, by application of the statutes which govern negligent and ineffective operation.
>
> From the standpoints of safety, of service and financing, the attempt of Mayor Hylan to furnish transportation has been a pathetic failure.

Mr. Harkness's statement followed a number of protests by Staten Island commuters, who asserted that they were facing a winter of unheated cars, inadequate in number and running on uncertain schedules.

In confirmation of these protests, Mr. Harkness made public a report by William O. Smith, Transit Commission inspector, to George F. Daggett, chief of the Transit Bureau, which cited instances of overloading on several Staten Island lines, ranging from 102 to 350 per cent.

New Wisconsin Valuation Policy Attacked

Public utility companies in Wisconsin, through the Wisconsin Utilities Association, are protesting against the Wisconsin Tax Commission's new valuation policy toward them. This policy is on a basis of 100 per cent of the present value regardless of the percentage used by local assessors in valuing other private property. General property, however, is assessed at 80 per cent, while the properties of gas, electric and electric railway companies will be assessed 100 per cent of their true value. The association brands the new policy as unjust and discriminatory unless it is extended to all property owners.

Further Progress Reported in St. Louis Reorganization

Argument before the court in the suit of the St. Louis & Suburban Railway bondholders for a separate receivership and foreclosure on that portion of the United Railways set for trial in the United States District Court in St. Louis has been continued until Nov. 15. As a consequence it is freely predicted in St. Louis that an early agreement with the Suburban bondholders will be reached by the reorganization committee of the United Railways.

It is said that only one point remains to be cleared up, the question of the period of extension of the maturity date of the $4,500,000 Suburban bonds. A virtual agreement has been reached on all other points at issue, it is said. It is possible that when the Suburban foreclosure case is again called before Judge Faris announcement will be made that an agreement has been reached covering all the points in dispute.

San Francisco Municipal Line Using Up Capital

Objection to the practice of the San Francisco Board of Supervisors in using depreciation reserve of the Municipal Railway to finance extensions and betterments, has again been over-ridden, although voiced by the city engineer and leading civic organizations. The Supervisors have adopted a resolution declaring they will appropriate $393,180 out of this depreciation reserve to pay for the city's part in driving another tunnel through the western hills to improve transportation into the so-called Sunset district. The tunnel would be used by the Municipal Railway and be paid for through an assessment district and by the city. An effort to authorize a $400,000 appropriation from the city's general fund has been tabled.

There was $1,184,737 in the depreciation fund in April last. Necessary carhouse and car shop extensions and the building of extensions ordered by supervisors, including trackage which would follow the bore, would convert this balance into a $94,000 deficit, it is estimated. Other necessities and proposals, which seemingly depend upon the same fund, if executed would enlarge that deficit to more than $3,000,000.

Observers of the Municipal Railway believe the city is storing up trouble in failing to maintain an adequate depreciation reserve to insure continued operation of the lines in the future. As one observer put it, on the basis of capital cost of properties and their expected life, the present depreciation reserve balance appears wholly inadequate without further withdrawals.

Dividend on Savings Association

At a recent meeting of the board of directors of the Savings & Loan Association of the United Railways, St. Louis, Mo., a semi-annual dividend at the rate of 6 per cent per annum payable to stockholders of record on Aug. 31, 1924, was declared. The sum to be disbursed is $71,000. This brings the total dividends paid in the past twelve months to $134,700. A grand total of $487,000 has been paid to members of the association since it was formed nine years ago. The association comprises 5,369 members, employees of the United Railways and their families. It has placed 1,558 members in their homes. At a special meeting of the stockholders on Sept. 16 the authorized capitalization of the association was increased from $8,000,000 to $9,000,000, the second million in authorized capital stock voted this year.

Schenectady Railway Earnings Improve

News comes from Schenectady, N. Y., that the local railway has turned a 270,000 deficit into a net of $80,000 for the quarter ended Sept. 30, 1924, as compared to the same period of 1923. The figures follow:

	1923	1924
Operating revenues.....	$119,930	$389,837
Operating expenses.....	390,629	309,801
Net revenue	$270,699*	$80,036
Taxes assignable to railway operation	23,847	27,224
Operating income	$294,546*	$52,812
Non-operat. income ...	295	605
Gross income	$294,250*	$53,417
Total deduction from gross income	42,707	53,226
Net corporate inc.	$336,958*	$191

*Signifies loss.

This is the first news indicating that E. M. Walker, president during the past year, is getting under way. The situation in Schenectady is considered one of the worst remaining in the industry. Mr. Walker has had a tremendously difficult task. He is making real headway, but the railway is still a long way from being on a satisfactory basis. What has been accomplished thus far in the way of improved service and better earnings is all the more remarkable in view of the fact that no new money has been put into the property. It seems obvious that further development of the property depends very largely on a program of modernization, which will necessitate new money.

Valuation Finding at Denver Still Before Court

The outcome of the litigation between the city of Denver and the Denver Tramway is expected to be known before Jan. 1 if present plans do not go amiss. The case is before Judge Robert E. Lewis of the United States Circuit Court of Appeals at St. Louis.

It will be recalled that it was Judge Lewis who named Ernest Stenger receiver for the company and authorized an 8-cent cash fare, the company cutting the amount of fare by selling two tickets for 15 cents.

The principal points to be passed on by Judge Lewis is: What is the proper valuation of the company's properties, and what is a fair return on its investment?

In this connection the city claims that the valuation is about $7,500,000. The company says the value is $30,000,000. Special Master in Chancery Dubbs fixed the valuation at $20,105,707. Judge Dubbs' report cited that 7½ per cent was fair on the $20,105,707 valuation. The city takes exception to the valuation of both Judge Dubbs and the company.

$1,000,000 Erie Issue Quickly Subscribed

Myron S. Hall & Company, New York, offered on Nov. 11 a new issue of $1,000,000 Erie Railways first and refunding mortgage 6 per cent bonds, due Oct. 1, 1954. The company owns about 67 miles of track serving a population of 128,000 in Erie, Pa. Valuation of the property by the Public Service Commission of Pennsylvania amounts to twice the total funded debt, while strong provisions surround issuance of further bonds under this mortgage. The bankers report an oversubscription to this issue. The bonds were priced at 95 and interest to yield 6⅜ per cent. The present Erie Railways comprises part of the property formerly included in the system of the Buffalo & Lake Erie Traction Company, segregated following foreclosure.

Power Company After Niagara Gorge Railroad

Application has been made by the Niagara Falls Power Company, Niagara Falls, N. Y., to the Public Service Commission for permission to acquire and hold all or any part of the capital stock of the Niagara Gorge Railroad, operating a scenic belt line in the lower Niagara gorge between Lewiston and Niagara Falls.

The application also asks permission to pledge as security for $1,000,000 of 5 per cent bonds of the Niagara Gorge Railroad an equal amount of 5 per cent bonds of the Niagara Falls Power Company. As its reason for acquiring the stock of the gorge route the application of the power company sets forth that the railroad owns valuable riparian rights along the shore of the gorge for a distance of more than 5 miles; that the Gorge Railroad is the owner of the stock of the Niagara Gorge Power Company, and that the free and paramount use of the railroad is essential in any construction work for hydro-electric development which may be undertaken along the lower Niagara gorge.

Paul A. Schoellkopf, president of the Niagara Falls Power Company, says that the value of the gorge line for scenic purposes is not to be disregarded and no effort will be spared to give the public the opportunity of seeing the lower group from the right-of-way of the electric route.

The Niagara Gorge Railroad is owner of all of the capital stock of Lewiston & Youngstown Frontier Railway, which is operated by the Niagara Gorge Railroad, in conjunction with its own Lewiston-Youngstown line.

Arbitration Award Delay Helps Financing

According to the Toronto *Globe* the intricacies of finance are illustrated by the issue of $7,900,000 in civic debentures to pay the balance due on the purchase price of the Toronto Railway system. Finance Commissioner Ross figures that, while the appeal to the Privy Council over the original award means that the city will have to pay more for the property than provided by the award, in the long run the city will save money. Had there been no appeal from the award when the majority of the Arbitration Board reported on the price to be paid by the municipality for the railway, the city would have had to issue debentures carrying 6.40 per cent interest. In the meantime money has become cheaper, and money that would have to carry 6.40 per cent early last year can be obtained now for 4½ per cent.

Mr. Ross roughly calculated that the delay of more than a year and a half will save the city about $2,000,000. Supposing the amount of the debentures to be issued in 1923 and now was the same, $7,900,000, the difference between one year's interest at 6.40 per cent and 4½ per cent is more than $156,000. This alone will show that the Finance Commissioner's deduction about a $2,000,000 saving during the full life of the debentures is quite reasonable.

Civic railway system debentures totaling about $1,300,000 issued in 1911-1912 carry 4 per cent. Five issues, amounting to approximately $700,000, issued between 1912 and 1915, carry 4½ per cent, and since then issues of about $32,000,000 have carried 5 or 6 per cent.

Stockholders of the Toronto Railway, Toronto, Ont., the property of which was taken over several years ago by the city subject to arbitration of the purchase price, will meet on Dec. 1 to consider the winding up of the company and if this is decided upon to appoint a liquidator. Transfer books will close on Nov. 28 and if the decision to wind up is taken, all transactions in the shares will cease from the date of the closing of the books. The meeting will take the first step in the distribution of assets.

$20,000,000 Issue Placed

The first financing undertaken on behalf of the Cities Service Power & Light Company, the newly created $100,000,000 subsidiary of the Cities Service Company, New York, into which all of the latter's public utility properties are to be placed, consists of $20,000,000 of 20-year 6 per cent sinking fund secured gold bonds, offered by a syndicate headed by Dillon, Read & Company, Federal Securities Corporation, and A. B. Leach & Company, New York, at 94½ and interest, to yield about 6½ per cent. The bonds will be specifically secured by pledge of the common stocks of the six most important operating companies in the Cities Service Power & Light Company, viz.: Toledo Traction, Light & Power Company, (owning the Toledo Edison Company), Ohio Public Service Company, Public Service Company of Colorado, Kansas City (Mo.) Gas Company, Wyandotte County Gas Company (Kansas City, Kan.), Empire District Electric Company (southwestern Missouri), and St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

Tax Refund Is Denied to the Philadelphia Rapid Transit

The federal government has refused to refund to the Philadelphia Rapid Transit Company $5,000,000 of income and excess profits taxes, which both the company and the city believes were erroneously paid. City Solicitor Gaffney is disappointed at the ruling and has said he would advise the Mayor to take an appeal to the Commissioner of Internal Revenue. The appeal will be based on the ground that the Government's decision is a discrimination against Philadelphia, inasmuch as in a similar case a decision was given favorable to Kansas City.

The Rapid Transit Company early this year appealed to the committee on appeals and review of the Treasury Department for a refund of $5,000,000 in income and excess profits taxes, paid by the company during and since 1917. The appeal was denied. Later the city decided to intervene in the matter on the ground that a section of the former Federal Revenue Act exempted from taxation any public utility in which a municipality or other political subdivision had an interest, such as the city has in the Philadelphia railway system by reason of the agreement of 1907.

Before the city appealed to the federal authorities it entered into a contract with the P. R. T. Company, whereby it was provided that if the $5,000,000 were recovered it should be used by the company for making improvements. The case was argued last August.

The recommendation made by the solicitor to the commissioner follows:

> With the exception of one point, the arguments of the City Solicitor merely reiterate with emphasis those presented by the Rapid Transit Company before the committee. Reference is made to the recommendation for a detailed statement of the facts and contentions. These have been again carefully considered, and this office remains unconvinced that error was committed in deciding that the agreement entered into between the Rapid Transit Company and the city was not such as under Section 11 (b) of the act of 1916, as amended by the act of Oct. 3, 1917, would entitle the corporation to exemption from federal income and excess profits taxes.
>
> The validity of the ordinance and contract may be questioned, for it hardly seems probable that a city would be empowered to act as a collecting agent for a corporation even though it was to receive the total amount collected, and there appears to be no other consideration for the contract, but in any event a sufficient answer to any argument founded upon them is found in the words of the proviso of Section 11 (b):
>
> ". . . whenever any State . . . or political subdivision of a State . . . has prior to the passage of this title entered in good faith into a contract . . . the object of which is to acquire a public utility, no tax shall be levied.
>
> Certainly the tax status of the Transit Company, under the act cited, cannot be affected by a contract entered into in 1924, even though it be in modification of a contract executed in 1907.
>
> It is, therefore, recommended that the protest of the city of Philadelphia, intervening on behalf of the Philadelphia Rapid Transit Company, be denied.

The case was argued orally in behalf of the city before the solicitor on Aug. 7.

Receiver Appointed for Michigan Railroad

The United States District Court for the eastern district of Michigan, Southern Division, Judge Charles C. Sumon presiding, has appointed John F. Collins, Jackson, receiver of the Michigan Railroad. He has been authorized to continue the operation of the railway lines under the direction of the court.

The receiver was appointed on the application of the Union Railway, Gas & Electric Company of New Jersey, owner of all the stock of the Michigan Railroad, excepting directors' qualifying shares, a general creditor of the company to the amount of $1,465,903, for moneys loaned and the holder and owner of $4,000,000 of the company's general mortgage bonds. The company's property is also subject to a first mortgage of $4,050,000, which it was thought could be extended.

The bill of complaint shows that the offer of the company to extend its $4,050,000 of first mortgage bonds, which matured on May 1, 1924, could not be effected because earnings have decreased to such an extent that the company cannot pay the interest.

The Michigan Railroad consists of the high-speed third-rail line operated between Kalamazoo and Grand Rapids, between Allegan and Battle Creek, and a line connecting Bay City, Saginaw and Flint, covering a trackage of 148 miles.

Holders of more than 85 per cent of the face value of the bonds agreed to an extension of the maturity date, but some of the minority threatened suit to collect. In order equally to protect all the holders the receivership action was started.

Modification Sought for Plan of Abandonment

An unusual situation was created recently by the announcement that the Visalia Electric Railroad, Exeter, Cal., had asked permission to continue a mail and express special car to handle mail and express business which, in the request for abandonment of passenger service, it had been assumed was to be dropped. The Visalia line is 54 miles.

The Al Askin Stage Line has been granted a permit to operate between Visalia, Woodlake, Lemon Cove and Exeter, replacing the service of the Visalia Electric Railroad, but Manager E. L. Askin stated that company will not begin operations until there is something definite done about mail and express business. It is on this traffic that the stage line bases its hope for some remuneration.

Another Issue Offered to Employees.—Subscriptions will be received by the Dominion Power & Transmission Company, which controls more than 100 miles of electric railway and supplies light and power to cities of Hamilton, St. Catharines and Brantford, Ontario, for 2,500 shares of 7 per cent cumulative preferred stock. Shareholders and employees will be first to receive opportunity to subscribe, after which a public offering will be made.

Will Redeem Outstanding Bonds.—The Public Service Corporation of New Jersey has elected to redeem on Dec. 1, at 107½ and interest, all its outstanding 20-year secured 7 per cent gold bonds due Dec. 1, 1941. Holders of the bonds are required to present and surrender them with all unmatured coupons attached for redemption and payment on Dec. 1, 1924.

Statistics on New Orleans.—Commissioner Paul H. Maloney of the Department of Public Utilities of New Orleans, La., has given out some interesting figures on the public utilities of that city, based upon the report of the New Orleans Public Service, Inc., recently submitted to him for the year ended Sept. 30. According to Mr. Maloney, the citizens ride the cars 106,673,420 times in a year and use 35,654,436 transfers. The total money invested in utilities in the city of New Orleans is $74,866,386. During a year New Orleans, not including Algiers, pays $7,517,091 for electric railway fares.

Traffic Decreases in St. Louis.—The report of the United Railways, St. Louis, Mo., for the quarter ended Sept. 30 shows a drop of about 4,000,000 passengers for the period compared with the same months in 1923. The total passengers carried in the quarter this year was 63,282,885, against 57,859,171 in the same period of 1923. For the quarter ended June 30 a decrease of 3,856,112 passengers was experienced, making the loss for the past six months more than 8,000,000 compared with the same months in 1923.

Charter Amended for Additional Stock Issue.—Complying with a permit granted recently by the Public Service Commission, the Georgia Railway & Power Company, Atlanta, Ga., will amend its charter so as to issue $2,500,000 of additional 7 per cent cumulative preferred stock. The stock will be redeemable at any time after Jan. 1, 1938, at $115 a share. The present increase will give the Georgia company $15,000,000 in common stock, $10,000,000 in second preferred stock and $6,400,000 in first preferred, making a total capitalization of $31,400,000.

Arkansas Central Stock to Be Offered.—Offering has just been made of 5,000 shares of Arkansas Central Power Company cumulative preferred stock by W. C. Langley & Company, New York, and the Old Colony Trust Company. The stock will be priced at $98 a share to yield 7.14 per cent. The company is the successor to the Little Rock Railway & Electric Company.

Deficit in Net Income.—The Boston Elevated Railway, Boston, Mass., in a return filed with the Massachusetts Department of Public Utilities reveals a deficit in its net income of $786,099 for the nine months ended Sept. 30. An increase in operating expenses and fixed charges is given as the reason. The report shows an increase in passengers carried for the nine months of 4,255,663 over a similar period in 1923, which, however, was not sufficient to offset increased operating expenses and fixed charges. Passengers carried in the nine months totaled 281,088,673 and for the same period this year 285,344,336. The first nine months of 1924, compared with the same period in 1923, shows a loss of $650,004 in operating income and $20,570 in non-operating income. The gross income for the nine months of 1924 was $5,212,357, against $5,882,923 for 1923.

Duluth-Superior Earnings Off.—Net income of the Duluth-Superior Traction Company, Duluth, Minn., for the third quarter of 1924 amounted to $10,061. This is a decrease of 73.84 per cent compared with the net income of $38,453 for the corresponding period of last year. Gross revenues for the quarter were $429,237, a decrease of 8.59 per cent. Operating expenses were $349,393. This is 1.88 per cent below the record for the corresponding period of last year. Net revenue was $79,844. This is a decrease of 29.63 per cent. Fixed charges and taxes were $69,782, a decrease of 6.97 per cent. For the nine months ended with September net income stood at $17,510, which compares with $124,873 for the first nine months of last year.

Algiers Properties Sold.—The liquidators of the Home Bank of Canada have, with the approval of the court and of the inspectors appointed to represent creditors, sold the interests of the bank in the West New Orleans Light & Traction Company and the South New Orleans Light & Traction Company, Algiers, La., to E. W. Burgis, of New Orleans, president and general manager of the companies, for the sum of $800,000 cash. The outlays of the Home Bank of Canada in connection with the railway and light enterprises amounted, with unpaid interest, to approximately $1,150,000 at the date of suspension of the bank.

Additional Offering of Debenture Bonds.—Bonbright & Company, New York, announce an additional offering of $5,000,000 of the American Power & Light Company's gold debenture bonds. The bonds are dated March 1, 1916, and are due March 1, 2016. The price is 94½ and accrued interest, to yield 6.35 per cent. The American Power & Light Company owns practically all the common stocks of companies supplying directly or indirectly 397 communities. The territory served included many important cities such as Portland, Ore.; Wichita, Council Bluffs, Duluth and other cities.

Traffic Decreases.—According to the report submitted to the Public Service Commission, approximately 40,000 fewer fares were collected during September on the lines of the United Railways & Electric Company, Baltimore, Md., than in August. There were also 1,480,158 fewer passengers in September of this year than in September a year ago. For June, July, August and September of the current year 71,890,389 passengers rode the cars, compared with 78,724,396 in the same four months in 1923.

Deficit for Interborough.—The total revenue of the Interborough Rapid Transit Company, New York, N. Y., for the three months ended Sept. 30, 1924, were $13,279,939, an increase of $445,607 over the similar three months of the year previous. The operating expenses, taxes and rentals paid the city for the old subway amounted to $9,201,167, a decrease of $281,153. The income available for all purposes was $3,672,858, an increase of $1,166,589 over the three months ended Sept. 30, 1923. After providing for actual maintenance there was a deficit of $923,184 for the three months period ended Sept. 30, 1924. This figure represents an increase of $936,854 over the balance for the similar three months period ended Sept. 30 a year ago.

Earnings Increase.—According to preliminary figures of the September gross earnings of the Indianapolis Street Railway, Indianapolis, Ind., an increase of 5.48 per cent is shown over gross earnings of September, 1923, while there is an increase of almost 2 per cent over the August earnings of this year. In round figures, there was an increase of $16,000 in earnings over September, 1923, and a gain of $10,000 over last August's receipts. Although the present rate of earnings is not so great as was expected when the company was granted an increase in fares last May, last month's record was by far the most satisfactory, as viewed from the company's standpoint, since the increase in fares became effective.

Municipal Line at Calgary Hard Hit.—The Canadian *Financial Post* says that continued deficits in the operation of the Calgary Municipal Railway, Calgary, Alberta, due to the marked falling off in passenger traffic, is the biggest problem facing Calgary. Administration and overhead expenditures have been reduced almost to a minimum, and the commissioners are now endeavoring to work out some system that will improve the situation. The introduction of buses in some sections is receiving serious consideration. The operation of street cars in the outlying districts of the city, where the passenger traffic is not sufficient to pay for the service, is largely responsible for the present condition.

Power Company Seeks to Purchase Railroad.—The Niagara, Lockport & Ontario Power Company is seeking authority from the Public Service Commission to purchase all of the outstanding capital stock of the Warren & Jamestown Street Railway, which runs between the borough of Warren, Warren County, Pa., and the city of Jamestown, N. Y. The stock is owned by the Venango Public Service Corporation of Pennsylvania. The prospective purchaser says it could furnish motive power to the railroad either directly or through its subsidiary, the Western New York Electric Company, and could effect economies by using existing transmission lines of the railroad for the distribution of electricity for light, heat and power.

Earnings Decrease.—The gross earnings of the railway department of the Cumberland County Power & Light Company, Portland, Me., for the first nine months of the present year showed a decrease of $92,291 over the same nine months in 1923. The operating expenses were $915,613, while for the first nine months of 1923 they were $982,565. This decrease was brought about largely through the reduction of schedules and limitation of shop crews. With interest, rentals and taxes taken into consideration, the department's deficit for the first nine months of this year was $26,331.

Personal Items

Lieut.-Col. J. E. Hutcheson Made Vice-President at Montreal

Lieut.-Col. J. E. Hutcheson, general manager Montreal Tramway and its predecessor, Montreal Street Railway, since 1912, has in addition to that office been elected vice-president of the company. From 1891 to 1912 Col. Hutcheson served with the Ottawa Electric Railway. At the time he joined that company the road was under construction. He served with it in various capacities, finally becoming superintendent. It was this post that he was filling when overtures were made to him from the Montreal company. Mr. Hutcheson entered railroad work in 1876 with the Grand Trunk Railroad as a telegraph operator. In 1884 he became connected with the Canadian Pacific Railroad at Ottawa as train dispatcher. Later he was made trainmaster of the company and continued in that capacity until 1891. He then went to Ottawa. Mr. Hutcheson was born in Brockville, Ont., on Sept. 15, 1858.

B. W. Roberts has been appointed purchasing agent of the Southern New York Railway, Hartwich, N. Y., succeeding Mrs. A. B. Brockway, resigned.

George Tracey has been promoted by the Southern New York Railway, Hartwich, to be superintendent in charge of transportation.

Sir Ernest Clark, Permanent Secretary of Ministry of Finance, and head of the Civil Service of Northern Ireland, will, at the invitation of Lord Ashfield, chairman of the London Underground Railways, join the staff of that group of companies. He is to be attached to the financial side of the undertakings. Sir Ernest has held various important colonial and Irish financial positions with great success.

C. G. Britton has recently been appointed superintendent of the Auburn & Syracuse Electric Railroad, Auburn, N. Y., operating 65 miles of city and interurban railway under the management of Peck, Shannahan & Cherry, Inc. Mr. Britton's first work was in 1903 as a commercial telegrapher. He held various positions in this capacity until 1904. He then entered the railroad field as station operator and later became a train dispatcher on a branch of the Pennsylvania Railroad. In 1906 he became connected with the Annapolis Short Line Railroad, holding positions as train dispatcher, trainmaster and superintendent of transportation until 1921. That year the road was merged with the Washington, Baltimore & Annapolis Electric Railroad, after which he engaged in other business until 1922, when he accepted a position with the Chesapeake Beach Railway as chief dispatcher. He remained with this company until he accepted his present position with the Auburn & Syracuse Electric Railroad.

Samuel A. Wallace, formerly with the London General Omnibus Company, London, England, will be in charge of the new plant of the Public Service Transportation Company at Irvington, N. J., purchased this year for use as a bus maintenance shop where major repairs will be made. The transportation company is the bus operating subsidiary of the Public Service Railway, Newark.

Clark Verner Wood, Jr., is now superintendent of the bus division of the United Electric Railways, Providence, R. I. He has been with the Providence company since March, 1923, in the capacity of assistant to R. R. Anderson, superintendent of transportation. Mr. Wood is the son of Clark V. Wood, president of the Worcester Consolidated Street Railway and the Springfield Street Railway in Massachusetts. Previous to his work with the United Electric Railways, he was for several years in charge of the power-saving departments of the Worcester and the Springfield companies. A brief outline of Mr. Wood's activities appeared in the ELECTRIC RAILWAY JOURNAL, March 24, 1923.

Vincent E. Keenan, superintendent of the bus department, United Electric Railways, Providence, R. I., has left the employ of that company to take charge of the mechanical department of the bus division of the Public Service Railway, Newark, N. J. Mr. Keenan has been connected with the United Electric Railways since April, 1923. For the preceding three years he was on the staff of the Fifth Avenue Coach Company, New York, in the capacity of research engineer, and previous to that time he was in charge of the experimental department of the Locomobile Company of America at Bridgeport, Conn. He was educated at Clason Point Military Academy, Westchester, N. Y., and Cornell University.

Charles W. Ford has resigned as general superintendent of the Kansas City, Clay County & St. Joseph Railway to become district representative of the Yellow Coach Manufacturing Company, with headquarters in Kansas City, Mo. His resignation becomes effective Dec. 1. Mr. Ford has had an experience of 25 years as general superintendent in charge of mechanical and operating details of both transportation and electrical properties. He has been with the Clay County electric line the last 10 years. He is president of the Midwest Electric Railway Association.

R. S. Mahan, claim and general passenger agent of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has been appointed general superintendent of the company to succeed Charles W. Ford, who has become connected with the Yellow Coach Manufacturing Company. Mr. Mahan has been conected with the railway in an official capacity ever since the company was organized.

Obituary

Dr. Walter Boveri

President of Noted Swiss Manufacturing Concern—Economist and Organizer of Electric Industry

Dr. Walter Boveri, president of the famous firm of Brown, Boveri & Company, died at his home at Baden, Switzerland, on Oct. 28. The immediate cause of his death was a heart lesion which he suffered in September. Doctor Boveri had actually never recovered from an automobile accident which he met with in August, 1922.

Doctor Boveri was a man of charming personality and one who never knew what it was to be confounded by any obstacle. He had many friends in the United States as well as in all the countries of Europe. He was an honorary citizen of the town of Baden and a member of many electrical and scientific societies.

Doctor Boveri acted as president of Brown, Boveri & Company from the inception of the company to his death. He was never a designing engineer. He was best known as an organizer and was a deep student of economics, but he did play a very important part in the development of the mercury-vapor rectifier as applied to electric railways, both tramway and trunk line, now coming into fairly wide use in Germany. He was primarily responsible for the creation of the associated companies with factories at various places in the eight countries and with affiliated sales agencies in virtually every country in the world.

Dr. Walter Boveri

Walter Boveri was born in Bamberg, Bavaria, in 1865, of Italian-Swiss parentage. He attended the industrial school at Nürnberg and after completing his studies there entered the services of the Oerlikon Machine Works, where he was chiefly in charge of installation work. In 1890 he left the Oerlikon works and with the elder Charles Brown, who was chief designer at Oerlikon, started the plant at Baden, which has since developed to be one of the best-known electrical manufacturing concerns in the world. The firm was founded as a purely electrical manufacturing concern with the modest capital of about $120,000. As early as 1892 it added mechanical products to its line.

In 1916 the Federal Technical High School of Zürich bestowed a diploma conferring the degree of doctor of engineering science upon Mr. Boveri "in acknowledgment of his great merits in the development of electricity in general and the Swiss electrical industry in particular."

Henry Procter Waugh, well known in newspaper life in New York for 20 years, died, on Nov. 12, after an operation for cancer of the throat. For many years Mr. Waugh had been publicity director of the Interborough Rapid Transit Company and editor of both the *Interborough Bulletin* and the *New York Railways Magazine*, published in the interest of the employees of those companies. He came to New York 25 years ago from the South, where he had worked on his home town paper in Morristown, Tenn. His newspaper experience also included a period on the *Courier-Journal*. Starting in New York as a reporter on the *World*, he remained with that paper for 12 years, finally becoming assistant city editor. He went with the Interborough in March, 1909. He was 50 years of age.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Public Service Will Buy 100 New Buses

The intention of the Public Service Transportation Company, a subsidiary of Public Service Railway, to purchase 100 new buses has just been announced by officials of the company. Conferences have been held between M. R. Boylan, vice-president and general manager of the railway, and representatives of various bus makers. Specifications for the new buses have not yet been made public, but it is understood that the railway wishes to include certain special features in the design. Quick delivery is very much desired.

Tentative permission to proceed with plans to buy the new buses has been given to the operating officials of the railway by Thomas N. McCarter, president. Final approval of the move is expected to be given at the next meeting of the board of directors of the corporation.

The large scale operations of the company in the purchase of existing buses during recent months have placed it in possession of many vehicles of antiquated design. It is the desire to replace these by modern buses at the earliest possible moment. Pending the deliveries of those now being negotiated for, the railway is making efforts to borrow buses from other cities.

New Company to Finance Bus Purchases

The directors of White Motor Company have organized White Motor Securities Corporation to increase facilities for financing time sales of White trucks and buses. The new company will have an authorized capital of $5,000,000. Walter C. White, president of White Motor Company, said heretofore the White Company had financed all of its customers' paper through its own resources without any rediscounting. However, the large increase in purchases by railroads and other transportation as well as a general increase in time sales makes it advisable for White Motor Company to anticipate requirements for additional facilities for financing such sales without impairing working capital. The new company will provide such facilities at the lowest possible cost to customers and will enable the company to take advantage of desirable business.

New York Railways Awards Oil Contract

An important electric railway lubricating contract was closed Nov. 8 when the business of supplying oil for the entire lubricating requirements of the New York Railways was awarded to the Texas Company.

The New York Railways operates 1,593 motor passenger cars over 72.43 miles of route in Greater New York. The contract with the Texas Company does not include oil for use in power stations as the railway purchases its energy from the Interborough Rapid Transit Company. The contract became effective on Nov. 1.

Bids Asked for New Carhouse at Grand Rapids

The Grand Rapids Railway, Grand Rapids, Mich., will rebuild the carhouse destroyed by fire on July 19, 1924, under plans by Williams, Crow & Proctor, Grand Rapids architects. When estimates have been obtained the company will be prepared to proceed with construction.

The new building will consist of two units. One, 16 ft. by 30 ft., will be an office building with two stories and basement. It will have a general office and cashier's office on the first floor, foreman's office and men's quarters on the second and a heating plant in the basement.

The other unit will include the car inspection shop and car washroom, with boiler room and a substation, the larger building being 38 ft. by 224 ft. and the substation 16 ft. by 65 ft. The present substation, 22 ft. by 33 ft., will be used for storage of sand and salt. The car inspection building will cover three tracks. Cars not in need of attention will be stored in the open.

The car inspection building will be one story and of brick construction like the other buildings now in use. It will include space for storage, heating plant, coal for the cars, oils and tool room.

Formation of a Court of Commerce Suggested

Bernard M. Baruch, former head of the War Industries Board, reviewing business conditions and their relationship to government, has suggested the formation of a Court of Commerce, which would decide for business men important questions that might confront them. This court, he said, would differ from the Federal Trade Commission, which he termed an "inquisitorial body," and would appeal to the business man as the Supreme Court does to the lawyer. Mr. Baruch made his suggestion at the Waldorf-Astoria at the fifth annual luncheon reunion of the former members of the War Industries Board.

He said that the country must soon determine what to do with great aggregations of capital. By encouraging them will it be made more difficult for individuals to start a business and cause them to enter the service of these great corporations in order to make a livelihood and career for themselves? He said in part:

> What shall be the attitude of government toward business? During the war we built up great combinations of industry, some of which have remained in the form of associations. These are capable of great good and possibly great harm. A grave question is. Shall the Sherman anti-trust law prevent such great combinations and associations, or shall business be permitted to combine for better production and distribution, thereby cheapening both and resulting in lower prices for the consumer; and if they are permitted to function, what regulatory or supervisory power should be exercised? These combinations, by their mass production, increase the standard of living by placing in the hands of the greatest number of people many of the things which they need.
>
> One of the ideas that we discussed among ourselves was the establishment of a Court of Commerce, before which business men would come with such questions as whether in time of overproduction and low prices they could cut down production and fix a price. If it were possible to establish such a court to say what could and what could not be done, instead of an inquisitorial body like the Federal Trade Commission, would it not appeal as much to the business man as the Supreme Court to the lawyer? Broadly, this court would encourage such practices of co-operation and co-ordination in industry as would be found to be clearly of public benefit, but it should watch against abuses.

Metal, Coal and Material Prices

Metals—New York	Nox. 11, 1924
Copper, electrolytic, cents per lb.	13.625
Copper wire base, cents per lb.	16.25
Lead, cents per lb.	8.65
Zinc, cents per lb.	6.762
Tin, Straits, cents per lb.	54.375
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.375
Central, Ill., screenings, Chicago, net tons	1.275
Kansas screenings, Kansas City, net tons.	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.25
Weatherproof wire base, N. Y., cents per lb.	17.75
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	1.14
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.152
Turpentine (bbl. lots), N. Y., per gal.	0.875

Rolling Stock

Brooklyn City Railroad will probably place the order for its new cars, which has previously been referred to in this paper, some time during the week ended Nov. 22. The order will comprise 335 new double-truck four-motor cars very similar in type to the 250 purchased last year. This order will call for an expenditure of more than $5,000,000.

Illinois Central Railroad, Chicago, Ill., it was reported on Nov. 10 was holding up temporarily the matter of the awards for the 250 new multiple-unit cars to be supplied to it for use in its terminal electrification project, but the opinion was expressed that the delay was a matter of only a few days. Specifications for the new cars were sent out early in September. Meanwhile, of course, announcement is delayed with respect to the probable award of contracts for the electrical equipment.

New York, Westchester & Boston Railway, New York, expects that the first of its 10 new all steel cars will be delivered at the Van Nest Shops about Nov. 18. The cars were built by the Pressed Steel Car Company and the first shipment was made on Nov. 5. The new car is 72 ft. 7¼ in. long, weighs 120,000 lb. and has a seating capacity of 80. The cars are equipped for multiple-unit operation at high speed. Dimensions and details of the equipment follow:

Type of car	Vestibuled Passenger
Weight:	
Car body	77,500 lb.
Motor truck	16,620 lb.
Trailer truck	12,580 lb.
Equipment	13,300 lb.
Total	120,000 lb.
Bolster centers, length	47 ft. 7½ in.
Length over all	72 ft. 7¼ in.
Truck wheelbase	8 ft. 0 in.
Width over all	10 ft. 4 in.
Height, rail to trolley base	14 ft., 5 in.
Body	All steel
Interior trim	Agasote
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Bronze
Axles	Standard Steel Works
Buffers	Pullman
Car signal system	Westinghouse conductor's whistle
Car trimmings	James L. Howard & Co.
Center and side bearings	Perry
Conduits and junction boxes	Westinghouse
Control	Westinghouse
Curtain fixtures	Morton Manufacturing Co.
Curtain material	Fabrikoid
Destination signs	Ellcon
Door-operating mechanism	National Pneumatic
Draft gear	Pitt-Forsyth
Gears and pinions	Nuttall BP pinion and flexible gear
Hand brakes	Blackall
Heater equipment	Gold
Headlights	Golden Glow
Journal bearings	Bronze
Journal boxes	Symington—5½ in. x 10 in.
Motors	Westinghouse 409-B, inside hung
Paint	Veluvine enamel
Sash fixtures	O. M. Edwards
Seats	Heywood-Wakefield
Seating material	Pantasote
Slack adjuster	Westinghouse Type L
Springs	Semi-elliptic
Step treads	Kass safety
Pantograph	Nuttall U. S. No. 131
Pantograph shoe	No. 14 gage steel
Trucks	Pressed Steel Car Company
Ventilators	Garland
Wheels:	
Motor truck	42-in. steel tired
Trailer truck	36-in. rolled steel

Grand Rapids Railway, Grand Rapids, Mich., plans to conduct a comparative test this winter of light-weight noiseless electric street cars, St. Louis and Brill cars. Last July the company lost 65 cars by fire, and since then has been reported to be in the market for 30 cars of the one-man, two-man type.

South Carolina Gas & Electric Company, Spartanburg, S. C., has received the first of the four new buses recently ordered by it for operation in the city supplementary to the street car lines. The vehicle has a seating capacity of 22 persons. It is of Dodge-Graham make. Three more vehicles of the same size and type are expected soon.

Track and Line

Spokane United Railways, Spokane, Wash., has been doing repair work on Sprague Avenue and on the Rockwood line. New ties have been put in, curves have been rebuilt and broken rails cut out. At Hamilton and Baldwin Streets new frogs have been installed and the track structure has been rebuilt.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has completed the construction of the eight-block extension of the Center Street line bridging the gap between Twenty-seventh Street and Thirty-fifth Street. The extension required an expenditure of approximately $100,000. It covers 2,700 ft. of trackage, 2,440 ft. of double track and 260 ft. of single track, the latter to be double tracked when grade crossing improvements are under way by the railroad which crosses this line.

Key System Transit Company, Oakland, Cal., has started reconstructing track and laying permanent pavement on West Twelfth Street at a cost of $103,000. The extension of the Lakeshore line on Walla Vista Avenue a distance of 1,787 ft. east will cost $25,000.

Stockton Electric Railroad, Stockton, Cal., will build a half mile double track extension to the College of the Pacific. General Manager Webster has secured an appropriation of $40,000 for the extension and work will start as soon as rights of way are secured and the franchise granted by the City Council.

Coral Gables Utilities Company, Miami, Fla., has been granted a 25-year franchise to build and operate a railway. Work on the new line, which will be approximately 3½ miles long, is to be started immediately. The estimated cost is $150,000. The downtown and city portion of the line will operate over municipal tracks and over tracks owned by the Coral Gables Utilities Company for the remainder of the distance. It is said that an arrangement has been made with the Florida Power & Light Company, lessee of the municipal traction line for using the tracks and furnishing power.

Dallas Railway, Dallas, Tex., celebrated recently the opening of the Southwest Oak Cliff route and the completion of the Hampton Place car line, an extension of about 2 miles from Tyler Street and Jefferson Avenue in Dallas, Tex. The extension has been completed at a cost of $136,000, a portion of which was borne by the Dallas Railway and the remainder by the Moss-Tate Investment Company.

Trade Notes

Heine Boiler Company, Inc., St. Louis, Mo., announces that R. C. Broach, formerly in the general sales department at St. Louis, has been appointed its southeastern district manager, with offices in the Glenn Building, Atlanta, Ga. S. B. Alexander will continue as special representative in North and South Carolina.

Gibb Instrument Company, Bay City, Mich., manufacturers of electric welding and electric heating equipment, announces the appointment of H. V. Beronius to represent it in Iowa, Kansas, Nebraska, Oklahoma and northwestern Missouri. His headquarters will be 33 Linwood Terrace, Kansas City, Mo.

Fuller-Lehigh Company, New York, N. Y., has entered into an agreement with Babcock & Wilcox, Ltd., of London, to operate under the Fuller-Lehigh Company patents, whereby everything in connection with its pulverized coal business will be handled in the various countries throughout the world by Babcock & Wilcox, Ltd., of London, with the exception of the United States, its dependencies, Canada and Mexico. Babcock & Wilcox, Ltd., has taken over a large number of the members of the Fuller organization who have specialized for years in work of this kind.

Globe Electric Supply Company, Denver, Col., has been appointed district representative for the Kuhlman Electric Company of Bay City, Mich. The territory involved includes the states of Wyoming, Colorado and New Mexico. The Kuhlman company expects to have a stock of transformers placed shortly with this new representative.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., will complete about Dec. 1 the $2,000,000 annex to its plant at Lester, Pa. The new plant, now partly in operation, is known as the turbine blading shop. Work upon the structure was begun last spring. Two buildings of steel, hollow tile and concrete and covering more than a city block are included in the new unit.

New Advertising Literature

Rail Welding & Bonding Company, Cleveland, Ohio, has issued Bulletin No. 112, covering Una Rod 300. The bulletin states "Una Rod 300 welds as easily as a low carbon steel and deposits a pad of clean high carbon metal as hard as the rail."

Triumph Electric Company, Cincinnati, Ohio, has issued a bulletin on the TR self-start motor.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued Bulletin No. 329, listing information on locomotive equipment, rail material and power plant and contractors' machinery.

General Electric Company, Schenectady, N. Y., has issued a 27-page bulletin, designated as No. 47731, on automatic station control equipment. It describes briefly the uses and advantages of this type of equipment and is well illustrated.

New York, Saturday, November 22, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 21

Chicago Mayor Persists in M. O. Discussion

FROM the results of the recent national election it is evident that the people of the nation do not want public ownership of railroads. That decision seems to have been most emphatically expressed. In Chicago, however, the Mayor is still endeavoring to work out a plan for municipalization of the surface and elevated properties. Direct negotiations for the purchase of these lines having apparently failed, Mr. Blair, president of the surface lines, has proposed the consolidation of surface and elevated lines into a comprehensive one-city, one-fare, transportation system under some form of service-at-cost franchise. Mr. Insull, chairman of the elevated lines, has offered to finance $23,000,000 of rapid transit extensions if the city will say "go." The Mayor continues to favor municipal ownership as the first consideration in working out a plan for improvement of transportation facilities.

It is reported that he is carefully waiting for an opportunity of splitting off some one part of the local transportation system to be used as a club to force more favorable terms from the security holders of the remainder, under the threat of extending a competitive city-owned system. Such a plan would correspond generally with the method used in Detroit to force the sale of the D. U. R. city lines to that city. While considering Detroit methods, it might be well for Chicago's Mayor to analyze carefully the results accomplished there by municipal ownership. Even granting that its municipal system has been successfully kept largely out of politics to date, what advantage has municipal ownership brought to the car riders? It is hard to find one. In fact, such success as has accompanied municipal operation is directly attributable to Detroit's wisdom in turning its system over to operating men who obtained their training and experience in private enterprise. The threat of future political interference is constantly present and is even more aggravated by the result of the recent election in that city.

It is generally considered that Chicago's Mayor is sincere in his views on municipal ownership. In that respect at least the present administration, from the standpoint of the car rider, is a vast improvement over the one that preceded it. He has, however, shown evidence of being so absorbed in the hobby of municipal ownership as to put acquirement of the lines by the city first, and speedy improvement of the transportation facilities second.

The City Council committee on local transportation is endeavoring to work out a plan for submission to the voters in a few months. If that is done, it is to be hoped that the people of the city will again express their opinion of public ownership as decidedly as was done in the national election. Thus the way will be cleared for the speedy adoption of a policy that will permit extension and improvement, just as business in general is responding after the burial of the government ownership bugaboo in national affairs.

Standardization of Contact Line Should Further Electrification

ONE of the most important things in facilitating progress in the electrification of American trunk-line railroads is the adoption of a common system of current supply. Rightly or wrongly, the attitude of the railroads has consistently been that interchangeability of motive power is essential if electrification is to be extended beyond installations where it has been adopted locally for particular reasons. With standardization of supply, say at 11,000 or 22,000 volts, the steam roads can purchase equipment with the knowledge that it can be used on more than a single division of a single railway.

Details of the locomotives to be operated on the various roads naturally will differ with the service requirements, depending on the physical features and the character of the traffic. So do steam locomotives differ. But the feature mentioned most often by steam railroad men is that any standard-gage steam locomotive can be operated anywhere in emergency, and while it may not be particularly well adapted to the load, it can function so as to handle a certain amount of business. For instance, during the shopmen's strike two years ago many roads used freight engines for hauling passenger trains and vice versa. Certainly it was better to get the trains over the road late than not to move them at all.

Leading railroad men and consulting engineers have felt for some time that the highest contact line voltage is none too high, if trainloads are to continue to increase in the future as they have in the past. The New York, New Haven & Hartford Railroad was the pioneer in high-tension distribution, having adopted a single-phase contact line at 11,000 volts nearly 20 years ago. On its system have been operated electric locomotives of nearly every type ever proposed for alternating current. While it is usually admitted that direct-current motors have advantages from an operating and maintenance standpoint, these advantages are not so great as to overbalance the ability to distribute large quantities of electrical energy economically by means of high tension. The latest types of a.c. locomotives employ d.c. motors with the aid of conversion equipment on the locomotive itself.

With greater and greater concentration of train weights and increase in propulsion power, the load factors have become correspondingly poorer. On a large system this can be compensated for to a great extent by increasing the distance served by a single substation as much as possible, which in turn demands high voltage to cut down the distribution loss. As an example, consider the supply of 20,000 hp. to one train, the amount mentioned as the input for the Virginian electrification. At 22,000 volts a.c. this would require some 900 amp. and at 11,000 volts 1,800 amp. With 3,000 volts d.c., even making allowance for the advantage of power factor, some 5,400 amp. would be needed, or three times as much. At 600 volts d.c. the delivery of this power would require 27,000 amp. Low voltage d.c. is clearly out of the question. Even at 3,000 volts such amounts of current have been collected only as an experiment. On the contrary, collection of the smaller currents for the high-tension systems is not difficult. The advantage in less distribution copper and the ability to space substations farther apart is obvious, as the copper loss varies inversely as the square of the voltage.

The decision of Henry Ford to use 22,000 volts on his road need occasion no concern. In case the demand for very heavy motive power continues this move is entirely logical. The main problem is insulation on the locomotive. Supposing that 11,000 volts is adapted as a standard, interchangeability need not be affected at all, as the same engines can be used on both systems by designing the transformer primaries for connection in series and in parallel, which can be effected almost instantly by a change-over switch under the control of the engineer.

With standardization on a contact line of 11,000 or 22,000 volts alternating current, there seems no reason why the last of the technical difficulties that for so long have stood in the way of a comprehensive electrification of the trunk lines of this country should not be brushed away. The roads can then proceed with confidence, and the problem can be worked out on economic grounds, so that the lines that should be equipped electrically, either to increase capacity or to give an operating economy, can be converted without delay.

The Majority of Shoppers Travel on Trolley Cars

A RECENT check made at 13 leading stores in New York City during a busy shopping hour showed that out of 35,252 customers only 813 came by automobile or taxicab. The others came by street car or subway, by bus or on foot.

In these days of the intensive use of the streets, the tendency will become more and more definite to apply the Darwinian theory of the survival of the fittest to determine what street users to favor, as there is not going to be room for every one. The first street users to go are those who want to use busy highways for storage purposes by parking their cars while they go shopping or are on some other business. Such users have the least excuse for street space, and anti-parking laws are being passed to take care of them.

In some cities the next line of attack will be against the car lines in certain busy streets. Indeed, such an attack has been begun. Mayor Hylan has already said that Forty-second Street and 125th Street, among others in New York, should be cleared of car tracks, and there have been suggestions in Los Angeles and other cities that more automobile traffic could be moved through certain busy retail streets, if the car lines were removed.

It is not surprising that such a plan appeals at first thought to the automobile owner. To him every other user of the street is an obstruction in his path. To those who have a real interest in ascertaining the facts, like the retail merchants, the situation is quite different, and it is not surprising that in both New York and Los Angeles, the storekeepers on the streets affected protested against any proposal to abolish car lines. In New York the protest would have been much louder if the suggestion had been taken seriously, but as it emanated from Mayor Hylan it was looked upon only as a part of his plan to pester "the interests."

In any contest in which a railway may be engaged over its right to serve the public, such evidence as the above should make the discriminating local merchants its strongest supporters. They are the first to feel the effect of any diminution in service of the local transportation system, and should realize that the great majority of their customers must reach their stores by trolley.

What Causes Traffic Congestion and How to Relieve It

PROBABLY no phase of the work done during the past year by the Transportation & Traffic Association is more important than that dealing with street congestion. This cannot well be denied when vehicular congestion is causing a reduction in speed from an average of 10 or 12 m.p.h. in the suburbs to somewhere between 1 and 4 m.p.h. in congested streets during the rush hours, as was brought out during a meeting at the recent convention.

Three major causes of congestion mentioned there are first, the concentration of large business population within a small area, a situation resulting from the development of the steel frame building; second, the increasing number of private vehicles on the streets, and third, automobile parking.

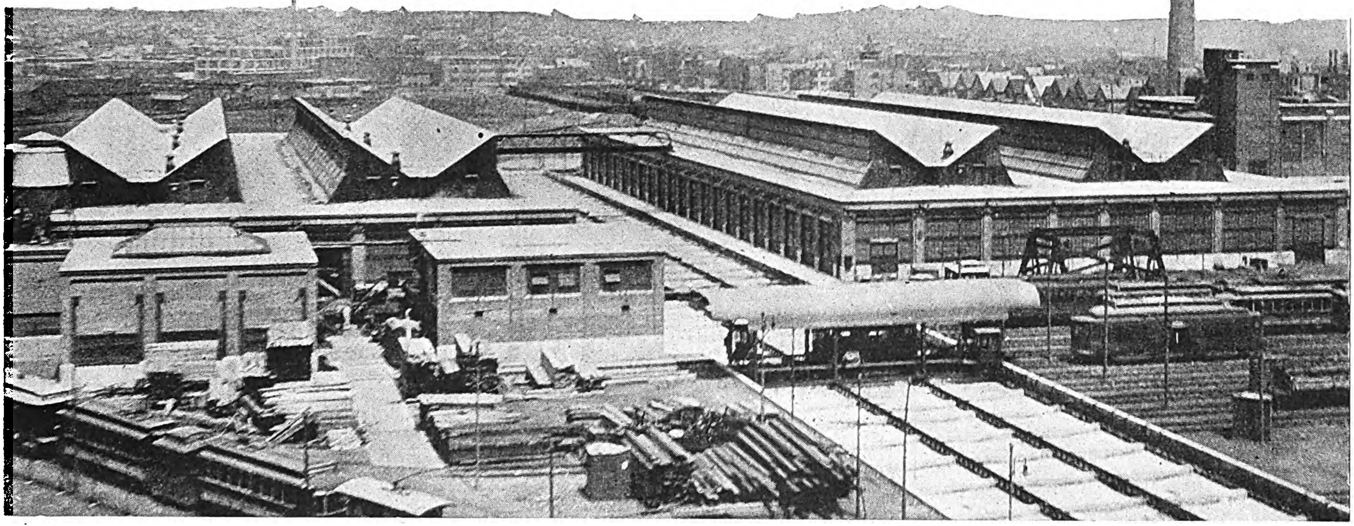
Suggested remedies fall into two groups. The first consists of methods to increase the area available for traffic, i.e., street widening, etc., and the second of ways to increase the usefulness of the existing traffic area. The first group the committee finds unsatisfactory because of the likelihood that the increased area will immediately attract increased traffic in sufficient amount to nullify any advantage.

In the second group of proposed remedies the elimination of auto parking, especially during the rush hours, is the most important. To accomplish anything along this line it will be necessary to secure the co-operation of the general public. How best to do this is quite another thing.

A committee studying this subject has recommended the appointment of a permanent committee. Good results are likely to come by such a step. Here is a problem that affects vitally not only every railway, but every street car rider, every automobile or truck driver, every merchant, every property owner—in fact, every resident of every city worthy of the name. The problem is all the more difficult because it is so widespread, each person having more or less well defined opinions on the subject. The thing to do is to keep at it, to try out as many plans as seem to have any merit and to study the results carefully. Progress in the relief of traffic congestion has been made in some cities, and in ways that will apply to the rest of the country. By collecting and disseminating information as to how this is being done, undoubtedly a better understanding of the problem will result, and real congestion relief will be obtained.

Everett Shops of Boston "L" Pave Way to Maintenance Economies

First Article



The New Shops of the Boston Elevated Railway Occupy a 22½-Acre Site Adjacent to the Everett Terminal of the Elevated Line

The New Layout, Which Provides for All Equipment Repairs Except for the Cambridge Subway, Was Decided On After Careful Survey of Requirements—Growth of the System Dictated Concentration of Facilities for Rolling Stock Maintenance—Comprehensive Provision for Mechanical and Electrical Services

STRATEGICALLY located to reduce dead mileage to the minimum, designed to meet the increasing demands of rolling stock maintenance on this transit system for years to come and finely equipped with woodworking and paint shop machinery and individually motorized tools, the Everett shops of the Boston Elevated Railway mark a distinct advance in traction repair facilities and point the way toward substantial economies in administration. Preliminary drawings of these shops were published in this paper March 19, 1921, and in the issue of Feb. 10, 1923, a general description was given of the layout of the buildings and the proposed routing of the work. Thus far the company has built only the paint shop, lumber storage, dry kiln, boiler house and wood shop, with related yard facilities as mentioned in the latter article. The steel-working shops or general machine shops have not yet been begun, as appropriations for these have not been available. Consequently there has been no opportunity as yet to secure the full economies anticipated from the ultimate layout, but on the woodworking and painting sides of rolling stock maintenance material gains in convenience have already been attained.

NEED FOR INCREASED FACILITIES RECOGNIZED EARLY

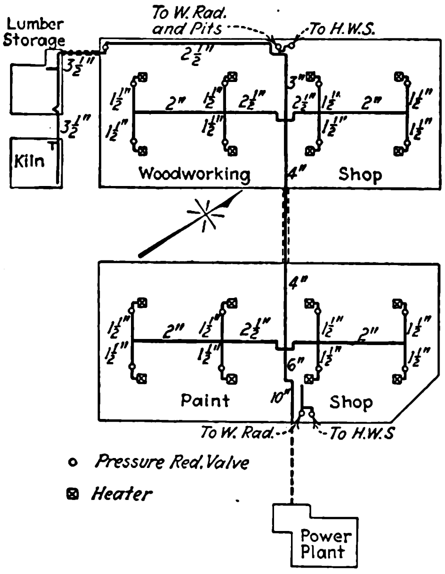
For many years the company has needed proper shop facilities for taking care of rolling stock maintenance, though large investments have been made for new and improved cars, heavier tracks and for power generation and transmission equipment. Many of the shop facilities used up to the occupation of the new shops were relics of the horse car days. The principal shop was located at Bartlett and Washington Streets, Roxbury, in an old horse car barn, which after electrification was converted into a car repair shop by making such improvements as were possible without a general remodeling. The greater part of the surface car repairs, except work on trucks and motors, was done there.

This arrangement worked fairly well for a while, but as the number and the size of the electric cars increased, this shop became more and more inadequate and inefficient. While there was considerable land available at the Bartlett Street site, there were no railroad facilities, so that expansion at this point was deemed inadvisable. Another shop which was in use for many years was a remodeled building on Albany Street, 1¾ miles away, and also without railroad facilities, which was purchased in 1889 as part of a site for the electric railway power station, and which was remodeled as a truck and blacksmith shop. The upper floors of this building were destroyed by fire in 1912, and an adjoining building was leased to provide additional space for the machine shop.

As the amount of rolling stock continued to grow it became necessary to handle at the individual carhouses much of the heavier maintenance as well as some painting. Then, too, a considerable area of the Bartlett Street shops became unusable since the transferway, elevators and track clearances were too small to permit the movement of the larger cars. By cutting notches in the columns some of the cars could be handled, but without sufficient room between tracks for good work. There was no space for lumber storage near the mill room, and frequently lumber had to be handled 200 ft. to be finished.

Beginning with rapid transit service in 1901, it was necessary to provide shops for the elevated cars. The first shop was built at Sullivan Square, all the work being done there except for the inspection and cleaning done at first in a small shop at Guild Street, adjoining the Bartlett Street surface car shop, and later in an inspection yard and shop at Forest Hills. With the construction of the Everett extension the inadequacy of repair facilities for the elevated was aggravated, since the construction of the main line tracks necessitated the removal of a portion of the shop.

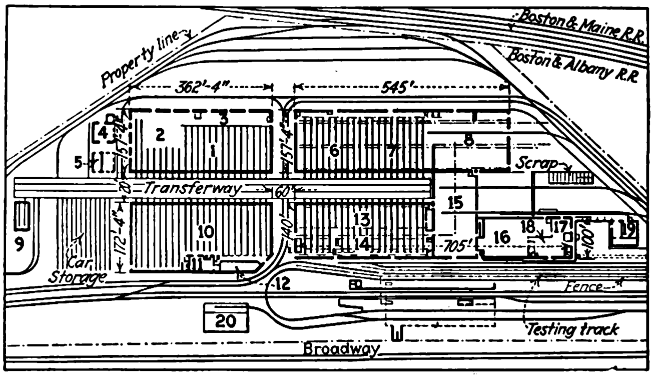
The Cambridge subway was constructed independently of the remainder of the rapid transit system, and the cars are so large that they cannot be operated over the remainder of the tracks. Accordingly a modern inspection and repair shop was built at Eliot Square, Cambridge, adequate to provide for this division and for the East Boston tunnel cars. An inspection loop is also planned in connection with the electrification of the Shawmut branch of the New Haven Railroad which will be operated under lease as a part of the Dorchester tunnel extension.


Lumber Storage
To W. Rad. and Pits
To H.W.S.
Kiln
Woodworking
Shop
Paint
Shop
To W. Rad.
To H.W.S
Pressure Red. Valve
Heater
Power Plant

Layout of Heating Mains for Buildings Already Constructed

For a number of years the company has been investigating the selection of a proper site for repair shops. The primary needs were felt to be accessibility to both surface and rapid transit lines and proper steam railroad and water transportation facilities. Such a site was chosen on a 22½-acre plot adjoining the Everett terminal of the rapid transit and surface lines. This site borders on the Mystic River and is within a 15-minute ride of the center of Boston.

Owing to the unsatisfactory conditions at Bartlett Street, particularly lack of room for car painting, it was decided that the first unit at Everett should replace those facilities. This unit, work on which began a year and a half ago, consists of a woodworking shop, paint shop, lumber building and dry kiln, with transferway and track connections to elevated and surface lines. There also are freight sidings and a connection to the steam railroad. In the first unit are also included the permanent heating plant and necessary electrical equipment common to the entire project. This first unit was put into partial operation in December, 1923.


Property line
Boston & Maine R.R.
Boston & Albany R.R.
362'-4"
545'
Transferway
Scrap
Car Storage
Fence
Testing track
Broadway
705'
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

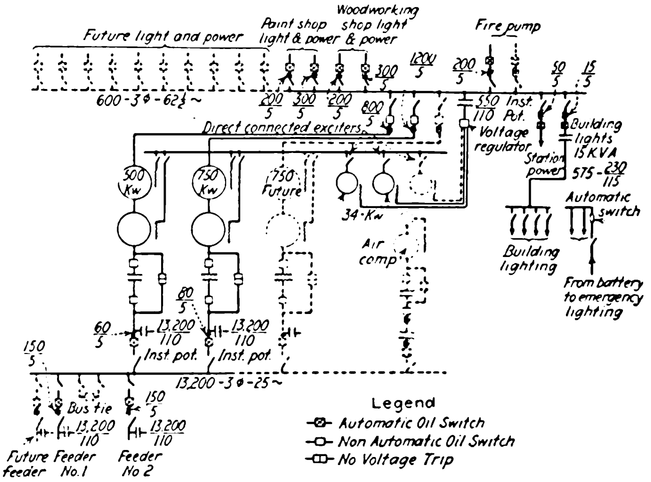
Completed Layout of the Everett Shops

1. Wood shop.
2. Mill room.
3. Carpenter shop.
4. Lumber storage.
5. Dry kiln.
6. Equipment, piping and wiring.
7. Steel car repairs.
8. Blacksmith shop.
9. Sand blast.
10. Paint shop.
11. Paint room.
12. Glass room.
13. Repair shop.
14. Truck shop.
15. Wheel and axle shop.
16. Storehouse.
17. Receiving.
18. Shipping
19. Oil house.
20. Boiler house.

The mechanical and electrical service supply of these shops centers in a combined steam boiler plant and substation located on the Broadway, Everett, side of the property. This plant is a brick and steel structure 84 ft. x 79 ft. 6 in. and containing one story and a basement. The ground floor is divided into a boiler room and an electrical operating room, the basement being occupied by ash-handling facilities and by low-tension electrical control equipment. The electrical bay on the operating floor extends the entire length of the building and is 29 ft. wide. A spur track connects the company's system with the north side of the boiler house for the convenient handling of fuel, ashes and equipment.

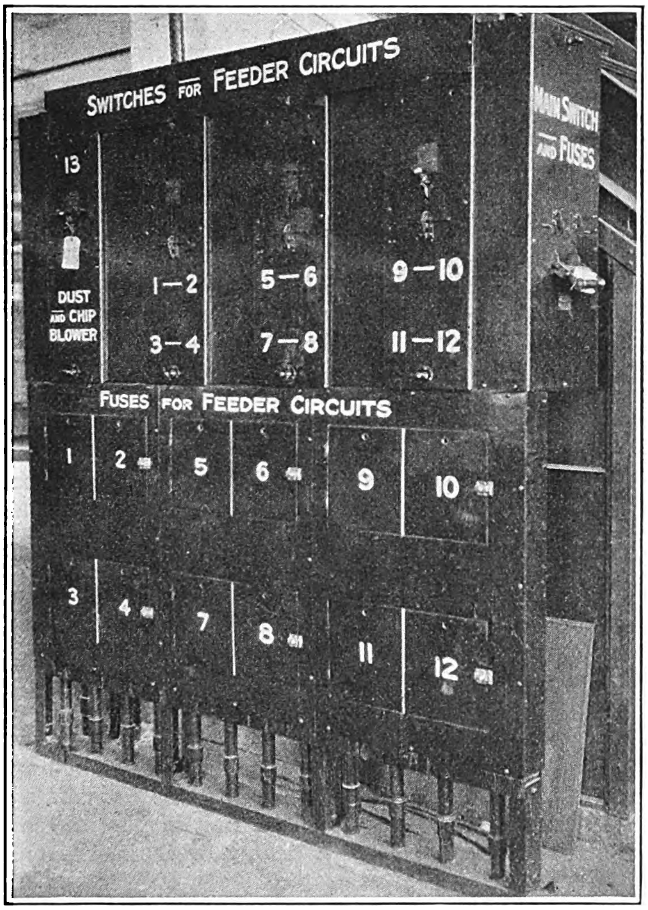
The exposed location of these shops on an open plain in the lower valley of the Mystic River and the extent of the ultimate installation of shops led to the selection of water-tube boilers fired by mechanical stokers for the steam heating plant. The paint shop and wood mill are of concrete, brick and steel construction, with butterfly roofs. The paint shop is 362 ft. 4 in. long x 172 ft. 4 in. wide, the wood mill being of the same length and 157 ft. 4 in. wide. There is space in the boiler house for four boilers set in two batteries in a single row, but the present installation consists of two 369-hp. cross-drum type Babcock & Wilcox units equipped with Taylor stokers and burning bituminous coal. B. & W. superheaters raise the steam 50 deg. F. above saturation temperature. The boilers are designed for 160 lb. pressure, but about 125 lb. will be used for the present.

Two turbo-driven Sturtevant forced-draft fans are


Future light and power
Paint shop light & power
Woodworking shop light & power
Fire pump
600-3φ-62½~
Direct connected exciters
Voltage regulator
Inst. Pot.
Building lights 15 KVA 575-230/115
Station power
Automatic switch
500 Kw
750 Kw
750 Future
34-Kw
Air comp.
Building lighting
From battery to emergency lighting
13,200/110 Inst. pot.
13,200-3φ-25~
Bus tie
Future feeder
Feeder No. 1
Feeder No 2
Legend
Automatic Oil Switch
Non Automatic Oil Switch
No Voltage Trip

Schematic Wiring Diagram for Power House, Including Provision for Future Additions installed on the operating floor of the boiler room to supply air to the furnaces. The boilers are equipped with concrete ash hoppers fitted with rolling gates. Ashes are discharged by gravity from the hoppers into an ash car and trackage system in the basement which connects with an automatic skip hoist on the outer side of the building. By pressing a button this hoist elevates the ashes above the boiler houses and discharges them into a 10-ton overhead hopper from which gravity delivery is made into cars on the spur track.

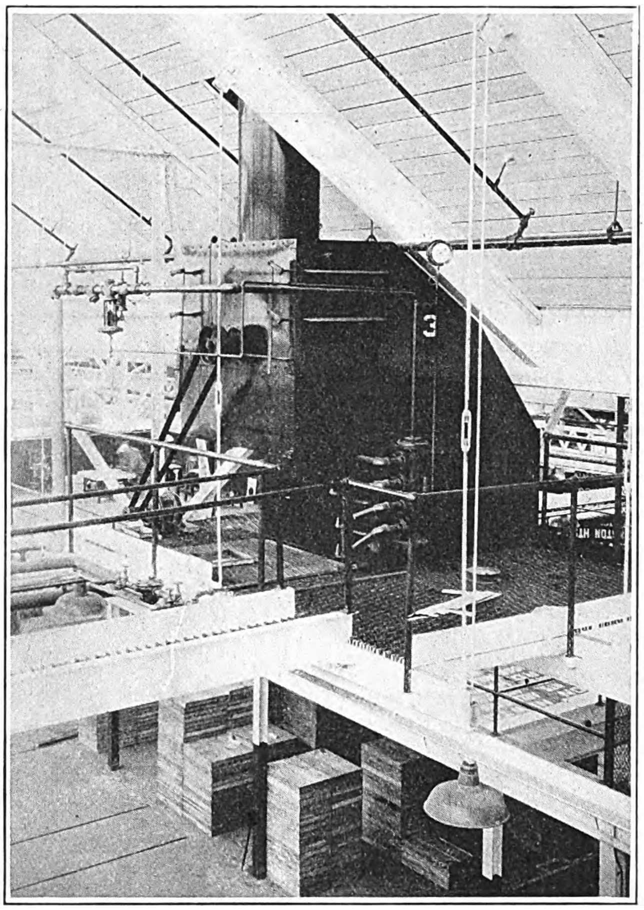
Coal crushed at the company's main generating station is brought to the boiler house in company cars and is dumped into a track hopper under the ash chute, so that when desired the same car can be used to deliver coal and remove ashes. From the track hopper the coal is carried by a belt conveyor to an elevated tower which forms part of a 200-ton storage bunker at one end of the boiler room, whence it is delivered to the stoker hoppers by a motor-driven lorry of the weighing type. The coal and ash handling machinery was installed by the Underwood Machinery Company, Boston.



Switchboard for Feeder Circuits, with Fuses Inclosed in Cabinets Beneath

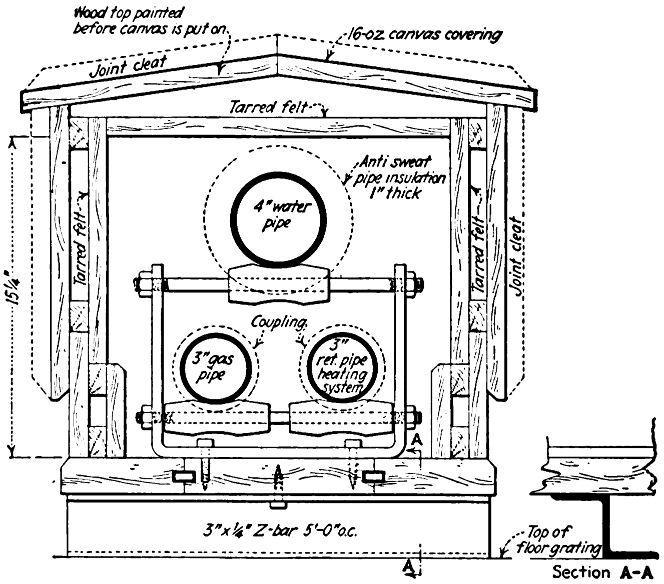
Two Lee-Courtney two-stage turbo-driven feed pumps constitute the major equipment of this type, but to obtain more economical operation at times of light load on the heating system a Union Iron Works reciprocating pump capable of supplying feed water to one boiler has been installed.

Electrical energy is being supplied temporarily to these shops by the Malden Electric Company, but the installation is designed so that in the near future it will come from the main generating plant of the Boston Elevated Railway. Energy will enter the substation at 13,200 volts, 25 cycles. Two No. 0000 three-phase underground feeders will serve the initial installation, with space provided for a third. These cables enter the substation basement and pass through disconnecting switches, current transformers and General Electric FH-103 500-amp. oil switches and further disconnects to a high-tension bus structure in this room. From the high-tension bus, cable connection is made through similar oil switches on the operating floor to starting compensators and switches controlling two General Electric synchronous frequency converters located in the operating room and designed to transform the 25-cycle, 13,200-volt energy into 60-cycle, 550-volt, three-phase energy for local distribution. One converter is rated at 500 kw. and the other at 750 kw., space being provided for a third unit of the larger rating. Two 34-kw. direct-connected exciters, with room for a third of the same size, are included.



The Ventilating Fan in the Wood Mill Is Installed on a Gallery

From the generators of the frequency converters connection is made to a 550-volt, 60-cycle, three-phase bus located in the basement, whence feeders are run to the various shops. The switchboard controlling the various equipment, including frequency converters and feeders, is located in the operating room and is of the remote-control type. An "E-9" Exide storage battery of 55 cells supplies direct current for oil switch operation and emergency lighting through an automatic switch installation. The battery is charged from a small motor-generator set in the substation. Space has been assigned in the operating room for a motor-driven air-compressor, but at present air is secured

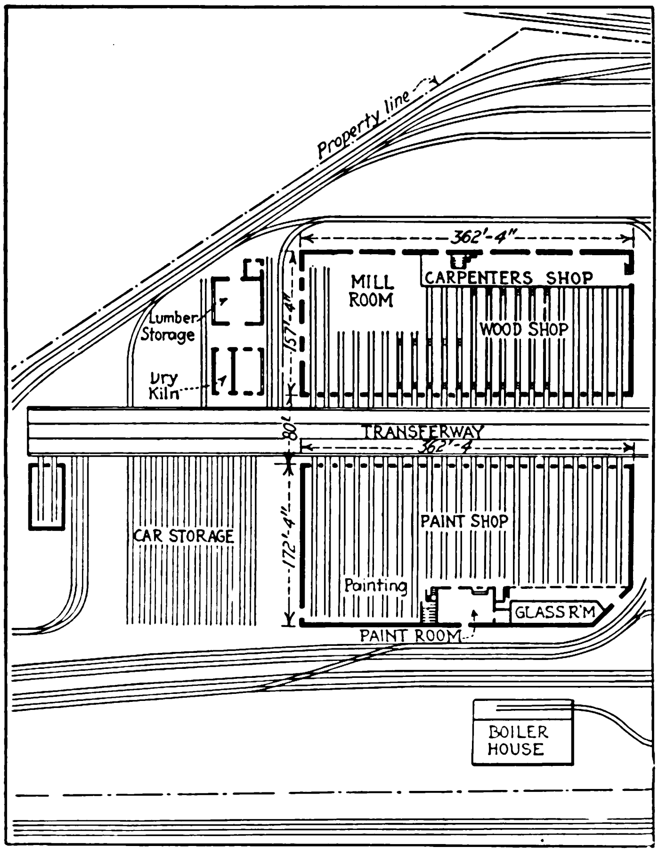


The Piping Is Carried Over the Transferway on a Bridge in an Inclosure

from the company's pipe line system. An Underwriters' fire pump of 1,000-gal.-per-minute capacity is installed, with space for a second unit. The substation is served by a 20-ton Whiting electric crane.

In general the paint shop and wood mill are heated by hot blast fans which force the air across steam coils and discharge it through outlets into the room below at the rate of 1,000 cu.ft. per minute per fan unit. In each of these buildings eight fan and heater coil units are installed. Steam is carried to the paint shop by an underground 10-in. line, with a 4-in. continuation to the wood mill. The latter pipe is carried in an insulated inclosure across a bridge clearing the transferway between the paint shop and the mill. Reducing valves are installed on the supply side of each set of heating coils.

The heaters operate on from 30 to 35 lb. steam pressure. In certain inclosed spaces such as offices and lavatories direct radiation supplements the fan system. The heater units are mounted on the skylight sections to leave the supply of natural light as free as possible. The air in this system can easily be recirculated and fresh air can be introduced freely from outside the shops. The heaters are of the Sturtevant inverted type, 8 ft. 3 in. high x 7 ft. wide, each unit having four discharge outlets at the bottom of the casing and located 18 ft. 6 in. above the floor. The heaters are supported by steel members spanning the space between roof trusses and also by hangers attached to the roof girders. A steel platform around each heater makes inspection and repair work easier. The fans are all motor-driven. A 6-in. return line brings the drips from the heating system to the boiler house for recirculation in the feed water system.



Layout of Wood Mill and Paint Shop, the First Units of the Everett Shop to Be Completed

The lumber storage building, two stories high and about 55 ft. x 52 ft., is served by a 3½-in. steam line. The second floor is divided into a series of warm rooms arranged in tiers along two sides of the building with an open space between. In each one of six rooms two sets of heating coils are installed. Each set of coils consists of 168 linear feet of 1¼-in. pipe, affording 72 sq.ft. of heating surface per set, and each set is served by a 1-in. live steam lead and has a ¾-in. return lead to the drip piping.

The dry kiln is heated by the direct two-pipe steam vacuum system. The heating unit is sufficient to build up and maintain a temperature of 150 deg. F. in the kiln while changing the air five times per minute. The fan installation has been made in connection with supply ducts leading from the fan discharge down the center of two trucks of lumber which are run into the kiln loaded on tracks at right angles to the transferway. The return ducts are along the sides of the kiln. A humidifying system provides for the entry of live steam sprays between the heating unit and the fan intake. There are also two lines of pipe extending under each line of tracks so that the lumber may be steamed before beginning the drying process. Various instruments used in testing the moisture content of the lumber, temperature and humidity are installed, with an electrically controlled charging oven for use in studying moisture present in small samples of lumber.

The standard pipe coloring schedule approved by the American Society of Mechanical Engineers is followed in these shops.

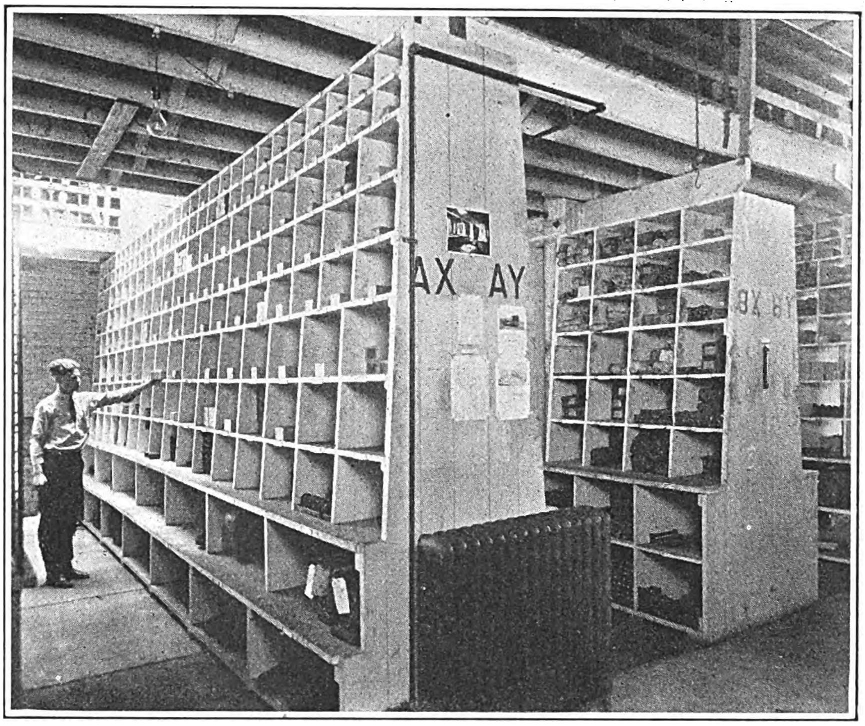
Atlanta Buys Steam from Incinerator

THE Georgia Railway & Power Company has just agreed to buy the excess steam of the garbage and refuse incineration plant in Augusta. It is expected that during the winter months the steam thus bought will be used in the commercial steam-heating system of the company and during the summer months it will be used in the commercial gas plant of the company. The contract is for ten years and provides that the city shall supply 80,000,000 lb. of steam a year, with a set minimum average per day and per hour at 170 lb. pressure.

Storeroom Improvements at Richmond Save Time and Money

Stock Has Been Completely Rearranged and New Cases Provided —Heavy Material Is Kept on Raised Platforms—Lift Trucks Save Much Time—Cost of Installing New System Was $5,400

By John Y. Bayliss
Director of Purchases and Supplies Virginia Railway & Power Company
Richmond, Va.



Material Is Piled in These Cases so It Can Be Counted Without Handling. The Stock in the Two Cases Here Shown Can Be Counted in 40 Minutes. Gas Steam Radiators Are Used for Heating the Storeroom.

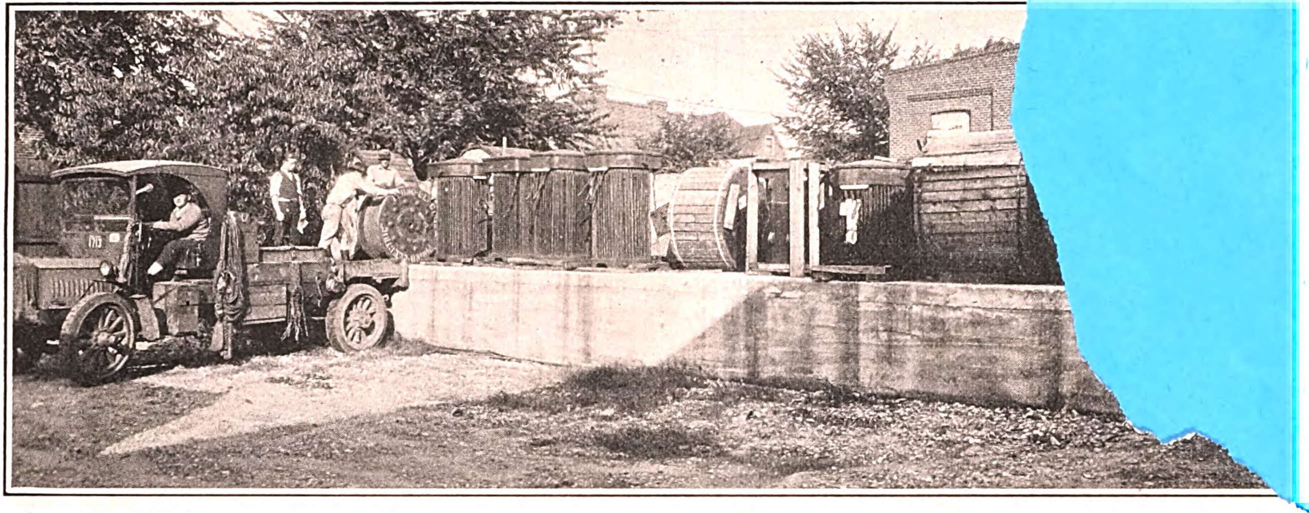
AFTER careful consideration of various methods of providing and conserving materials and supplies for current use, the Virginia Railway & Power Company has adopted the so-called stock-book system, and has installed it in one of its large storerooms. The installation involved not only changes in making and keeping the record of stock, but also a complete rearrangement of the stock itself.

The stock-book form is printed with columns for the usual descriptive information about each article and has also space for recording the amount of each article in stock for each month of the year. Each sheet holds the record for four years. The system depends upon a complete inventory once a month, so that requisitions can be made with definite knowledge of the amount of each article on hand. To make possible such an inventory with reasonable expense, the stock must be visible on the shelves and must be stored in such shape that to a large extent it can be counted without handling. Although annual inventory has always loomed as an ominous cloud on the storekeeper's horizon, the monthly inventory can be made in a comparatively short space of time and without extra help. Paradoxically, what was a great bugaboo once a year, now that it comes once a month scarcely makes a ripple on the smooth surface of the affairs of the storeroom.

The Richmond storeroom contains supplies for both railway and light-and-power service. For convenience in arranging the stock and keeping the records, the materials have been classified according to use and physical characteristics. There are 77 classes of material in this storeroom. The material is listed in the stock book and placed on the shelves and floors in comformity to this classification.

The typical material case is made of dressed lumber and is 22 ft. long and 10 ft. high. It is 4 ft. 4 in. wide at the base and 2 ft. wide at the top. At a height of 3 ft. from the floor there is a shelf 8 in. wide on which the men stand to reach the bins at the top. The case is divided equally by a galvanized wire partition of ¾-in. mesh and No. 14 gage running lengthwise and from top to bottom through the middle. From this the shelves open on both sides. Such a design admits plenty of light and makes it possible to see through the shelves from one side to the other. The case is painted white inside and out with two coats, the last coat being enamel for a hard, glossy finish.

Each bin or pocket has a small galvanized metal card holder, on the front in which is inserted the number and description of the contents. The cases are separated by aisles 3½ ft. wide. Experience has proved the aisles should be not less than 4 ft., or better still 4½ ft., in width if the space is available. As far as practicable, the materials are piled in multiple units to facilitate counting and handling. Small articles are put up in packages containing the amount usually issued on requisition. The articles are packed thus by the makers, if the material in that form can be purchased economically. If that cannot be done, packages are put up by the storeroom clerks when they are not otherwise engaged. This method has advantages over the unit-piling system, because it not only facilitates the inventory, but also aids the issuing of the material.



Concrete Platform for Storing Heavy Reels of Cable and Large Transformers. Two-Ton Reels and Large Transformers Can Be Easil and Quickly Loaded and Unloaded from This Platform

A section of the storeroom has been set aside for receiving and checking material delivered. It is inclosed by a partition, the lower part of which is of wood and the upper part of wire-mesh screen. It can be locked off from the remainder of the storeroom. Here deliveries are received and inspected before the material is placed in stock. Such a section adds to the orderly operation of stock receiving and prevents premature issues of materials that have not been accepted and accounted for. A locker section also is provided for articles in suspense, such as goods rejected, incorrectly shipped, or not identified by proper shipping papers.

Another section has been built for issuing materials on requisition. It consists of a wooden counter surmounted by a wire-mesh partition. The man with a requisition presents it at this counter and the clerk brings him the material required. There is a gate with a latch which can be opened to pass out bulky articles not easily issued over the counter. The tendency for men from other departments to enter or pass through the storeroom, either on business or otherwise, is thus prevented.

Special cases have been built for storing pole-line hardware, gear wheels, glass, sheet metal, tubing, etc. Such articles, being bulky or inconvenient for shelf storage, heretofore were piled on the floor, resulting in wasteful use of floor space and improper protection of the property. Putting the material in cases saves storage space, makes it more accessible, and presents withal such an improvement in the appearance that even the men who handle the stock have more respect for its importance and value.

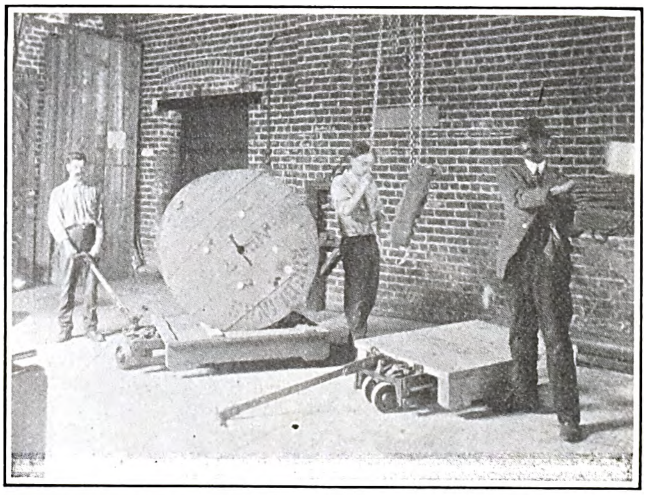
Transil oil is stored separately in an isolated metal house with concrete floor. The drums are thus protected from moisture, and small transformers can be filled under cover. Lead-covered cable and heavy transformers are placed on a concrete platform level with the body of the delivery truck. This convenience has greatly reduced the time, labor and cost of receiving and issuing these heavy stores. Fiber duct for underground conduit, although expensive material, has usually been piled on the ground, resulting in damage and inconvenience. It is now stocked neatly in racks made of cedar posts 12 ft. high, with the tops tied together by wire.

Reels of weatherproof cable and other heavy supplies for inside storage are unloaded on small, portable platforms and moved to position in the storeroom by lift trucks. When the lift truck is removed, the platform rests on the floor with the load on it, where it remains until issued for service. The lift trucks have a capacity of 3,500 lb. and cost $150 each. By their use a carload of heavy reels, each weighing 1½ tons, can now be received and stored without extra help in less than an hour. Formerly, it took half the day for a gang of men to do the same work. Moreover, the stock is in such position that one man with a lift truck can wheel it to the door of the storeroom, where it is quickly lifted to the delivery truck by an overhead hoist. A reel or transformer can thus be issued almost as quickly as a hand package.

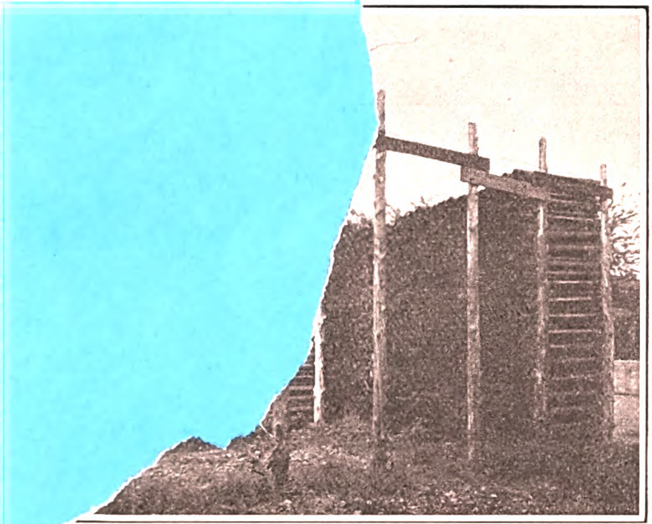
IMPROVEMENTS IN HANDLING METHODS

Heavy cases of electric equipment, kegs of track material, barrels of insulators, and similar packages which can be stacked, are piled one upon another by a stacking machine or portable elevator, which costs $334. By this means floor space is saved and the property is better protected against damage. The floor for such heavy stores is divided into sections, and aisles 4 ft. wide lined off by white paint give access to the stock.

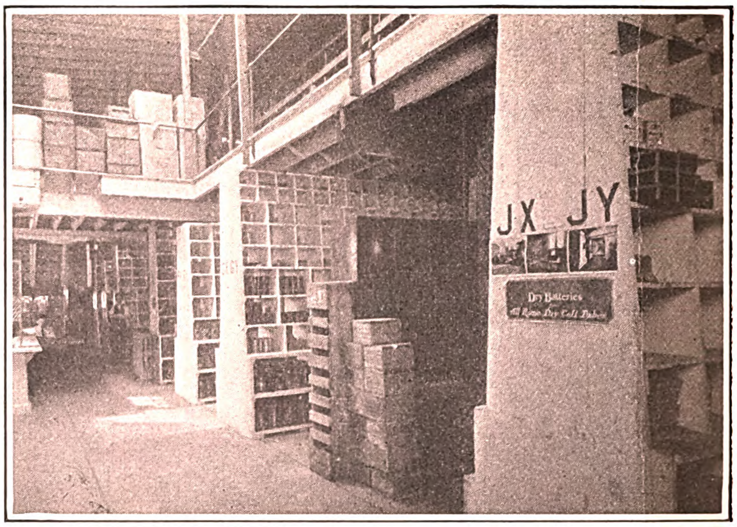
The time and expense required for installing the



Lift Trucks Having a Capacity of 3,500 Lb. Each Are Used to Handle Heavy Material. When in Position the Truck Is Lowered and the Platform Left in Place with the Load on It



Fiber Conduit Is Stacked in Open-Air Racks. These Are Made of 12-Ft. Cedar Posts Having the Tops Tied Together with Guy Wire



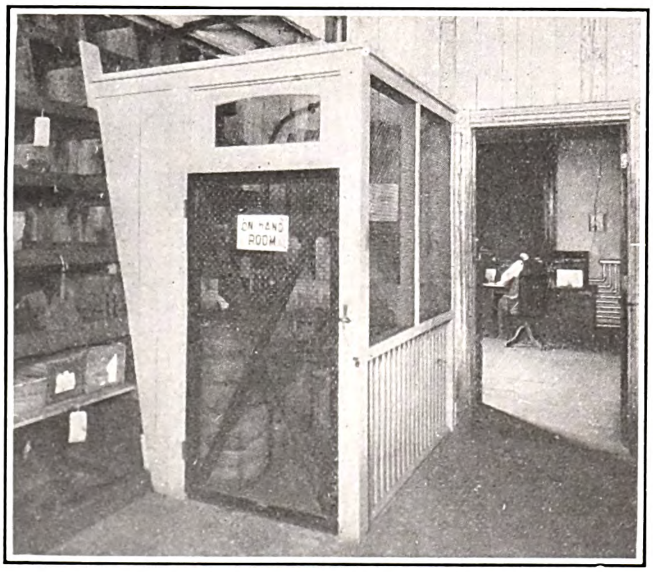
Main Storeroom Showing "Daylight" Cases for Material. The Unit System of Piling Is Used to a Limited Extent. Cases Are Painted White

system were moderate. In the Richmond storeroom a period of 17 months has been taken to lay out the work, tear out the old shelves and material cases, make and set up the new cases, rearrange all the stock, and write up the stock books. With this ample time allowed the change was made gradually. A few cases were built, or a small section was remodeled, at a time, thus avoiding disturbance of the regular routine in the storeroom. After each new case was installed, the material was placed in order on the shelves, following as closely as possible the adopted classification. When the cases had been in use long enough to insure satisfactory arrangement of the stock, the items were written up in the stock book in the order found on the shelves, and the work of installing the new system was done.

CHANGE MADE AT SMALL COST

In this storeroom about 5,000 different articles of stock are carried, of which 4,800 are stored in the building and 200 outside in the open air. The total value of the stock is about $260,000. The cost of installing the stock-book system, including new hoisting and trucking equipment, new material cases, and the salary of an additional clerk for part of the time, is $5,400, distributed as follows:

Taking out old material cases and setting up new cases complete	$3,952
Stock books and forms	152
Portable elevator, lift trucks, etc.	876
Additional clerk for six months at $70 per month	420
	$5,400



Locker Used for Storing Materials in Suspense, Such as Articles Rejected on Delivery or for Which the Proper Identification Has Been Delayed

This system has not been in service long enough to draw final conclusions as to the economy and other advantages realized. It is probable the benefits will not be reflected fully in the operating figures when available. It is nevertheless confidently expected that the new system will enable the stores department to supply the needs of the company more effectively, with a smaller investment in general supplies and with no greater expense in operating the storerooms. Some indirect benefits already appear evident. There is a better arrangement of the stock in the storeroom with smaller floor space occupied. Quicker service is given in receiving and issuing supplies, with better provision for protecting the stock from damage. The discovery and disposition of obsolete and surplus stock are made more frequently and effectively than heretofore. The good effect on the minds of the personnel, because of more perfect order and a better system of storing and handling materials, is apparent.

Overhead Test Material Painted Red

THE Department of Street Railways, Detroit, is following the practice of painting red all overhead material on test. This color attracts the attention of the line crew, which may remove this particular article so that it will be brought into the office for examination and reinstallation. Another advantage noted is that, as all test material is checked periodically until worn out or a condition is reached which makes replacement desirable, the red color makes identification easy and positive. A brief reference to this practice was published on page 88 of the issue of this paper for July 19, 1924.

D. U. R. to Operate Co-ordinated Rail-Bus System

Bus Lines Now Paralleling Interurban System Will Be Co-ordinated with Rail Service to Give Alternate Bus and Electric Car Service on Frequent Headway

PLANS of the Detroit United Railway to co-ordinate with its railway service the bus lines which operate on the highways paralleling practically all of its routes are rapidly nearing completion. The consummation of these plans will mark the end of the destructive competition which followed the completion of paved state highways, and which became very serious during the first half of the current year. Acquirement of the bus lines by the railway will permit bus and rail schedules to be staggered so as to give maximum frequency of service without the useless and wasteful duplication that has existed up to this time.

Along with these plans relative to service outside of Detroit, a novel and interesting terminal project within the city is expected to be in operation within a short period. In this case buses will be used to haul interurban passengers between terminal stations at the outskirts of the city and the present downtown interurban terminal. An earlier brief outline of this terminal plan was given in this paper, issue of Nov. 15.

Bus competition with the lines of the D. U. R. started in 1919, shortly after the completion of the paved road, between Mount Clemens and Detroit. Another bus line was put into operation, paralleling the division from Pontiac to Detroit. Although this competition began to be felt almost immediately it was not serious, due to the higher bus fares and also to the character of equipment operated by the bus men. As bus operation was extended so that these vehicles paralleled other divisions of the railway, passenger revenue continued to fall off. However, this loss was partially offset by increased earnings from intensive development of freight business.

The continued pressure resulted in various operating economies on the railway. Chief among the measures adopted was the increased use of one-man operation on local lines and within some of the communities served. Some of the existing equipment was remodeled for one-man operation and additional new cars of this type were purchased. When the changes, which are still under way, are all completed, there will be between 150 and 175 cars of this type in use on the property. It is estimated that this program alone will make a saving of approximately $500,000 per year.

In the spring of the current year, the situation arising from the bus competition became acute. Improved bus equipment and more frequent service made more serious inroads on the railway receipts. As this more frequent bus service was met by increased service on the rail lines, a fare war ensued, which rapidly brought matters to a climax. In some cases, bus fares were cut as low as 1 cent per passenger-mile, and these cuts were met by the railway. Such low fares induced some additional riding, but the increase was far from enough to compensate.

Improved bus equipment and more frequent service were also put in on some of the long-distance routes paralleling the railway lines between Detroit and Port Huron, Flint, Toledo, and Ann Arbor. A further loss in railway revenue resulted, and during the first 5 months of the current year the
no more than sufficient to pay a
and fixed charges only.

Practically all of the compet
granted certificates of convenie
amounted to franchises. A
Supreme Court has ruled tha
ignore the service of existing ste
lines in determining the public c
sity in connection with the grant
the existing bus route is taken i
passing on an application for a sec
same route. Consequently, purchas
seemed to be the only course left ope
to offer some assurance of eliminat
competition and give a co-ordinated service.

A subsidiary company, known as the People's Coach Company, has been chartered to operate railway buses. New financing to the extent of $2,000,000 has been approved by the commission, and this money will be used to cover additions to railway equipment, purchase of existing bus lines and extension of routes to give through bus service between the important cities of the state.

Where bus routes parallel the railway lines, a staggered headway will be arranged so that alternate bus and car service will be given. On the lines between Mount Clemens, Pontiac and Detroit, both cars and buses will be operated at intervals of 30 minutes, so that there will be 15-minute headway between alternate cars and buses. Thus a very convenient service will be given, but present needless duplication of service will be eliminated. The economies expected from the elimination of wasteful duplication are estimated to amount to $500,000 per year. Thus the combined result of one-man operation and the co-ordination of cars and buses is expected to make operating savings of approximately $1,000,000 per year.

Although bus and rail fares on some of the shorter lines were on the same basis and were very unprofitable, those charged by the buses on some of the longer lines were higher than rail fares. On the line between Flint and Detroit the railway fare is $1.58. Parlor cars are operated on this line and also on some of the other important divisions of the railway, and an additional charge of 50 cents is made. This parlor car service has proved to be both popular and profitable. The bus fare for a trip between Flint and Detroit has been $2. The company considers these fares to be on an equitable basis, but the fares on some of the shorter routes where competition forced the rates down to a basis 1 cent per passenger mile are not sufficient to meet the costs of operation even after the service is co-ordinated. On these routes application has been made to the commission for increased rates.

The terminal situation at Detroit has for some time been the source of considerable loss to the D. U. R. Within the city the interurban cars operate over the tracks of the city-owned street car system, and the speed is necessarily slow, with frequent stops that are annoying to through passengers.

During the year 1923, 9,250,000 passengers were carried into the city on the D. U. R. cars. This is considerably less than the total number of passengers that are brought in to the city limits, as many people leave the cars at the outskirts of town and ride the jitneys to the business district because of the saving in time that can be made. Others take the city street cars at the able to transfer to other points ict for the same fare, and with interurban cars.

a 6-cent fare for the ride from owntown terminal. Operating verage about 27 cents per car-cted just about meets this cost. this operation within the city 2,000,000 car-miles. The charge the use of its tracks amounted to s was in addition to other operating d a net loss on the operation of the the city area.

loss, buses will be used to haul pas-he outskirts to the center of the city. nals are under construction, one on each of in divisions of the D. U. R. lines. At these ter-nals, passengers will be transferred to the buses. In this way, a saving in time for the trip of between 20 and 30 minutes will be made, and it is expected that many people who now use the jitneys to make this saving will transfer to the buses. The revenue from the bus operation is expected to pay the entire cost, and thus a material saving will be made in comparison with the operation of interurban cars to the center of the city. The buses will operate express between the terminals and the business district and will do no local business.

The installation of the terminal bus service will be made gradually. For the present, parlor car trains will continue to operate into the center of the city over the street car tracks, so that passengers will have the option of transferring to the buses or continuing on the cars to the downtown terminal.

Hearings before the commission on some of the phases of the new plan are set for the latter part of November, and it is expected that if the commission approves, the co-ordinated operation will be started during the month of December.

Accident Costs Reduced 1.56 per Cent of Gross Earnings[*]

The Plan Adopted by the Memphis Street Railway a Year Ago Has Already Resulted in a Saving of Approximately $50,000, of Which the Trainmen Have Received Half

THE management of the Memphis Street Railway after trying various accident reduction plans, such as individual bonuses, prizes, etc., became convinced that the best plan would be one by which the savings in the cost of accidents would be divided between the company and its employees. Plans based on individual performance were thought to have a tendency to discourage the making of full reports of all accidents. On the other hand, a plan based entirely on the actual reduction in accident cost was thought to be free from this objection.

To make such a plan successful it was necessary to devise a method of determining accident costs within a short time after the occurrence of the accident. Previous experience indicated that damage claims were ordinarily settled or a lawsuit was brought within 60 days. Moreover, statistics running back over a period of years showed that the ultimate cost of all litigation was 6 per cent of the amount sued for.

With this experience in mind a new plan was put into effect on June 1, 1923. The actual amount expended each month in the settlement of claims, plus 6 per cent of the amount sued for during that month, was considered to be the accident cost for the month. For two years prior to June 1, 1923, accident costs had averaged 4¼ per cent of the gross earnings of the railway. The difference between this figure and the accident cost, figured as described above, would be the savings under the new plan and would be divided on a 50-50 basis between the company and the men.

It was decided to make the award periodically every three months, the men's share to be prorated on a basis of hours worked, no man participating who was not in the service of the company on the last day of the three months' period. If at the expiration of any period the cost exceeded the 4¼ per cent of gross, this excess was to be absorbed during the next period before any dividend was paid. Under this arrangement no bonus was paid unless there was an actual saving to the company.

The results obtained during the past year have been as follows:

Period Three Months Ending	Total Saving	Trainmen's Share
Sept. 1, 1923	$12,244	$6,122 or 1.75 cents per man-hour
Dec. 1, 1923	8,762	4,381 or 1.27 cents per man-hour
March 1, 1924	10,128	5,064 or 1.45 cents per man-hour
June 1, 1924	15,240	7,620 or 2.10 cents per man-hour

During the year ending June 1, 1924, the total number of accidents was 2,716 or a reduction of 7½ per cent from the number the preceding year, which was 2,937. The total cost of these accidents was 4.03 per cent of gross earnings, as against 5.59 per cent the year before. This reduction in the number of accidents was obtained in spite of the fact that the number of automobiles on the streets of Memphis increased to 25 per cent.

It has been found that this plan not only lessens the number of men requiring disciplinary action, but also makes the administration of discipline much easier and more satisfactory. On the first Tuesday of each month a meeting of the officials of the transportation department, the carmen's union and the claims department is held. All matters pertaining to safety of operation are then discussed. On the second Tuesday two meetings are held, one for the day trainmen and one for the night trainmen. At this time a discussion is held of the operation during the preceding month, good work of certain individuals is commended, and failures pointed out in a manner calculated to improve the operation. About three-quarters of the total number of employees attend these meetings.

The chief advantages of this plan have been found to be that it encourages the full reporting of all accidents or happenings, no matter how trivial. It also encourages politeness and courtesy on the part of the employees and stimulates their efforts to increase the gross revenue of the railway. Moreover, it promotes friendly feeling between the trainmen and the company and makes the administration of discipline easier as the majority of the men do not wish to have careless, indifferent or incompetent men retained in the service.

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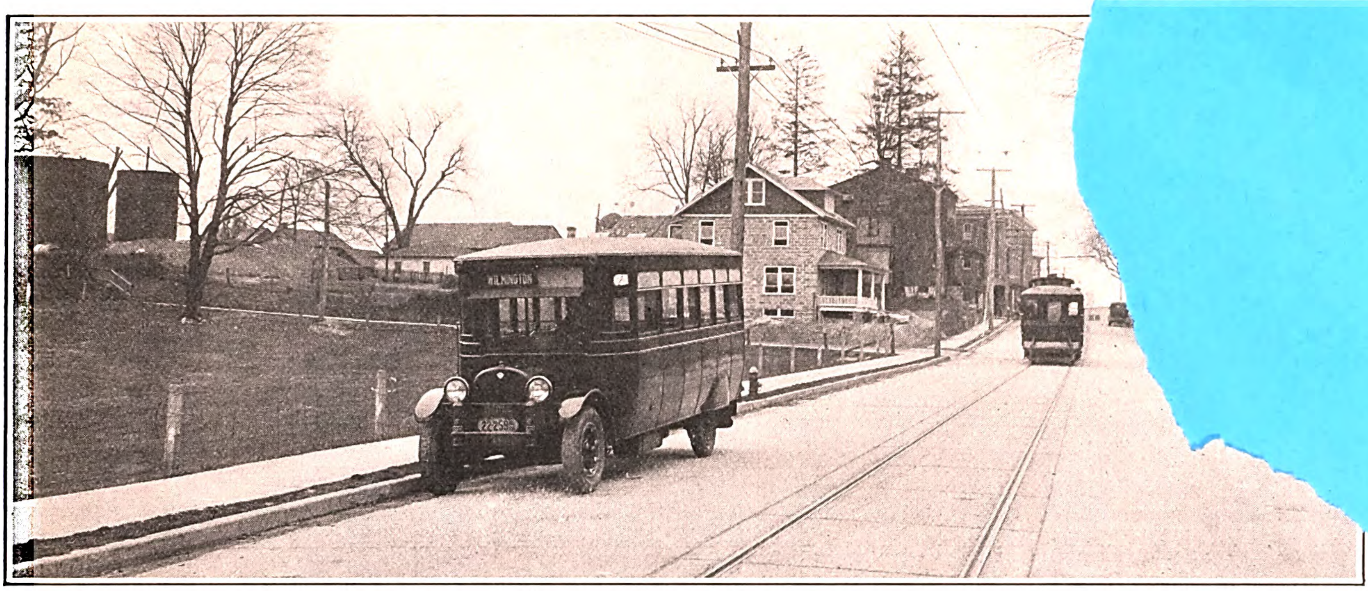
[*] This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.



Bus Making Connection with Car Under the Co-ordinated Service Plan of the West Chester Street Railway

Transportation Service Co-ordinated in Southeastern Pennsylvania

The Acquisition of 11 Bus Lines and 8 Miles of Rail Route Has Enabled the West Chester Street Railway Greatly to Extend Its Operations and Population Contact — The Company Has Been Relieved of Paving Obligations—Railway Is the Backbone of the Bus Development

DURING the past 18 months the West Chester Street Railway, West Chester, Pa., has added to its system 8 miles of electric railway lines formerly belonging to other companies, and has acquired nearly 200 miles of non-competitive interurban motor bus routes. The unified system serves approximately 1,000 square miles of populous and fast-growing territory in southeastern Pennsylvania and northern Delaware. A map of the system appears on another page.

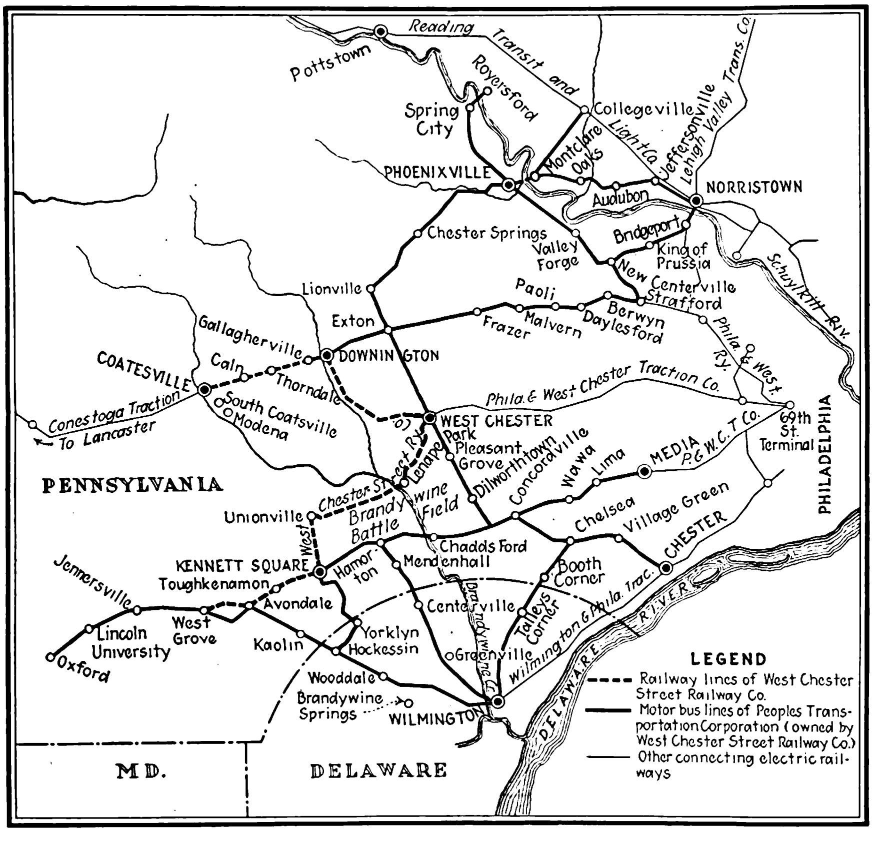
By the acquisition of these bus and rail lines the company has added substantially to its earning power at comparatively small expense, by bringing large sections of populous territory, heretofore isolated, into direct contact with its railway system. Although the unified system as shown on the map has been established only a few months, the company is obtaining regular traffic on its railway lines from territory which in the past, without bus connections, yielded only occasional revenue. Judging from these satisfactory results, it is thought that with proper co-ordination of service and the use of comfortable and attractive equipment and adequate advertising to inform the public of facilities afforded, the volume of traffic carried on both railway and bus systems will be further increased.

In addition to the income from scheduled bus service, considerable revenue is derived from the sale of gas and oil, private automobile storage and from the hire of buses by private parties for sightseeing trips and other purposes. The company considers the latter class of business susceptible of large and profitable development on account of the flexibility of the bus and the character of territory, which is rich in points of historical and educational interest and gridironed with concrete and hard-surfaced roads.

Some of the Picturesque Territory Through Which the West Chester Street Railway Operates Its Interurban Service

The West Chester Street Railway was incorporated in 1890. It owns and operates two interurban lines aggregating about 37 miles of single track. One extends north and west from the Borough of West Chester, the county seat of Chester County, to Downingtown and Coatesville, a he other extends south and west Kennett Square, Avondale and of more than 21 miles. Connec- ester with the Philadelphia & ompany, giving direct and fre- lphia.

n of the railway serves an im- on of Chester County, centering wningtown. Between these points he Lincoln Highway and parallels e Pennsylvania Railroad. Because sing shortage and the character of trict seems destined to have consid- l development. The southern division, West Chester through the Brandywine district and Lenape Park, a popular summer to Kennett Square and West Grove, serves not y the local interborough traffic in southern Chester County centering in Kennett Square, but also the through traffic to the county seat and to Philadelphia.


Reading Transit and Light Co.
Pottstown
Royersford
Spring City
Collegeville
Montclare
Oaks
Jeffersonville
Lehigh Valley Trans. Co.
PHOENIXVILLE
Audubon
NORRISTOWN
Chester Springs
Valley Forge
Bridgeport
King of Prussia
New Centerville
Schuylkill Riv.
Lionville
Paoli
Strafford
Berwyn
Daylesford
Malvern
Frazer
Exton
Phila. & West. Ry.
Gallagherville
Caln
Thorndale
DOWNINGTON
COATESVILLE
Conestoga Traction
To Lancaster
South Coatsville
Modena
Phila. & West Chester Traction Co.
69th St. Terminal
PHILADELPHIA
WEST CHESTER
Lenape Park
Pleasant Grove
Dilworthtown
Concordville
Wawa
Lima
MEDIA
P. & W. C. T. Co.
PENNSYLVANIA
Unionville
Chester St. Ry.
West Chester St. Ry.
Brandywine Battle Field
Chadds Ford
Chelsea
Village Green
CHESTER
Jennersville
KENNETT SQUARE
Toughkenamon
Hamorton
Mendenhall
Booth Corner
Avondale
Centreville
Talleys Corner
Wilmington & Phila. Trac.
DELAWARE RIVER
Lincoln University
West Grove
Kaolin
Yorklyn
Hockessin
Greenville
Oxford
Wooddale
Brandywine Springs
WILMINGTON
MD.
DELAWARE
LEGEND
Railway lines of West Chester Street Railway Co.
Motor bus lines of Peoples Transportation Corporation (owned by West Chester Street Railway Co.)
Other connecting electric railways

Railway and Bus Routes, Locally Known as the "Chester Valley Lines," Serve an Area of 1,000 Square Miles

Prior to 1923 the railway's southern division terminated at Kennett Square. In that period the Kennett & Wilmington Electric Railway, an independent company, operated two divisions, one extending west from Kennett Square, a distance of 7½ miles through a well-developed section to the neighboring towns of Toughkenamon, Avondale and West Grove, while the second extended south a distance of 14 miles through rural territory to Brandywine Springs on the outskirts of Wilmington. Losses on this rural division more than offset the gains on the interborough line between Kennett and West Grove, with the result that service was abandoned in the spring of 1923.

About this time Kelly, Cooke & Company, engineers, Philadelphia, for many years associated with transportation work in southeastern Pennsylvania, acquired control of the West Chester Street Railway. The new management promptly took steps to secure the profitable section of the railway formerly in operation from Kennett to West Grove, and by this means to obtain not only the local traffic between these points, but also the additional through six-fare business to the county seat from points in the southern part of the county. The property was taken over in October, 1923, and reconstruction work was immediately undertaken.

Traffic on the West Chester-Kennett division was produced primarily by the terminal populations at West Chester and Kennett Square, and secondarily, by the connecting railway lines to West Grove and Brandywine Springs. This feeder service for years had been handicapped by irregular operation, due to derailments and other causes. Unsatisfactory as this connecting service had always been, it was utilized as a matter of necessity and brought considerable "county seat traffic" to the Kennett division of the West Chester Street Railway.

The line from Kennett to West Grove has now been reconstructed, through service having been inaugurated in July, 1924. The annoying necessity of transfer at Kennett has been eliminated and a great improvement in the regularity of service and the character of the equipment has been effected. The company has equipped nearly all of its cars with luxuriously upholstered seats built to order by the Hale & Kilburn Company. Seating accommodations include swivel armchairs, which have proved a popular innovation. The marked increase in pleasure riding which has occurred is attributed by the management to the pleasant riding qualities of the new seats. An interior view of the improved car is shown in an accompanying illustration. Present indications are that the increased passenger revenue on the extended Kennett division will be approximately three times the increase in operating expenses and fixed charges.

Another important phase of this situation is that under ordinances enacted by the city of Coatesville and the Boroughs of Downingtown, West Chester and Kennett Square the company has been permanently relieved of former paving obligations in these communities. Typical sections of paved track, which has practically all been rebuilt with heavier rail sections in concrete or permanent base, are shown in accompanying pictures. Except in these towns the tracks are nearly all on private right-of-way and are unpaved.

Recently the company has also acquired about 1 mile of paved track extending from the terminus of its line in Coatesville, south on First Avenue to the plant of the Bethlehem Steel Company. This extension will permit the operation of a more frequent service along the main street in Coatesville, and will enable the company to gain considerable local revenues heretofore lost on account of the 30-minute headway of the interurban service and of its inability to handle the industrial traffic to its final destination.

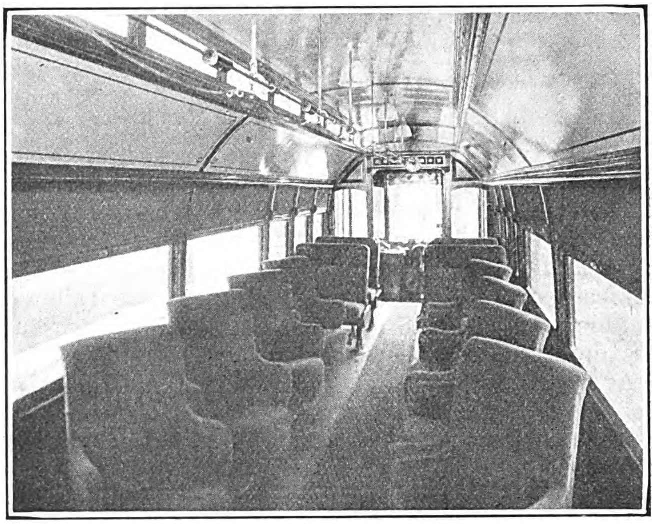
The First Avenue track was formerly the property of the Coatesville Trolley Company, organized to construct an electric railway from Modena (about 3 miles south of Coatesville) north through Coatesville to Honey Brook. About $80,000 was spent in constructing the First Avenue track before funds were exhausted and the project abandoned. The track, which has never been in operation, is constructed of 90-lb. girder rail set in concrete, with a diamond turn-out centrally located, and was obtained by the West Chester Street Railway on most favorable terms.

WHEN AND HOW BUS LINES WERE ACQUIRED

On account of the location of the railway system in relation to the communities which it serves, and to connecting highways leading to near-by population centers, the inauguration of a supplemental bus service was seen to be necessary to increase and stabilize railway revenues through an enlarged and diversified population contact. While the management considered that the construction of new electric railway lines connecting certain sections of the territory would in the end be more profitable than buses, it was found that this would have required extensive construction along parts of the primary concrete highways for which franchises would be difficult, if not impossible, to obtain. For this reason decision was made to utilize the bus as the most immediately available substitute.

As an initial step in the execution of its plan for a co-ordinated railway and bus service the West Chester Street Railway in June, 1923, bought control of the Peoples Transportation Corporation. This was a small company organized in 1920 to operate buses on the Baltimore highway between Media, the county seat of Delaware County, and Kennett Square, and also between Concordville and the city of Chester. In purchasing the Peoples Corporation, the railway accomplished several objectives at one stroke. A going company was thus acquired through which to operate the railway's buses, and control obtained of routes entering the populous Chester district from the northwest via the Concordville concrete highway. The railway was also placed in a good position for acquiring bus routes into Wilmington.

In October, 1923, the routes from Kennett south to the Delaware and Maryland lines, together with others in the city of Wilmington, were granted to the Peoples Transportation Corporation, thereby placing under one management all bus transportation between the boroughs of southern Chester County and Chester and Wilmington.



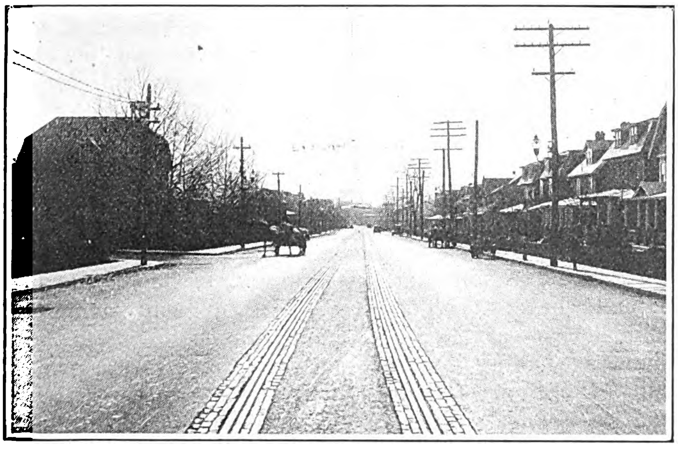
Parlor Cars Equipped with Revolving Armchairs Are Inducing Pleasure Travel

In northern Chester County the same company also acquired by purchase a route extending from Downingtown east on the Lincoln Highway to Exton, thence northeasterly through several small villages to Phœnixville, an important industrial center. Pending the acquisition of other routes in this territory, this resulted in a franchise covering the entrance to Downingtown (a railway terminal point) and also to the principal borough in the northeastern section of the county.

ACQUISITION OF OTHER FRANCHISES HAS EXTENDED POPULATION CONTACT

Franchises have also been obtained covering the Lincoln Highway from Downingtown through Frazer, Malvern, Paoli and Devon to Strafford, connecting there with the Philadelphia & Western Railway, operating a 20-minute high-speed electric service to Philadelphia. The route from Strafford to Valley Forge National Park and Phœnixville has also been secured to develop pleasure travel to that historic point. This route, passing through a region of great natural beauty, offers a very attractive and convenient means of reaching Valley Forge from Philadelphia.

Other franchises granted to the company are those between Norristown and Phœnixville and between



Coatesville, Terminal Point of the Railway System

A Section of the Railway in Downingtown

Phœnixville and the near-by boroughs of Spring City and Royersford, which gives to this important district the advantages of a permanent and unified bus transportation system. Following the acquisition of these franchises the corporation obtained the right to extend its Phœnixville line and also its Chester line into West Chester (the railway terminal), thus completing the unified system. The effect of this has been to bring large sections of population, heretofore isolated, into contact with the railway, thus aiding materially the development of long-distance riding on the railway. It has taken about 18 months to establish the various bus lines and the railway extensions.

As of November, 1924, the Peoples Transportation Corporation owned and operated 21 motor buses of seating capacity ranging from 12 to 30 passengers. It is planned by the West Chester Street Railway still further to improve its equipment and extend its facilities to permit of more economical centralization of maintenance work.

Extensive Use of Advertising

While each route has been placed in operation as acquired, it has only been within the past 2 months that the company has been in a position to advertise the service as a whole, due to the necessity of first modifying the original schedules of each route and coordinating them with the requirements of a unified system of operation. The management estimates that it will take about a year of "cut and try" to fit these to the public need and fully to develop the traffic potentially tributary to the lines.

One form of advertising which has produced results is shown in an accompanying illustration. As another means of informing the public of its service facilities, the company publishes a standard form of time-table for each railway and bus line with a map of the system, and giving telephone numbers throughout the territory through which further information can be obtained. These booklets are placed in multiple pocket schedule boxes located at advertised points and in all railway cars and buses. Large numbers of schedules are also being constantly sent through the mails upon request, it being considered that every inquiry or schedule taken represents a probable patron. The company has also issued an attractive illustrated folder describing many points of historic and educational interest in the territory served by its lines, which is particularly rich in its Colonial history.

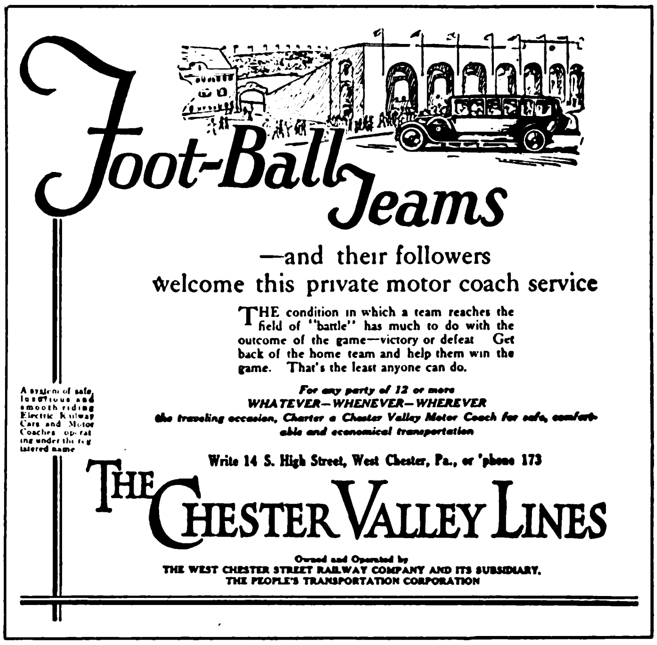
Public Relations

One of the interesting results of the company's constructive program has been the complete reversal effected in public sentiment. Whereas formerly this had been decidedly antagonistic, there now appears to be a friendly feeling and a good word on every hand for what the company is accomplishing in the way of property and service betterments. An editorial in the Coatesville *Record*, entitled "Pleasing the Public," shows how the public responds to genuine efforts to make traveling more pleasant and comfortable. This editorial said in part:

> Credit must be given officials of the West Chester Street Railway for the manner in which it is serving the public.
>
> The present management of the trolley company apparently realizes that it prospers most when it gives the best possible service, and there is plenty of evidence that it is spending both energy and money in its plan to render such service. Improvement in tracks and roadbed, remodeling and renovating of trolley cars, additions to service through more cars and better schedules—these have gone a long way toward bringing to the company a hearty public support which it must be admitted was entirely lacking only a few years ago. This condition is shown also on the motor bus lines operated by the same company.

Large Tributary Population

The total population of the territory in contact with the bus system is 336,423, and with the co-ordinated railway and bus system 359,517. Of this 93,194 is in Chester County; 68,352 in Delaware County; 70,834 in Montgomery County, and 127,137 in New Castle County, Del. This population is only that of the territory in direct contact with the railway and bus lines and does not include any part of the large population between that territory and the western boundary of the city of Philadelphia. The latter district is directly connected by seven high-speed electric lines with Philadelphia, containing more than 2,000,000 people. All these lines enter the Union Terminal Station at Sixty-ninth Street, which is also the terminus of the Market Street subway and elevated lines of the Philadelphia Rapid Transit Company. There are about 190,000 people living in the intermediate territory west of Philadelphia, which is the most rapidly growing district adjacent to the city. A large part of this population lies immediately to the east of the bus terminals and is tributary in varying degrees to the bus lines by reason of connecting railways which traverse this territory en route to Philadelphia. The population per mile of route for the bus system is 1,780, and for the railway alone, 1,320, which indicates the extent of possible future development of the traffic.



Foot-Ball Teams

—and their followers
welcome this private motor coach service

THE condition in which a team reaches the field of "battle" has much to do with the outcome of the game—victory or defeat. Get back of the home team and help them win the game. That's the least anyone can do.

For any party of 12 or more
WHATEVER—WHENEVER—WHEREVER
the traveling occasion, Charter a Chester Valley Motor Coach for safe, comfortable and economical transportation

A system of safe, luxurious and smooth riding Electric Railway Cars and Motor Coaches operating under the registered name

Write 14 S. High Street, West Chester, Pa., or 'phone 173

THE CHESTER VALLEY LINES

Owned and Operated by
THE WEST CHESTER STREET RAILWAY COMPANY AND ITS SUBSIDIARY,
THE PEOPLE'S TRANSPORTATION CORPORATION

Advertising the Special Trip Service

Demands for service to accommodate parties for special trips for distances varying between 10 and 200 miles are frequent and increasing. It has been impossible heretofore, owing to lack of equipment, to furnish this service except in occasional instances, but plans are going forward actively to provide for it. With the intercommunity activities in this territory and its richness in points of historical and educational interest, it is believed that revenues from this class of service are subject to considerable development.

Association News & Discussions

Iowa Association Discusses Maintenance

Track Construction, Automatic Substations, Bus Operation, Equipment Maintenance, Electric Welding and Lubrication Furnish Subjects for Fall Program and Lively Discussion

APPROXIMATELY 100 members of the Iowa Electric Railway Association assembled at Des Moines on Nov. 13 and 14 for a busy two-day session devoted to a discussion of many operating and maintenance problems. Comparison of practice and exchange of experiences helped to make the meeting particularly valuable to the operating men present from the standpoint of furnishing fresh inspiration and many practical ideas for modernizing.

In addition to strictly railway subjects, the bus also was taken up in one paper, and the discussion showed plainly that many of the railway men present are actively interested in this vehicle for the transportation of passengers, and are rapidly accepting the idea that the electric railway companies of Iowa are the logical agencies to control and operate transportation lines on the highways of the state.

The meeting was opened by chairman John Sutherland, master mechanic Tri-City Railway. Track construction, automatic substation operation and maintenance and bus operation occupied the first morning session. The afternoon was spent inspecting the various departments of the Des Moines City Railway and the Des Moines & Central Iowa Railway. The second business session took up the subjects of equipment maintenance, welding practice and lubrication. The entire association was entertained at luncheon as the guests of the management of the Des Moines City Railway, and an evening banquet completed a full entertainment program.

A paper by M. W. Freund, superintendent of way and structures Tri-City Railway, Davenport, on the construction and maintenance of street railway track, is abstracted elsewhere in this issue. In the discussion of this paper, R. H. Findley, superintendent of track and roadway Omaha & Council Bluffs Street Railway, said that in Omaha the railway company is trying to unload its paving burdens. He cited some examples of maintenance problems in Omaha, and said that the tendency toward lighter rolling stock equipment was giving the track department relief in two ways: First, in making it possible to construct at less expense new track that seems to stand up satisfactorily under lighter equipment; second, in cutting down the wear and tear on track now in the street. He also said that the use of modern tools like pneumatic tamping equipment, by improvement in tamping, make it possible to cut down somewhat the thickness of ballast required. He favored a sand cushion only in preference to sand and cement under brick pavement, but pointed out that the results obtained depended largely on the local drainage conditions.

Some results obtained from the use of a new quick-hardening cement called Lumnite were described by W. L. Wilson, chief engineer maintenance of way Des Moines City Railway. Mr. Wilson said that this material was extremely handy for patchwork and for concreting short stretches where quick hardening made it possible to allow traffic on the new material after a very short interval. Later in the program, the chairman, at the suggestion of Mr. Wilson, called on Mr. Campbell of the Atlas Lumnite Cement Company to describe some of the properties of this new material which it is putting on the American market.

Track joints were held to be the critical part of the track construction by C. M. Feist, master mechanic Sioux City Service Company. He said that the receiving rail gets a severe hammer blow unless the joint is perfectly level and smooth, and stressed the importance of grinding joints until they are in this condition after welding. Mr. Jameson, of Jameson-Ross Company, said that most track men considered it good practice to grind all joints when laying new rail. Mr. Freund said that the practice in Davenport is sometimes to make the joints slightly above the rest of the rail and then to grind them level.

In a discussion of the use of fillers in brick pavement near the rail, F. V. Skelley, assistant manager Tri-City Railway, cautioned against the use of materials that would flake off and cause derailments. Mr. Findley thought that pitch had been used in the case cited, as he held that it would flake off in cold weather, but that a good grade of asphalt filler would not cause trouble from this source.

"Experience in the operation and maintenance of automatic substations" was the subject of a paper by D. H. Nail, superintendent of power Des Moines City Railway, which is abstracted elsewhere. In the discussion it was pointed out that relief from labor difficulties, as well as elimination of the expense of attendants, was one of the most outstanding advantages of automatic operation.

W. G. Lamb, master mechanic Waterloo, Cedar Falls & Northern Railway, read a paper giving the experience of his company in the operation and maintenance of buses. In 1922 the Johnson Motor Bus Company, operating on the paved road between Waterloo and Cedar Falls, was taken over by the railway and modern 25-passenger buses were put in service on a 30-minute headway between 6:30 a.m. and midnight. A new garage was erected adjacent to the car shop with facilities for the proper inspection and maintenance of the bus equipment. The bus fleet averages between 800 and 1,000 miles per day. The master mechanic has charge of the maintenance of buses as well as railway equipment, and the operation of the new service was placed in charge of a supervisor of bus operation, reporting to the superintendent of the property. The careful records kept give a complete history of the performance of each bus. Facilities for filling the buses when they go out in the morning were installed. Special tanks of 40 gal. capacity enable the buses to operate the full day without refilling.

Attention is given to the appearance of the buses and the drivers are trained in courtesy. Co-operation between the operating and mechanical departments enables small operating troubles to be remedied before they become serious and tie up equipment. Maintenance cost between Jan. 1, 1924, and September 30, 1924, amounts to approximately 7.1 cents per bus-mile, made up as follows:

Superintendence of maintenance..	$0.00161
Repairs to bus bodies	.00381
Repairs to chassis	.00854
Repairs to transmission	.00073
Repairs to engines	.01023
Repairs to ignition and lighting.	.00285
Painting and varnishing.........	.00168
Tire renewals	.01283
Bus depreciation	.02828
Maintenance of garage	.00049
Total	$0.07105

Total operating expenses of the bus fleet per bus-mile were placed at 15 cents.

Tire performance is watched closely and an average of 23,000 miles, with a maximum of 48,000 miles per tire, is obtained. Bus overhaul periods are fixed by the condition of each bus after a careful inspection rather than on a predetermined mileage, and wide fluctuation in the mileage between overhauls is obtained on different individual pieces of equipment of the same manufacture. Buses that have been overhauled and have made a total of close to 200,000 miles are still found to be in first-class operating condition, Mr. Lamb said. He emphasized the importance of careful attention to the little items of maintenance as the best precaution against serious damage to the equipment and consequent heavy maintenance expense. Proper lubrication was held to be an important factor in avoiding high maintenance and serious interruptions to service.

Mr. Skelley reported that the operation of buses by the Tri-City Railway to date was costing 15.2 cents per bus-mile. The buses are used as feeders only and the service is very light. Income averages about 12 cents per mile, making a net loss on the bus operations of about 3.2 cents per mile. Pull-ins due to failures are about one per 3,000 miles of operation and are all due to minor defects such as fan belts, punctures, etc.

A. E. Johnson, supervisor of bus operation Waterloo, Cedar Falls & Northern Railway, said that the bus is a legitimate means of transportation, primarily because it is popular with the public. He felt, however, that the use of reduced fares in the battle for business is all wrong, and sets a dangerous precedent which is very liable to make it extremely difficult to adjust fares to a profitable point when the use of the new vehicles becomes stabilized. First-class equipment, careful supervision, courteous drivers and the maintenance of safe operating conditions and reliable service were held to be the proper weapons for a railway bus operator to use in a fight for business with competing lines. As an example of the safety of properly supervised bus operation, he cited the experience of his company, which has hauled more than a million passengers without an accident to a passenger except where one was hurt in a slight scuffle when the bus was standing still at the curb. Careful selection of drivers and comfortable and attractive equipment were held to be of paramount importance in fullfilling the modern conception of good transportation service. In special party service he said that his company made a flat charge of 50 cents per running mile.

Some sidelights on the bus operating insurance situation in Iowa were given by M. A. Welsh, superintendent and traffic manager Waterloo, Cedar Falls & Northern Railway. Mr. Welsh explained the provisions of the motor carrier law of the state which required every operator of motor buses to carry insurance in a company approved by the commission. Under the mandatory provisions of this law, the cost of insurance for liability only would amount to about $707 per year per bus, according to Mr. Welsh. He said that his company finally succeeded in getting relief from this heavy burden by convincing the commission that the prior lien provisions of the Iowa laws which give an injured passenger a prior lien on all the property of the company was protected by the large fixed investment of the railway within the state. To satisfy mandatory provisions of the motor vehicle law relative to the filing of a bond by a motor bus operator, a nominal bond was finally accepted by the commission, thus materially reducing the cost.

A paper by W. M. B. Brady of the General Electric Company dealt with the many applications for electric arc welding in salvaging electric railway materials. Mr. Brady listed a large number of items which could be profitably salvaged by welding, and gave comparative figures to show the savings which had been made in several instances from reclaiming worn parts. He described some of the applications for automatic welding apparatus manufactured by his company, with particular emphasis on the economies which could be made by welding rolled steel wheel flanges by this method. He said that preheating and annealing of welded wheels was not successful, and in addition was very expensive. This is unnecessary in welding flanges with automatic equipment, according to Mr. Brady. He attributed the lack of trouble from cracking, when the automatic welder is used for building up flanges, to the uniformity of the work as compared with hand welding, which has not proved successful in some instances. He opposed attempting to weld worn treads, as he said this produces severe and injurious strains in the material due to the extremely high temperature resulting from laying on such a large amount of material.

Mr. Lamb said that hand welding of 36-in. wheels on his property had given no trouble. J. G. Munson, master mechanic Cedar Rapids & Iowa City Railway, reported that his company has been building flanges on interurban equipment with hand welding equipment for 7 or 8 years and has experienced no difficulty. The use of welding for building up flat spots in wheels was also reported on favorably by several of those present. Welding of worn axles and armature shafts was not recommended, as it was felt by some that these parts should be scrapped when they have become so worn as to require building up the journals. Mr. Feist described the practice on his property of using a pit grinder to keep the tread diameters of mating wheels the same, and attributed freedom from sharp flanges to this practice. Mr. Munson concurred in the conclusion that the practice of keeping wheels ground to the same diameter gave freedom from sharp flanges and cited an example from his experience of wearing out rolled steel wheels completely on single-truck safety cars without turning, by putting on wheel-truing brake shoes whenever the wheel diameters became slightly different.

Mr. Skelley read a paper prepared by T. E. Wood, master mechanic Omaha & Council Bluffs Street Railway, on the maintenance of equipment. In this paper Mr. Wood pointed out the need for reduced maintenance cost to meet the materially decreased revenue of many electric railways, and held that increased efficiency of maintenance men, the adoption of the most improved methods of doing work and general raising of employee morale through good management by the head of the department were the methods by which this result can be accomplished. Mr. Wood said that the car inspector plays one of the most important parts in the maintenance of equipment and emphasized the importance of selecting and training these men with extreme care. A blueprint form used by the Omaha company for sending a comparative statement of equipment failures to the various carhouse foremen helps materially in getting more careful inspection by inspiring a spirit of rivalry among the various foremen. He said that systematic inspection is the first step in getting good inspection and reported that all of his company's cars are equipped with Economy meters, which help materially in assuring inspection at proper intervals.

Another method of helping the various foremen to do good work, according to Mr. Wood, is to furnish them with copies of blueprints showing car wiring diagrams, part numbers of car equipment for ordering purposes and any other information which will help them in making repairs or replacements to parts. Keeping a complete file of foreign prints which is always available to shop foremen and from which information can readily be furnished to carhouse foremen was also considered a help in getting good results in Omaha. Mr. Wood said that dipping and baking of armatures had been a distinct success in reducing armature maintenance. He also described the Omaha company's method for cutting the cost of painting by minimizing on labor and material.

Mr. Feist called attention to the trolley wheel as a source not only of maintenance cost, but also of power loss. Mr. Anderson said that his road had obtained average mileages of between 20,000 and 22,000 miles from wheels of the type designed by Mr. Feist. With this type of wheel, Mr. Anderson also said that it had been able to do away with one night inspector at each of its stations. In answer to a question Mr. Wood said that it was the practice on his property to have the Economy meters read by the transportation department. Mr. Sutherland said that the savings during the first year after the installation of Economy meters in Davenport amounted to $12,000. In answer to a question he also said that the average number of pull-ins for all mechanical causes on the cars of the Tri-City Railway, including fenders and broken glass, was 6,400 miles per pull-in.

John S. Dean, Westinghouse Electric & Manufacturing Company, read a paper prepared by C. Bethel of the railway motor engineering department of his company on the subject of lubrication of railway motors. In this article Mr. Bethel not only outlined some of the high spots in correct lubrication practice, but also gave charts and curves illustrating in detail some of the reasons for these conclusions as shown by careful tests conducted by his company. A complete article by Mr. Bethel on this subject was published in ELECTRIC RAILWAY JOURNAL, issue of April 19.

The paper was received with interest by the Iowa men, and many sidelights on lubrication practice were brought out in the discussion. Mr. Feist said that he believed in the use of plenty of oil, and although this material should not be wasted, he felt that the loss of one armature through insufficient lubrication would more than offset all the savings made through restricted use of oil. The most important item in lubrication procedure, according to Mr. Feist, is to make sure that the man in charge of the work does not miss a bearing through carelessness when going over a car. Mr. Welsh of the Viscosity Oil Company said that if every operator followed closely the suggestions contained in Mr. Bethel's paper there would be very few lubrication failures on electric railway equipment. Mr.

Feist attributed most equipment troubles to the vibration caused by poorly lubricated and worn parts. Mr. Dean described various methods used by railways for making bearings fit tight in the motor housing after they have become worn. One method described was that of driving a drift through the shell to expand the outside diameter, and the other consisted of copper plating the outside of the worn shell until the desired diameter had been obtained. In this latter method the bearing is first babbitted and then copper plated, after which the babbitt is bored out to the correct diameter to fit the shaft. He said that the cost of the process averaged about 30 cents per bearing. Mr. Dean also described a new type of oil seal housing which is being perfected by his company, but is not yet on the market.

At the conclusion of the meeting, a nominating committee consisting of C. M. Feist, John Lewin and W. G. Lamb brought in a recommendation for the membership of next year's convention committee, which was unanimously approved. The members elected to this committee are as follows: W. L. Wilson, engineer maintenance of way Des Moines City Railway, chairman; R. H. Findley, Omaha; R. C. McMahon, Des Moines; W. G. Lamb, Waterloo; W. A. Clough, General Electric Company; F. R. Grant, Westinghouse Electric & Manufacturing Company, and H. R. Sampson, Ohio Brass Company. John Sutherland, master mechanic Tri-City Railway, was re-elected chairman of the meeting for next year.

Maintaining Street Railway Track[*]

BY M. W. FREUND
Superintendent of Way and Structures
Tri-City Railway, Davenport, Iowa

IN ANY track repair job the procedure depends on the condition of the rail, joints, ties and the foundation under the ties. One stretch of track in Davenport approximately 1,800 ft. long on a 4 per cent grade was 18 years old. This was built of 7-in. tram rail, ties 2½ ft. center to center, and was in very bad condition. The rail in this track was worn down to such an extent that there were two, and in some places three, grooves in the tram. These grooves were so deep that the wheel flanges could not slide sidewise from one groove to the other, and as a result cars were being derailed at the rate of one per day. Relief at minimum cost was obtained by renewing one rail of the track with a tram rail which had sufficient depth to permit the flanges of the wheels on one side of the car to slide sidewise on the head of the rail. This track has been operated more than 3 years without a derailment.

We have renewed the rail on several other stretches of track at comparatively small expense. These stretches were built new in 1903 with 7-in. tram rail, ties 2½ ft. centers, ballast under the ties. In 1912, on account of street paving by the city, it was necessary to reconstruct these stretches of track. The old rail and joints were used, but 50 per cent of the ties were replaced. The ballast was removed and 6 in. of concrete placed under and between the ties. By 1924 the rail and joints had become very poor in condition. The brick paving concrete foundation and the ties were still good. In this case, 10 in. of paving on each side of the rail was taken up, and the rail was carefully shimmed with steel and wood shims and was then spiked to the old ties.

Rail joint repair practice varies with the conditions encountered. When the joints are tight, whether welded or bolted, and there is a very slight cup, it is our practice to grind the joint to a perfect surface with a reciprocating grinder. When the joints are tight and the cups are deep, the rails are built up with an arc welder using hard steel, and are then ground with a rotary grinder. If the joint plates become loose but are still in good condition, they are rebolted, and usually are welded to the rails. When the joint is loose and plates are also badly worn, new plates are welded to the rails provided both rail ends are in good condition. In the case of joints on Lorain section 80-316 rail—we have experimented with welding the old continuous joints after the base support has been cut off, making them fish plates. These plates are set in close to the web of the rail at the base. The top of the outside plate is set ⅛ in. out from the head of the rail. The joint is then bolted with six bolts and welded to the base, the outside plate being welded only at the top. As it is very difficult to weld the inside plate at the top, the welding is omitted. When the joints are loose and the rail ends are broken, it is necessary to cut out the broken rails and insert a piece of rail with two new joints. The length of the rail cut in depends on the tie spacing, varying from 4 ft. to 14 ft., the latter being used when ties are on 6-ft. centers. The new joints are always placed over ties.

New joints that are being put in are ⅞-in. machine plates with four-hole drilling. These are welded to the rail at the head and base by either the carbon or metallic arc. There are three welds made on tram rail, and four on tee rail. Rails are cut through the head with a hack saw and the remaining part of the cut is made with an oxyacetylene torch.

When repairs are necessary to manganese centers in special work, they are built up with a special manganese welding rod, which gives satisfactory results providing the welding is done according to instructions. Loose hard centers are not welded until after they are tightened. This is done by removing bolts and raising the center on shims to the proper elevation and then replacing bolts and tightening. After the center has been reset and the cars have operated over it for a few days, it is again tightened and the bolt holes filled with hot asphalt.

New track in Davenport is constructed with 8-in. stone ballast, creosoted oak ties spaced 2 ft. center to center, 7-in. 80-lb. tee rail, 25-in. four-hole machine joints and tie rods spaced 10 ft. The joints are opposite and are welded by the carbon-arc process to the head and base of the rail, mild steel insert being placed between the rail ends before welding. All new track is ground with a reciprocating grinder.

In the reconstruction of old track the best of the old bricks are saved. The rails are then jacked up from the ties and removed, the ties remaining to be removed by the steam shovel. After the grading is completed, the sub-grade is rolled, and 6 in. of stone distributed and rolled. The ties are spaced on 2-ft. centers, the rail distributed and spiked, after which sufficient stone is placed in the track to raise to grade and tamped with Ingersoll-Rand pneumatic tie tampers. After tamping, the cars are permitted to operate over the track in order to hammer it down thoroughly. It is then raised to grade and retamped, the interval between tampings depending upon the frequency of the car service, the average time being four days. After the second tamping the track is lined and is then ready for the concrete paving base, which is placed during car operation. Brick paving is laid on a 1-in. cement mortar cushion mixed 1:4, and is filled with 1:2 grout. Vehicular traffic is not permitted on the paving for at least 4 days.

Where the old track is in solid concrete other methods are employed to do the excavating. Air hammers are equipped with chisel points and are used to loosen the ties from the concrete and cut a channel along the edge of the excavation. Where the concrete is 10 to 12 in. thick it is necessary to use steel tipped wooden prys 4 in. x 6 in. x 12 ft. long to raise the concrete, which is then broken with heavy sledges. This concrete is crushed by a portable crusher and used as ballast in the new track.

During the winter of 1923 and 1924 the Tri-City Railway made a number of track changes in Davenport on account of the rerouting of the cars. The work was done in the most severe weather, the temperature on many days being below zero. In making the excavations, it was necessary on a few jobs to remove 21 in. of frost. After this was completed, the building of the track, including tamping, was done with very little difficulty. Concrete was placed on days when the temperature was higher than 20 deg. F. We did not have much success heating the materials for concrete before putting them in the mixer, as the amount of material needed for concrete for one day was considerably larger than could be heated. We used a mixer that could deliver 6 cu.yd. of concrete per hour, and heated the materials after they were placed in the mixing drum with a Hauck concrete heater. After being placed, the concrete was covered with straw on the top of the rail, and the straw in turn was covered with a cheap grade of tar paper to prevent the wind from blowing it away and also to help retain the heat in the concrete. When the weather was not too cold, the straw and tar paper were removed after 48 hours. The concrete was then swept clean and heated with large paving heaters and paving lard. The sand for the paving cushion was heated on old junk boilers. Steam from a portable boiler was used to heat the water that was used for making the mortar paving cushion and the cement grout. Immediately after grouting, the paving was covered with the straw and tar paper, and was thus protected for at least a week when the weather was moderate, and longer when it was very cold.

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[*] Abstract of a paper presented before midyear meeting of the Iowa Electric Railway Association, Des Moines, Iowa, Nov. 13, 14, 1924.

Experience with Automatic Substations[*]

By D. H. Nail
Superintendent of Power Des Moines City Railway, Des Moines, Iowa

Automatic substations do not require a great deal of attention other than periodic cleaning and inspection. In the early use of these stations in Des Moines they were inspected twice each month. Later on we found that this time could be extended to once each month without any trouble occurring to the equipment. The buildings in which these equipments were installed are fireproof and well ventilated. When inspections are to be made the station is shut down after the morning peak load is over, the machine is blown out and the switchboard and the station are cleaned up. Compressed air is furnished by a portable air compressor operated by a 600-volt d.c. motor. This compressor is transported in a truck to each station when inspections are made.

After the station has been blown out the maintenance men inspect each part of the apparatus separately, clean the machine, interlocks and relay contacts, and go over all nuts and terminals on the back of the switchboard to see that everything is clean and making good contact. All protective devices are next tried out to be sure that they are working properly. This is done by starting up the machine but not letting it go on the line. The inspector then operates each protective relay or electric interlock by hand in the same manner as they would operate normally.

After all these protective devices have been thus tested out, all line and control switches are closed so that the machine may come on the line normally. The time required for two men to clean and inspect a one-unit station is about 6 hours. This allows plenty of time for the station to be back on the line in time for the evening peak load.

The Des Moines City Railway was among the first to install automatic controlled substations exclusively for city railway power, having begun in the year 1916 and continued with this work until the entire system is now fed from this source. At the same time the Des Moines & Central Iowa Railroad began to use automatic controlled substations for interurban service. Up to the present time the Des Moines City Railway has 10 and the Des Moines & Central Iowa Railroad has 5 substations operated by automatic control. These rotary converters range from 300 to 750 kw. each. The Des Moines City Railway was also among the first to build a portable substation automatically controlled. This station is of 500-kw. capacity and the equipment is installed in a steel car. The power transformer is designed for 4,500 or 22,500 volts as the city transmission lines operate at 4,500 volts, while the transmission lines feeding the substations for the Des Moines & Central Iowa interurban system use 22,500 volts. Two sets of operating and instrument transformers are needed for the different voltages. The time required to change the station from 4,500-volt to 22,500-volt operation is about 4 hours. This arrangement makes this portable substation very handy in case of trouble with either a city or an interurban station.

Data on the efficiency of automatic substations, and a comparison of the relative economy of automatic and hand-controlled stations, are furnished by the following figures for one year:

OUTPUT AND CONVERSION LOSS OF AUTOMATIC SUBSTATIONS, DES MOINES, IOWA.

Location	Substation Capacity Kw.	Annual D.C. Output Kw.-Hr.	Conversion Loss Per Cent
City Lines			
12th and High Streets	500	1,884,700	10.77
E. 2nd and Walnut Streets	500	2,435,150	8.66
Interurban Lines			
Brennan	300	197,080	22.01
Hyperion	300	240,320	23.45
Interurban Lines, Hand-Operated			
Mitchellville	300	235,420	37.45

The last two stations both having the same kilowatt capacity showed a difference in d.c. output of 4,900 kw.-hr., but a difference in conversion loss of 14 per cent for the period of one year. Aside from the saving due to the low conversion loss there was the additional important saving resulting from the elimination of operators in the automatic stations.

Comparison of the costs of operating the same single unit 750-kw. station automatically and by hand for a period of a year as taken from our operating data shows the following results:

	Hand Operation	Automatic Operation
Conversion loss, per cent	22	12
Conversion loss, kilowatt-hour	475,000	259,000
Loss at $0.0125 per kilowatt-hour	$5,712.50	$3,237.50
Maintenance labor, materials and supplies	450.15	450.15*
Wages of three operators working 8 hours per day at 50 cents per hour	4,380.00	
Total operating cost per year	$10,542.65	$3,687.65
Saving from automatic operation		$6 855.00

* Taken at actual cost of hand station.

Conversion losses in per cent for two-unit automatic substations, taken from actual records for a period of 6 months, were as follows:

	Machine No. 1	Machine No. 2
Station at 12th and High Streets, loss, per cent	5.47	7.15
Station at 2nd and Walnut Streets, loss, per cent	8.81	5.06

Under conditions where the leading machine is carrying light load part of the time, and the trailing machine comes on the line during the peak only, when it is not subject to light load conditions, the leading machine naturally shows the highest proportional conversion loss. This condition does not exist when the two machines are more uniformly loaded.

Comparison of inspection and cleaning costs for nine automatic substations of 500-kw. capacity each operated by the Des Moines City Railway shows the following results for one year:

	Total Cost for 9 Stations	Av. Cost per Station
Inspection and cleaning labor	$1,623.96	$180.44
Maintenance labor	2,238.76	248.75
Supplies, including brushes for machines, rags, oil, fuses, aluminum arrester electrolyte, sweeping compound, floor brooms, etc	885.62	98.40
Maintenance materials and parts	927.05	103.01
Totals	$5,675.39	$630.60

The use of automatic substations in Des Moines has not only proved economical from the standpoint of operation and maintenance costs, but, due to the fact that an operating force is not required, has permitted the use of more stations giving more feed-in points on the system. This increased number of feed-in points has reduced the amount of d.c. feeder necessary and has resulted in providing a very uniform trolley potential throughout the system, permitting higher schedule speeds and lower power losses.

For interurban service automatic substations can be located along the line where it would not be convenient to use the hand-operated substation, as some companies find it necessary to locate hand-operated stations near points where they can furnish living quarters for the attendants.

Subways in the Air

Taking as his subject "Traffic and Transit," Mayor Hylan of New York City addressed a joint meeting of the American Society of Civil Engineers and the American Society of Mechanical Engineers on Nov. 19. He told how under his administration the city had spent huge sums of money for the purchase of street cleaning equipment and praised the efficiency of the New York Fire Department. Incidentally, he repeated his well-known ideas on the benefits that would result to the city from the removal of "worn-out" street railway tracks, "antiquated" elevated structures and the inauguration in their stead of a swiftly moving "modern bus system."

He spoke in glowing terms of the benefits which resulted from the removal of the elevated spur on upper Sixth Avenue and prophesied the early removal of the rest of the elevated railway in that street. To care for the present traffic he wants the much-discussed Sixth Avenue subway to be built by the city. The Board of Transportation is now working on plans to accomplish this. No intimation was given, however, as to how it is proposed to construct a new subway at Thirty-fourth Street, where three underground lines at different levels are already in existence, nor where the money is to come from to carry out the city's ambitious projects.

Following the talk by Mayor Hylan,

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[*] Abstract of a paper presented before midyear meeting of Iowa Electric Railway Association, Des Moines, Nov. 13, 14, 1924.

Fire Chief John Kenlon told how the construction of elevated railways in various parts of the city had destroyed property values. He expressed the opinion that no more such structures should be built. The difficulty of moving fire apparatus through the congested streets was also mentioned by this speaker.

Major Elihu Church, transportation engineer Port of New York Authority, in a snappy talk told of the growing popularity of horse-drawn vehicles for heavy trucking in New York City. He cited actual counts showing more than 70 per cent of the vehicles carrying freight to and from certain terminals being drawn by horses. The proportion is steadily increasing, he said. Time, not distance, being the measure of expense in heavy trucking, the superiority of the cheaper vehicle is notable where congestion exists. With the average speed of traffic movement in the city streets being from 3 to 4 m.p.h. and with one-half to two-thirds of the time of the truck spent standing still, it is more economical to use horses. Major Church explained how a system of trunk line motor highways and bypasses around cities would relieve this severe congestion.

Utilities Commissioners Discuss Bus Regulation

THE annual meeting of the National Association of Railroad & Public Utilities Commissioners was held at Phoenix, Ariz., Nov. 11-15. Most of the time of the meeting was given over to discussion of matters not especially pertinent to electric railways. The new president elected was William D. B. Ainey, chairman of the Public Utilities Commission of the Commonwealth of Pennsylvania, who is well known in electric railway circles, as he has several times addressed the American Electric Railway Association. James B. Walker of New York was elected secretary.

J. N. Shannahan, president of the A.E.R.A., addressed the commissioners, primarily on the subject of proper regulation of the motor bus and motor truck. Mr. Shannahan's address was published in this paper last week. It was enthusiastically received at the convention. One of the members stated that Mr. Shannahan had given some very helpful suggestions on one of the most pressing problems of the day. He also suggested that the commissioners' association should give more attention to this subject, that not enough study and discussion had been given the report of the committee on motor vehicle transportation presented last year, and urged that the commissioners devote more attention to this important subject during the ensuing year.

Among resolutions passed by the convention on the subject of national legislative matters was one of interest to the electric railways. This was "that Congress be respectfully urged to make such amendments to the existing (transportation) law as shall clearly exclude from the jurisdiction of the Interstate Commerce Commission the regulation of rates and service of electric railways carrying on local street railway transportation."

A report of particular interest to electric railway men was that of the committee on motor vehicle transportation, an abstract of which follows:

REPORT OF COMMITTEE ON MOTOR VEHICLE TRANSPORTATION

The fees thus far required in the various states from auto transportation companies may be roughly divided into three classes: (1), fees applied toward the expense of regulation; (2), fees of the nature of compensation for the use of public highways; (3), fees exacted in exchange for franchise rights.

Fees to Cover Regulatory Expense.—The committee believes that the exaction of fees to cover the expense of regulation is sound in principle. The regulation of motor vehicle transportation is more expensive in proportion to its volume than is the regulation of other kinds of transportation, and the benefits from efficient regulation accrue more directly to the persons engaged in such enterprises. The auto transportation companies, as a rule, do not object to the payment of reasonable fees when they feel that they are getting value received in the form of fair and efficient regulation.

Fees or Taxes to Cover Road Construction and Maintenance.—Motor vehicle transportation is in a class by itself in respect to the roadbed or way over which its vehicles operate. Steam and electric railroads are required to purchase rights-of-way, construct roadbeds, lay ties and steel, and maintain such structures at their own expense, and in addition thereto, pay taxes thereon.

Motor vehicles operate over highways constructed by the public, and as long as no compensation for the use of such highways is exacted of auto transportation companies, they are indirectly subsidized at the expense of the public. It would be manifestly unjust, however, to exact fees from auto transportation companies subject to regulation, without at the same time exacting similar fees from all vehicles making commercial use of the highways. Most of the states which have statutes regulating auto transportation apply them only to stages and trucks operating between fixed termini and over regular routes. By amending statutes covering the regulation of auto transportation companies operating between fixed termini and over a regular route so as to create and regulate a new class of auto transportation companies embracing practically all other vehicles using the highways for commercial purposes, they could be brought under some form of regulation and could be required to make reports upon which equitable fees could be based. As a general rule trucks used by private industries in the transportation of their own products, which are not operating for hire in a strict sense, are more heavily loaded and do more damage to the highways than those of any other class. Yet they are in a position most likely to escape fees or taxes exacted as compensation for the use of the highways, except the gasoline tax.

Gasoline Tax.—A large number of states are now exacting a gasoline tax, amounting to either 1 or 2 cents per gallon in most instances. This form of tax operates equitably upon all users of the highways in proportion to the use they make of the same. It is the only tax yet devised which is fair and equitable to all. Objection to the gasoline tax on the ground that it falls equally upon those who use the highways for pleasure and those who use them for profit, is answered by the suggestion that those who use the highways for pleasure should be willing to contribute their just quota toward building and maintaining the highways. Pleasure cars are usually lighter and the mileage less than with commercial vehicles, so the amount paid by their owners is much less. It is estimated that, in the state of Washington, for instance, the amount contributed by stages in license money and gasoline tax will average about 60 per cent per mile of travel more than that contributed by private cars. In any fee system involving vehicles using the highways, the gasoline tax should be a part of the system, and additional taxes might reasonably be imposed from those making commercial use of the highways.

Other Forms of Taxation.—Other forms of taxation designed to compensate for the use of highways and for the protection which the certificate of public convenience and necessity affords includes the gross operating revenue tax and wheelage or mileage tax. The states of Washington, California and South Dakota require, in addition to the fees imposed upon all other motor vehicles, a gross revenue or gross earning tax. In Washington, under the present law, this fee cannot exceed 1 per cent, and is designed for the sole purpose of covering the cost of supervision and regulation. In California, the amount imposed is 4 per cent of the gross receipts, less the amount paid as municipal fees and taxes. In South Dakota, the tax is 2 per cent of the gross, in addition to motor vehicle tax and personal property tax. In the state of Washington, this tax amounts to approximately $50,000 per year. In South Dakota, the tax is represented as yielding about $4,000 the first year, with prospect of considerable increase in later years. In California, the 4 per cent gross revenue tax yielded for the first quarter about $100,000. It is expected to produce at least $125,000 per quarter or $500,000 per year.

Flat Fees.—Alabama, Arkansas, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Michigan, Minnesota, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Wisconsin, and the District of Columbia have widely varying flat fees, based in most instances on the passenger seating capacity as applied to passenger cars and on weight or capacity as applied to freight carrying trucks. This form of taxation is so new that the committee was unable to secure information regarding experience with this form of tax or its desirability.

Wheelage Tax.—Other states, including Iowa, Maryland, Oklahoma, Virginia and West Virginia, impose certain taxes based upon ton-mileage. There is a wide variation, both in the method of computing the tax and in the amount of the tax imposed. In Iowa, the tax for motor vehicles having pneumatic tires is ⅛-cent per ton-mile of travel over and along the public highways. For motor vehicles having hard rubber or solid tires, the tax is ¼ cent per ton-mile. The statute also includes the method of figuring the ton-miles of passenger travel, the passenger weight being taken at the full seating capacity figured at 150 lb. per passenger, plus the weight of the vehicle, multiplied by the number of miles operated, which, however, cannot be considered as less than the number of miles required to maintain the schedules filed. When figuring ton-miles of freight travel, the freight carrying capacity of each truck or unit, including trailers, plus the weight of the vehicle, is used in calculating the ton-miles. The Iowa law applies to persons or corporations operating a motor vehicle for delivering merchandise other than farm products, except those operating wholly inside of city limits, as well as passenger and freight carriers operating for compensation over their regular routes or between fixed termini. The amount of revenue from this tax for the year ending July 4, 1924, was estimated at $50,000.

In West Virginia, passenger carriers operating over regular routes, where the vehicle weighs less than 3,000 lb., are required to pay 1/20 cent for each passenger seat-mile; over 3,000 lb. and less than 7,000 lb., 1/15 cent per passenger seat-mile; and over 7,000 lb., ⅒ cent per passenger seat-mile. Property carriers over regular routes pay for a capacity of 3 tons or less ⅒ cent per ton-mile; over 3 tons and less than 5 tons, ⅙ cent per ton-mile. Passenger carriers not running over regular routes or between fixed termini pay a flat rate of $75 yearly. Property carriers under the same condition pay a fee double that of trucks not used for hire. The above law became effective on July 27, 1923, and the revenues collected thereunder up to June 30, 1924, were approximately $306,000. A feature of the law is that vehicles operating over a regular route are required to pay the full year's tax in advance.

No Special Taxation Imposed in Some States

Some states, such as Michigan, Nevada, New Hampshire and Vermont, impose no state tax other than the ordinary fees required of all motor vehicles, but the various counties and other local subdivisions are permitted to impose certain fees in widely varying methods and amounts. The committee believes that such a system is wrong in principle and is illogical and inequitable. All fees should be uniform throughout the state and should be collected by state agencies, with the possible exception of a municipal fee for vehicles operating wholly within city limits.

Arizona, Delaware, Kansas, Kentucky, Mississippi, Missouri, Nebraska, South Carolina, Utah and Wyoming impose no taxes or charges upon auto transportation companies or vehicles other than those applicable to all other motor vehicles, unless such legislation has been very recently enacted.

In the discussion by correspondence between the various members of the committee, it was suggested that the mileage tax or other fees exacted should be based somewhat upon the character of roads over which the operation is conducted. After considerable discussion, it was agreed that it was impracticable to base a tax upon the type of road traversed.

George H. Pride, president of the Heavy Haulage Company of New York City, speaking on the subject of cost accounting in highway transportation operation not long ago, made this statement:

The Public Pays the Cost of Motor Transportation

"The public as a whole pays for the construction and maintenance of the highways in the form of taxes, and, although it is not generally realized, it also defrays the entire cost of the motor truck transportation which passes over the highways in the price for the commodities it buys, for it can be unqualifiedly stated that practically everything purchased has been transported by motor truck one or more times during its process of fabrication."

Mr. Pride also states that eleven times as much money is spent in operating motor trucks over the highways yearly as is spent in building the highways themselves.

In imposing taxes upon motor vehicle operation in any state, careful consideration should be given to existing statutes, so as to avoid pyramiding taxes to the injury of motor transportation and ultimately to the inconvenience of the public. In the state of Washington, for instance, the stage is subject to regulation by paying $56,522 a year license money and about $35,000 per year gasoline tax, or $91,522 per year for the use of the highways. The trucks, subject to regulation, pay about $25,000 per year license money and about $15,000 per year gas tax, or about $40,000 per year for the use of the highways. The same stages pay about $65,000 per year and the trucks $25,000 per year personal property tax. Thus it is seen that the stage is at present operating under regulation by paying to the state under the various statutes about $220,000 annually besides the gross operating revenue tax of 1 per cent, designed to cover the expenses of regulation, which amount to approximately $50,000 per year. The total for the state of Washington, $270,000 per year, is equivalent to about 5.4 per cent of the gross operating revenue of auto transportation companies. No doubt similar situations exist in other states.

In California, the license fee is a flat sum of $3 per year against an average license fee in Washington for stages of $91.74 and an average fee for the type of trucks used by auto transportation companies of about $77.50. In California, all municipal fees and taxes are deducted from the gross revenue tax. It is doubtful if the auto transportation companies of California pay a greater per cent of their gross revenue under the 4 per cent law than is required of such companies in the state of Washington under the various tax and license provisions of that state.

Seven General Principles Proposed for Taxation

At present the time of operation under the various laws has been so short that it is impossible at this time to determine, from the standpoint of operation and experience, the most practicable and feasible method of taxing auto transportation companies. The announcement of a few fundamental principles, the committee believes, should be helpful in the enactment of any fee statute.

1. A reasonable gasoline tax should be imposed, applicable to all vehicles using the highways.

2. All taxes imposed upon motor vehicle common carriers should be imposed and collected by the state, with a possible exception of city taxes upon vehicles operating wholly within the city limits.

2. An equitable franchise tax might properly be imposed upon vehicles operating between fixed termini and over a regular route under certificates of public convenience and necessity, to the exclusion of vehicles not so operating.

4. Taxes or fees on motor vehicle common carriers, the proceeds of which are limited to the construction and maintenance of highways, should be imposed upon all stages, trucks and "for hire" cars, whether operating between fixed termini and over a regular route or otherwise, or whether operated for hire or by private industries in the transportation of their own commodities.

5. In states where the imposition of fees and taxes would cripple or destroy small stage or truck operations rendering useful service in sparsely settled communities, any revenue tax imposed should apply only to revenues over and above a reasonable return to the motor vehicle carrier.

6. Statutes which provide for the regulation of auto transportation companies operating over regular routes and between fixed termini should be amended so as to include motor vehicle common carriers not so operating; but in any case fees for the use of the highways, whether flat or in the form of mileage tax or revenue tax, should apply to all motor vehicle common carriers, whether subject to regulation or not.

7. Any new or supplementary fee or tax statute should take into consideration all fees and taxes paid under existing laws, so that the total for any one purpose or as a whole shall not be unjust, unfair or unduly burdensome.

The report was signed by E. V. Kuykendall, chairman; T. E. McKay, Fay Harding, Gen. J. F. O'Ryan, Ivan Bowen, J. F. Harper, O. W. Rugh, H. V. Osborne and G. R. Shelby.

Southwestern Association Convention at Houston Next May

THE executive committee of the Southwestern Public Service Association, at a recent meeting, set the 1925 convention of this association for Houston, Tex., May 19-22. W. E. Wood, Houston, heads the convention committee.

New York State Dinner on Jan. 22

THE New York State Railway Association will hold its next convention in New York City on Jan. 22 at the Commodore Hotel. There will be a morning and an afternoon session and an informal dinner in the evening.

American Association News

Executive Committee

THE executive committee of the American Association met in New York on Nov. 21, with the following members present: President J. N. Shannahan, R. P. Stevens, W. H. Sawyer, L. H. Palmer, R. I. Todd, F. R. Coates, A. W. Brady, L. S. Storrs, C. E. Morgan, T. C. Cherry, C. H. Clark, W. L. Davis, M. B. Lambert, E. P. Waller, B. A. Hegeman, Jr., C. S. Hawley, A. A. Hale and Secretary Welsh.

R. P. Stevens, chairman of the finance committee, presented the annual audit of accounts, which was accepted. He also presented the budget for 1926, which anticipated receipts of $321,000 and expenditures of $318,000. This was approved. An appropriation of $2,500 in support of the street and highway safety program of Secretary of Commerce Hoover was approved.

Mr. Coates reported briefly for the policy committee. He was authorized to draw up a resolution giving the indorsement of the association to the work of the Better Business Bureau and the National Vigilance Committee, and urging co-operation of member companies with these organizations in their own cities. The committee on policy was also instructed to draw up a statement expressing more definitely the position of the association with respect to the motor bus. Similarly, the question of proper regulation of interstate highway carriers was referred to the committee on national relations.

A communication from Gen. Guy E. Tripp, chairman of the Committee of One Hundred, was read, which requested a termination of this committee's activity on Jan. 1, 1925, in view of the fact that the association is now financially able to carry on this work on the same scale. This action of the Committee of One Hundred was recorded and President Shannahan directed to write a letter on behalf of the executive committee to General Tripp, thanking the Committee of One Hundred for the splendid work it has done in the interest of the association and of the industry.

At the suggestion of President Shannahan and on motion of Mr. Sawyer, the president was authorized to appoint an advisory council of the association, whose membership will be made up of the principals representing ownership of electric railway properties. The function of the advisory council will be to carry on the work formerly done by the Committee of One Hundred and such other matters as it may consider desirable to act upon. President Shannahan expressed the thought, reiterated by Mr. Sawyer, that the American Electric Railway Association has not had the co-operation of the owners of the properties to the extent desired. It was felt highly desirable to create some arrangement which would bring to the association the benefit of their interest and active support.

Mr. Palmer reported for the committee on company and associate membership that one railway had applied for membership, this being the Bamberger Electric Railroad Company, Salt Lake City, Utah. Bonbright & Company, investment bankers, New York, had applied for associate membership. These applications and those for twelve manufacturer members were approved.

Mr. Morgan reported for the company and community section and individual membership committee. The main point of interest was that the membership of the Metropolitan Section in New York has now reached 693. Mr. Morgan spoke briefly of the great interest shown in the meetings of this section and also of the fact that many of the members had shown a new interest in industry problems as a result of attendance at the first two meetings.

Mr. Clark, president of the Engineering Association, asked for and received the approval of the executive committee, to invite certain railway companies to send engineers as members of a committee which will make a special study of the causes and cure for rail corrugation. This committee will make a tour of inspection of the conditions on a number of properties. Each company will be requested to pay the expenses of its own representative and a portion of the expense of the secretary of the committee, who will probably be a professor of some university which takes an active interest in electric railway matters. This secretary will compile the report. Mr. Storrs for the Connecticut Company, Mr. Morgan for the Brooklyn City Railroad, and Mr. Emmons for the Baltimore company, agreed to send a man on this trip and Mr. Clark was authorized to send out his letters inviting other companies to do likewise.

In the absence of J. P. Barnes, Secretary Welsh read the report of the committee on public relations. This will appear in next week's issue of this paper.

Mr. Sawyer reported the recommendation of the committee on location that the Midyear Meeting be held at Washington on Tuesday, Feb. 17. This was approved.

President Shannahan spoke on the fact that the lease on the headquarters office expires shortly and that the association will have to face a considerable increase in rent as the present lease was made 10 years ago. On motion he was authorized to appoint a committee consisting of the chairman of the finance committee, Mr. Stevens, the chairman of the policy committee, Mr. Coates, himself, and such other members as he may direct, to consider this matter and with power to act.

On motion the president was authorized to appoint a committee on customer ownership, the suggestion having been made in a letter from Past-President Britton I. Budd.

Mr. Coates read a report on the American committee on inductive coordination and requested an appropriation of $250 to support the work of this committee. This was approved.

A letter from C. L. Van Auken, vice-president and managing editor *Electric Traction*, was read requesting President Shannahan to make a place on the program at next year's convention for the award of a certificate of merit and a silver cup to the company showing the highest operating speed and asking him to make the award. The president was instructed to thank *Electric Traction* for the spirit and motive behind the suggestion but to disapprove it.

As a matter of information, Secretary Welsh pointed out that the National Industrial Conference Board is now engaged in making a study of the weekly earnings of public utility employees. One of the executives stated that executives in other industries are beginning to ask why street railway wages are going up while all others are going down. This trend is putting the electric railways in an unfavorable light among other industries.

The next meeting will be held in New York on Wednesday, Jan. 7.

Location of Midyear Meeting

"AT WASHINGTON, Tuesday, Feb. 17" were the place and date selected by the committee on location at its meeting in New York, on Nov. 20, for the Midyear Meeting and dinner of the American Electric Railway Association. Members of the committee present were Chairman W. H. Sawyer, President Shannahan, Charles Castle, A. A. Hale, S. J. Cotsworth, J. H. Hanna, E. P. Waller, E. C. Faber, Harry L. Brown and Secretary J. W. Welsh.

The committee also discussed the question of the location of the annual convention next fall and whether or not there should be exhibits. Mr. Brown reviewed to the committee the wishes expressed by some 40 manufacturers in various parts of the country. The expression of these manufacturers was almost unanimous in favor of having exhibits with the convention.

Young's Pier in Atlantic City is becoming increasingly inadequate for the electric railway exhibition and a sub-committee was, therefore, appointed to make a thorough investigation as to a more suitable location and also to determine whether any improvement in facilities at Atlantic City may be possible. This sub-committee will report back to the main committee at the time of the Midyear Meeting in Washington.

Maintenance of Equipment

Overhead Rail for Handling Armatures

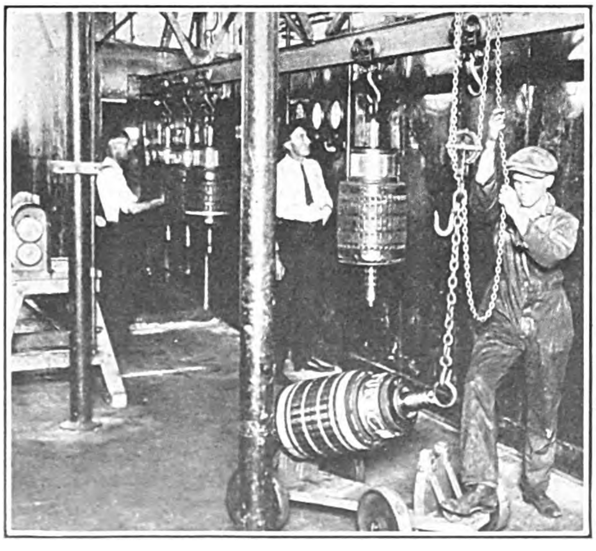
By J. G. Jeffery

Director of Public Relations Los Angeles Railway, Los Angeles, Cal.

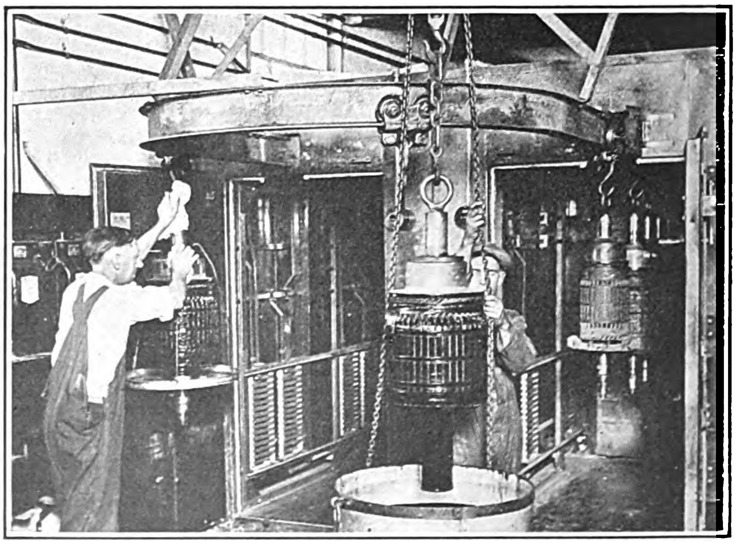
The use of an overhead rail for moving armatures in and out of the new preheating and electric baking ovens at the shop of the Los Angeles Railway is proving a great time and labor saver as well as providing a more convenient method than the use of trucks for rolling these armatures about. The overhead rail extends for a considerable distance in front of the preheating oven. Armatures are hoisted to the overhead rail and are suspended from carriages which travel on the rail, which extends entirely through the oven. They are preheated for 12 hours at a temperature of 205 deg., after which they are pushed out the opposite end of the preheating oven, which has a semi-circular extension of the overhead rail. On this end the armatures are dipped in insulating varnish. A tray is placed underneath to catch the drippings, and the armature with the tray attached is then pushed into the baking oven, where it is kept at a temperature of 195 deg. for 48 hours.

At present the armatures are dipped by lowering them into a stationary tank, but the company is considering building a tank for the insulating varnish with provision so that it can be lifted by an air hoist. With this arrangement it will be unnecessary to remove the armatures from their hooks on the carriages for dipping.

The method used for holding the armatures suspended is of interest. A hole is bored into the end of the armature shaft and tapped out so that an eyebolt can be quickly screwed into the end of the armature shaft which is to be handled. It can then be hoisted by the chain hoist from the floor or from trucks. When raised to the height of the rail it is transferred to the carriage, which has a hook to fit the eyebolt.



Hoisting Armatures to Overhead Rail After Eyebolts Have Been Screwed Into Armature Shaft. They Are Then Pushed Along Rail Into Preheating Oven.

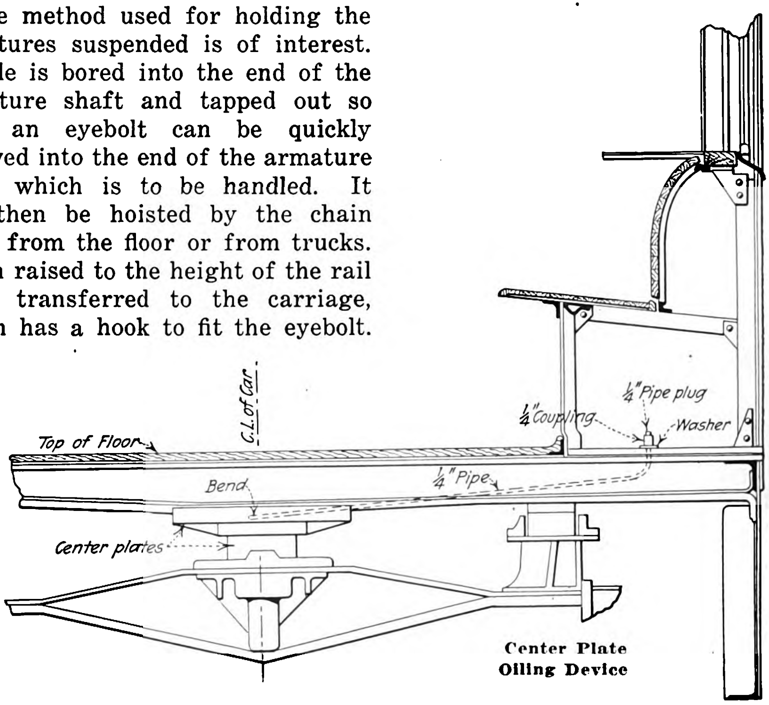


At the Right an Armature Is Being Hoisted from the Dipping Tank. The Armature at the Left Is Being Pushed Into the Baking Oven After A Tray Has Been Placed Underneath to Catch the Drippings

Convenient Method of Oiling Center Plates

It is extremely difficult to oil center plates on most types of car, and as a result the greasing or oiling at this point is frequently neglected. The Boston Elevated Railway experienced difficulty in getting the center plates apart. In order to overcome the trouble, it has installed oiling pipes as shown in the accompanying illustration. These are now being used on all of the Main Line rapid transit type cars.

The device consists of a ¼-in. wrought-iron pipe, bent to proper shape and leading from underneath one of the longitudinal seats to the center plate at that end of the car.

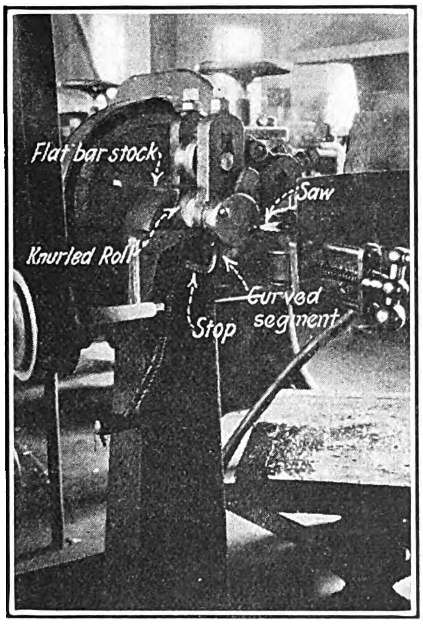


Center Plate Oiling Device

The lower or center plate end of the pipe fits tightly in a hole drilled in the center plate. The end underneath the seat is fitted with a standard ½-in. coupling and with a plug on top. When oil is placed in the pipe it works its way down to the cored chamber in the body of the center plate. From this point it passes through a small hole to the bearing surfaces of both plates. The present method consists of adding oil about once each month and the installation of these devices has entirely eliminated the trouble previously experienced.

Making Controller Segments from Flat Stock

A SPECIAL machine designed and built by the mechanical department of the Twin City Rapid Transit Company enables this company to make controller cylinder segments for repair work, out of flat bar copper stock by an automatic and semicontinuous process.

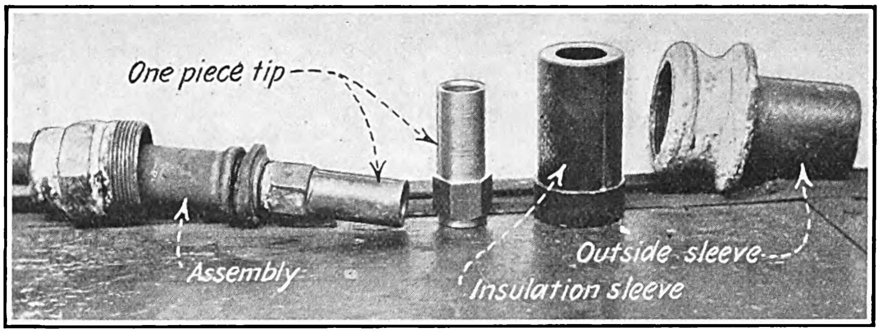


Controller Segments Are Formed from Flat Bar Stock in This Special Machine Developed by the Twin City Rapid Transit Company

The flat bar copper is fed into the machine between a pair of power-driven rolls, one of which is knurled, so that it grips the stock and forces it through. A third roll at the back of the machine guides the bar, so as to form the segment of a circle. This segment can be formed to any desired radius, within certain limits, by adjustment of the position of the roll. In the illustration the curved strip of copper is shown below, after it has passed through the machine.

An automatic trip stops the machine when the end of the bar makes contact with it. By setting the trip in any desired position, the machine is stopped when a predetermined length of segment has been rolled. The horizontal saw, which is shown at the extreme right of the illustration, is then operated by the hand feed, and cuts the rolled segment off to the proper length. Another segment is then rolled and the operation repeated.

Improved Bus-Line Jumper



Assembly of Bus-Line Jumper Cable Includes Solid Connector Tip in Place of the Two-Piece Tip Formerly Used

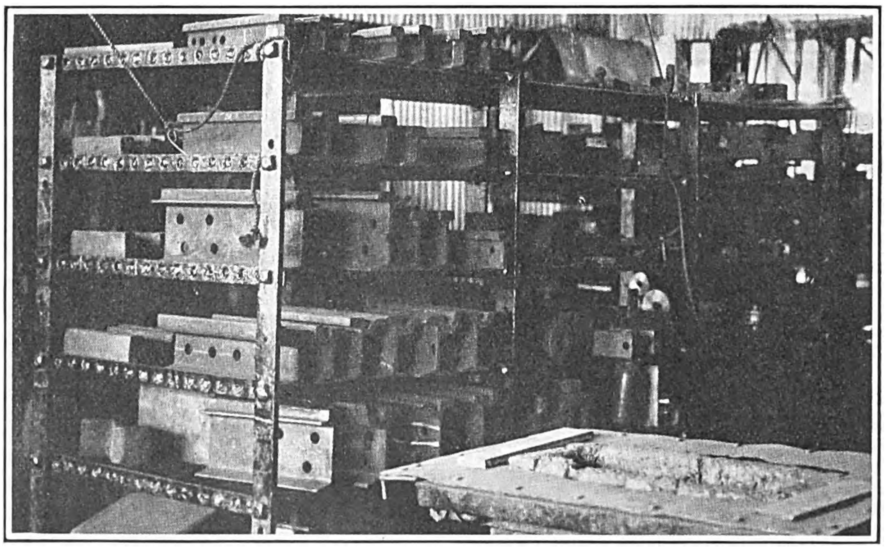
AN IMPROVED bus-line jumper connection has been devised at the Wheaton shops of the Chicago, Aurora & Elgin Railroad. This design eliminates the possibility of the connection burning away due to excessive arcing. The standard type of jumper used had a two-piece threaded contactor receptacle. One end was soldered to the jumper cable and the other end received the spring prong attached to the car. Although the object of this type of connector is to facilitate the changing of this latter part in case it becomes badly burned, it has led to difficulty, because a trainman in breaking the connection is apt to give the jumper a twist tending to unscrew the receptacle from the fastening on the cable end.

To eliminate the possibility of this occurring, a new design of connection was perfected. This consists of a solid brass piece taking the place of the two pieces previously used. It is fastened to the cable jumper and has sufficient brass between the jumper and the connector plug so that any heat of arcing will be dissipated sufficiently to leave the solder unharmed. The new brass plug fits into the standard insulation provided for the two-piece plug, and in every way answers the purpose of the two-piece plug with the exception of ease of renewing the end tip. It is found, however, that this one disadvantage is greatly offset by the desirability and permanency of the connection between the jumper cable and the connector tip.

Collecting Sample Rail Sections for Forge Shop

BY J. L. ROGERS
Forge Shop Foreman Kansas City Railways

THE forge shop of the Kansas City Railways is called on to make up various parts for use in



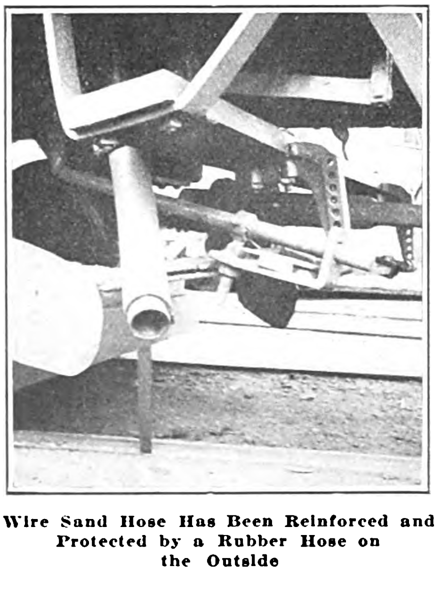
Stored Conveniently in a Special Rack, These Sample Sections of All Rails In Use in Kansas City Enable the Forge Shop to Check Track Parts by Fitting Them to the Actual Sample Piece of Rail trackwork. Among other things, the making of compromise plates runs into a considerable volume of work.

As the practice on the system has been revised from time to time, various forms and sizes of rail sections have been used. This has made it very important that orders for plates be carefully checked in order to make sure that they are properly made to fit the different rail sections.

Short sample lengths of rail are maintained in an appropriate rack where they are always accessible, and are not allowed to leave the forge shop. Each piece is known by its section number, and when forging work such as the making of joint plates is to be started for any particular section of rail, the workman can always check with a piece of rail of the proper section, to make sure no error has been made in the selection of the proper die before a large quantity of material is made up. In addition, any other questions regarding the correctness of forging work for the track department can always be checked by fitting to the actual rail sections in the shop.

Rubber Cover Prolongs Life of Sand Hose

SOME time ago trouble was experienced by the Eastern Massachusetts Street Railway on account of moisture getting into the sand boxes of its cars and interfering with the proper flow to the rail. Wire hose was at that time in use for the outlets from the sand boxes. In service the wire hose had become somewhat damaged and bent, however, further interfering with the flow of sand. It was then decided to slip a piece of rubber hose over the wire hose, thus at the same time effectually closing the openings through which moisture was entering and straightening out the pipe. This arrangement is shown in an accompanying illustration. In the photograph the rubber covering has been pushed back slightly in order better to illustrate the arrangement. In reality the rubber and wire hose are of the same length. This procedure has resulted in making the flow of sand more reliable.

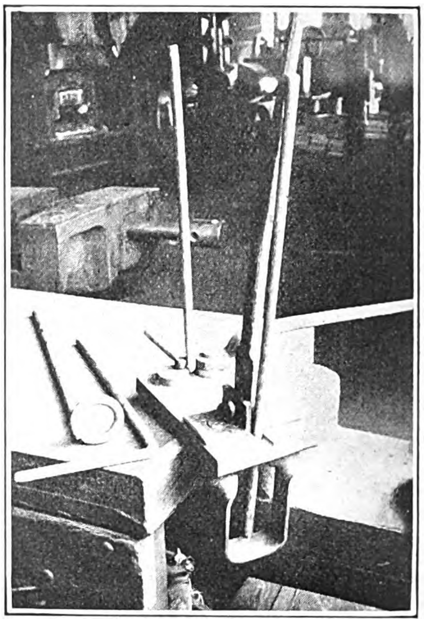


Wire Sand Hose Has Been Reinforced and Protected by a Rubber Hose on the Outside

Die for Forming Sand Hose Brace

MANY operations in the forge shop lend themselves readily to the use of simple dies that effect comparatively large savings in time and labor. A device of this type is represented by the die shown in the accompanying illustration, which was developed by the mechanical department of the Twin City Rapid Transit Company for forming sand hose braces from round bar stock.

Two operations are necessary in order to form the circular loop at right angles to the supporting rod, as shown by the completed brace lying on the bench in the illustration. The first operation consists simply of making a right-angle bend in the piece. This is done by the vertical lever at the front of the die in the illustration. The condition of the piece at the end of this operation is shown by the sample.



This Simple Tool Speeds Up the Work of Forming the Sand Hose Brace Shown at the Left, from ⅝-In. Round Bar Stock

After the bend is made the piece is set between two rollers, as shown at the rear of the illustration. A lever having a hook at one end is set over a pin projecting through one of the rollers, and by rotating this lever in a counter-clockwise direction, the piece of work is forced between the rollers so as to form the loop on the end. This brace is made of ⅝-in. round stock in one heat.

New Equipment Available

Fire-Fighting Machine Perfected

A 40-GAL. portable foam chemical engine has been developed which uses the principles of operation employed by the Foamite system of the Foamite-Childs Corporation, Utica, N. Y. The new engine has substantially the same outward appearance as the type previously used, but the internal construction has been redesigned. With this new meter-type engine, a medium pressure is generated at the start, which gradually decreases during the period of effective discharge. The volume of firefoam generated is almost double the quantity delivered by the old type engine from the same quantities of chemical solution. In addition, the quality of the foam produced is superior to that of the old. Extensive tests have been made by the manufacturer with the new engine, and it has been submitted and approved by the Underwriters' Laboratories as effective on both class A and class B fires.

Pressed Steel Forge Hearth

A ONE-PIECE hearth, 24 in. x 36 in., constructed of heavy gage pressed metal, has been brought out by the Buffalo Forge Company, Buffalo, N. Y., for its standard line of forges. This new pressed metal hearth takes the place of the cast-iron construction previously used. Advantages claimed for the pressed steel hearth are elimination of rust, decreased weight and improved appearance. Breakages of the cast-iron type, which occurred frequently, cannot occur with the new construction.

The News of the Industry

Necessity for P. R. T. Revaluation Up to Expert

The Pennsylvania Public Service Commission, at its meeting in Harrisburg, on Nov. 17, formally requested Milo R. Maltbie, public utility expert, to determine whether a revaluation of the Philadelphia Rapid Transit Company property was necessary. The commission decided that upon his decision would rest the question of reopening the revaluation proceedings. Mr. Maltbie said he would review the testimony in the former valuation case as well as a number of other questions involved, and added that his conclusions would be ready for the commission "sooner than many expected."

Following the meeting the commissioners made it clear that the inquiry by Mr. Maltbie would in no way interfere with the hearings in the P. R. T. higher fare case. They indicated that they would be ready to go on with hearings relative to the advisability of continuing the "temporary" 8-cent fare order which they recently issued when the Superior Court hands down its decision on an appeal taken by the city.

The question of the valuation was reopened by the recent opinion of Attorney-General Woodruff, who held that a real valuation of the P. R. T. property did not exist. In that statement he quoted an opinion of the Supreme Court, which stated that "an indeterminate valuation" was not an effective or legal valuation. This opinion written recently by Attorney-General Woodruff to W. D. B. Ainey, chairman of the Pennsylvania Public Service Commission, stated that the commission might legally make an investigation which would enable it to determine whether the valuation of the Philadelphia Rapid Transit Company property was necessary and proper in connection with the pending 8-cent fare case. The opinion did not specifically direct the commission to begin the work of valuation, but it practically indicated that the work could be undertaken. The document was written in reply to three brief questions of law submitted by Commissioner Ainey on Oct. 27 and suggested by Governor Pinchot.

Court Instructs Kansas City Railways to Submit Bus Plan

Judge Stone of the federal court at Kansas City, Mo., on Nov. 18 adjourned to Dec. 2 the final hearing as to the installation of bus service by the receivers of the Kansas City Railways. The receivers were instructed to hear all interested parties, including the civic bodies, and to prepare a report for submission on Dec. 2 embodying recommendations as to routes, type of equipment and investment required for bus service. The receivers have announced public hearings at the railway headquarters each day until Nov. 25.

Various interests, including attorneys and others representing creditors, attended the hearing on Nov. 18. They agreed to the general proposition that the installation of bus service by the receivers was necessary to protect the property from competition. These interests, however, reserved final consent until the extent of the installation and the amount of receivers' funds that would be used could be definitely ascertained. Meanwhile a decision is expected from Judge Van Valkenburgh of the federal court responsive to a petition by the receivers for an injunction against Moore and others operating a bus line in alleged violation of ordinances of Kansas City, Mo.

On Nov. 17 Judge Stone definitely instructed Prof. Harry Earl Riggs to proceed with the valuation of the property. Attorneys and others interested were heard, but no objection was raised except a general one from the attorney for personal injury claimants. He said he was opposed to any proceeding that might tend to delay a final settlement with his clients.

Proposes Extension of Public Control

Chairman of the Boston Trustees Urges Ten Years More Under the Present Arrangement—Other Suggestions Offered at Meeting Include "Customer Ownership" and Restoration of Five-Cent Fare, with Public Taxed for Deficit

JAMES F. JACKSON, chairman board of public trustees of the Boston Elevated Railway, proposes an extension of the time of public control of that company. He is of the opinion that the property will never be turned back to the stockholders, but that it will go from public control to public ownership.

Many other suggestions were made by various speakers before the members of the special legislative recess committee at a hearing held during the week ended Nov. 15. Some speakers suggested "customer ownership," others that the equipment should be privately owned but the structure should be owned by the public; there were suggestions that the 5-cent fare should be restored and the public taxed for the deficit, and that there should be more economy in the use of tickets.

The legislative committee is required to report on Dec. 15 what additional legislation ought to be enacted next year regarding the Boston Elevated.

A statement of the imperative needs for capital expenditures to improve the service of the railway was recently submitted to the committee by the trustees. It covered the completion of general repair shops at Everett, improved facilities at carhouses in Medford, in Arlington, in Brookline, and at Lotus place and City Point in Boston, additional boiler equipment at South Boston to make available the full capacity of that plant, underground conduits required by law, purchase of additional cars, lengthening of platforms at elevated stations, track betterments and miscellaneous additional tools and appliances, all aggregating $24,500,000. It was said at that time this program of improvement ought to be inaugurated at once and completed within ten years. It was pointed out that they mean practical economies, elimination of waste and safer and better accommodation for the riding public.

In his plea Mr. Jackson said that each item in that statement has since been re-examined for the purpose of making it conservative to the last degree. That examination led him to believe that the aggregate outlay can be reduced from $24,000,000 to $20,000,000, to be expended from time to time for purposes named by the Legislature and specifically supervised by the Department of Public Utilities. Mr. Jackson said:

> As the state policy prohibits the issue of stock at less than par value and prohibits the issue of bonds in excess of outstanding capital stock with premiums paid upon it, the trustees are facing and have faced during the past year an impassable barrier to the proper performance of their official duty.
>
> They therefore presented the situation to the Legislature, assuming that the Commonwealth in undertaking a trial of public control must have had in mind a genuine and satisfying test of the ability of public management to accomplish better results than private management is likely to secure in the conduct of this metropolitan service. They believe that no such test is possible without available capital for the purposes which have been named.
>
> The public control act informs investors that at the end of the ten contract years or at any time thereafter the Legislature may end this lease and return the railway to the lessee. It makes it plain, too, that after the ten years have expired the Legislature only can terminate public control. They may feel very sure that public control will continue indefinitely, but they realize the fact that there is always the chance that this expectation may not be realized; uncertainty prevents investment. To meet the situation the trustees have suggested the advisability of determining at this time whether or not public control under this lease between the State and the company is to continue beyond 1928. In doing this they have refrained from expression of opinion as to what the decision upon this fundamental question should be, believing it a legislative question and one upon which they should not be heard. Certain questions, however, have been asked which I desire to answer.

Mr. Jackson further said he thought the trustees agreed that if the present experiment in public control is to be given a full test there should be legislation to extend the period of ten years named in the act with preservation of the right of the State to take over the property at any time, with appointment of trustees by the Governor for the same term of office, one member to go out of office every two years and to be ineligible for reappointment, and with generally the provisions for administration of affairs that are now found in the public control act.

He also said that the trustees agreed in the belief that this property will never be returned to stockholders; that any change from public control will be to full public ownership.

Bus Proposal Revived for Cleveland Railway

Legislation designed to have the Cleveland Railway establish three bus lines in Cleveland, Ohio, has been introduced into the Cleveland City Council by Councilman Fielder Sanders, former city street railway commissioner.

Under this legislation the Cleveland Railway would operate three lines, one from the extreme east end of the city to the Public Square and two other feeder lines in the suburbs. The type of bus used would be that of the Fifth Avenue double-deck variety. A 10-cent cash fare would be charged with 1-cent transfer charge from the buses to the street cars, and a 4-cent transfer charge from the street cars to the buses.

It is hardly likely that the Cleveland City Council will act on the legislation until the State Supreme Court has decided the question of whether the Ohio Public Utilities Commission or the Cleveland City Council has the right to grant bus franchises and regulate bus operation in Cleveland.

A decision from the State Utilities Commission on the application of the Cleveland Railway to run buses in Cleveland under the jurisdiction of the State Commission is expected soon. If this decision takes away the right of the Cleveland City Council to regulate buses in Cleveland, the case will be appealed to the State Supreme Court.

C. M. Ballou, City Street Railway Commissioner, has recommended bus operation in Cleveland as "feeder" lines to the main arteries of the Cleveland Railway. In his report to the Council Mr. Ballou said that it is hardly necessary to restate the principle that in any community such as Cleveland all local transportation should be operated under one management.

Officials of the Cleveland Railway have expressed their willingness to undertake bus operation or extensions of the company's present system if the City Council will devise some means of financing expansion by the company. Under the present service-at-cost grant the Cleveland Railway is not permitted to sell stock except at par to obtain new capital. The company's stock is quoted in the local market at about $86 a share, a price which would make it prohibitive for the company to finance a program of extensions or expansion.

The company has asked the City Council to allow it an additional 2 cents a car-mile for operation, so as to bring the allowance for operation up to 28 cents a car-mile. If the Council does this it will increase the company's operating allowances approximately $700,000 a year.

Municipal Subway Suggested

Mayor Hylan of New York City Makes More Promises—Transit Commission and Mayor Still at It

The Board of Transportation of New York City, of which John H. Delaney is chairman, hopes within a few weeks to have ready for public consideration plans for Mayor Hylan's project of an independent municipally owned and operated subway system. Announcement to this effect was made on Nov. 18.

An important feature of these plans is that the trunk line of the system in Manhattan leading to Washington Heights is to be under Sixth Avenue and not under Eighth Avenue, as the Transit Commission had decided.

In undertaking to drive this new subway under Sixth Avenue, it was said, the Board of Transportation has found it necessary to effect some arrangement with the Hudson-Manhattan Railroad, whose tubes run under that thoroughfare between Ninth and Thirty-third Streets. The arrangement, it is believed, provides either for the virtual forfeiture of the franchise of the Hudson tubes uptown extension of one mile and a quarter or, as is thought to be more probable, embodies a joint traffic agreement under which some compromise may be effected looking to utilization of the level now used by the Hudson tubes by the new municipal subway also.

State Transit Commissioner Harkness says that a separate municipally owned and operated subway system, such as Mayor Hylan proposes, would mean three systems instead of two as there are today, and instead of one as there should be. He says it would also mean a triple fare instead of a double fare as there is today and a single fare as there should be. Further, Mr. Harkness said:

> Yet Mayor Hylan attempts to pose as a champion of the 5-cent fare. What the city needs to catch up for Mayor Hylan's long delay in subway construction is to build new lines as rapidly as possible and to build them so as to use every existing agency of transportation to the utmost. Expressing it in another way, the Transit Commission's plan of combination and consolidation will get in terms of added service about $1.50 for every dollar spent while Mayor Hylan's plan for a new independent system will get about 50 cents for each dollar spent.

In this connection it is interesting to note that the Transit Commission has recently made public the following chronological table of the more important moves made by it looking toward action by the city to secure adequate transit relief:

Commission promulgates new subway routes	May 15, 1922
Adopts Brooklyn Crosstown Route	Aug. 30, 1922
Adopts first Central Park West Route	Oct. 3, 1922
Adopts Staten Island Tunnel Route	Oct. 3, 1922
Adopts St. Nicholas Avenue extension of first Central Park West Route	Oct. 6, 1922
Board of Estimate rejects Crosstown Route	Nov. 10, 1922
Board of Estimate rejects other three routes	Nov. 9, 1922
Commission adopts six routes comprising proposed Eighth Avenue-Amsterdam Avenue Line	Nov. 28, 1922
Board of Estimate rejects above six mentioned routes	Dec. 22. 1922
Commission resubmits altered Brooklyn Crosstown and Washington Heights Routes	May 15, 1923
Board of Estimate considers routes at public hearing, and joint conference committee of Commission and Board of Estimate authorized	June 2,1923
Joint conferences held	June and July, 1923
Main portions of Washington Heights and Brooklyn Crosstown Lines approved by Board of Estimate at special meeting	Aug. 3, 1923
Long Island City portion of Crosstown Line approved by Board of Estimate	Aug. 17, 1923
Transit Commission has engineers prepare subway plans, and joint conferences continue between Board and Commission	Aug. to Dec. 31, 1923
Chairman McAneny announces Board of Estimate and Commission substantially in full accord on Brooklyn Crosstown and Washington Heights Routes	Jan. 1, 1924
Work on plans, specifications and forms of contracts for new subways, continued by Transit Commission	Jan. to June, 1924
Board of Estimate takes definite stand rejecting all work of Transit Commission on Washington Heights and Brooklyn Crosstown Lines	June 7, 1924
All construction powers transferred to Board of Transportation	July 1, 1924

On Nov. 14 Chairman McAneny of the Transit Commission received from the secretary of the Board of Estimate a copy of the amended draft of the Mayor's "charges" against the Transit Commission, referred to in a resolution of the board adopted Oct. 24. It will be recalled that Mr. McAneny had warned the Mayor that he would be held accountable for libelous statements. In the revised version the amiable charge of homicide, which the Mayor first made against the members of the Transit Commission, and which, until challenged, he seemed quite willing to employ as a part of his political campaigning, has disappeared, along with other libelous things. The statements that remain relate almost wholly to subjects that are matters of record. The Transit Commission will now lay before the Governor, without expurgation, the complete record of what has occurred in its three years' effort to give the people of New York City transit relief.

While all this has been going on G. M. Dahl, chairman of the board of the Brooklyn-Manhattan Transit Company, has issued under his own name a volume of 117 pages entitled "Transit Truths." Mr. Dahl has taken for his text "Truth Is Mightier Than Abuse." Mr. Dahl has spread before the public the complete record of the attitude of his company with respect to transit matters. There is a 9-page index to make reference to any particular subject easy. There are maps and plates and ads. If any doubt still remains with any member of the public in regard to where Mr. Dahl's company stands it is due to the fact that the doubter either has not got a copy of the book or cannot understand a situation such as that with which Mr. Dahl deals even when the matter has been reduced to its simplest terms.

Electric Railway Exonerated for Chicago Grade Crossing Accident

Complete exoneration for the Chicago Surface Lines was contained in a coroner's jury report on the collision of a street car and a switch train recently in which 10 lives were lost. The case was made an issue in Chicago over the grade crossing peril and interlocking devices were studied by the jurors.

The accident occurred just after midnight of the night of Nov. 1, when the street car, heavily laden with passengers, was struck near an unlighted cut by a coal car at the end of a train of 55 cars pushed by two locomotives.

Inquiry revealed that safety gates across North Avenue were down when the street car stopped. A crippled switchman, later found to be of subnormal mentality, was on the job. When the gates went up several autos passed the car and proceeded across the track. These drivers saw nothing approaching on the railroad, and they recalled that the conductor of the street car had walked across the crossing, looked both ways and signaled the motorman to come on. Midway of the crossing and without any warning the train hit the car.

The jurors unreservedly censured officials of the Chicago, Milwaukee & St. Paul Railroad and ordered that three employees, a brakeman, the yardmaster and the assistant superintendent of terminals be held to the grand jury for manslaughter.

Former Governor Edward F. Dunne was one of the jurors and the others were Chief Justice Harry Olson of the Municipal Court, Henry Barrett Chamberlain, superintendent of the Chicago Crime Commission; County Clerk Robert M. Sweitzer, John Terborgh, vice-president of the Foreman National Bank and a capitalist, and Robert Eitel, proprietor of the Bismarck Hotel.

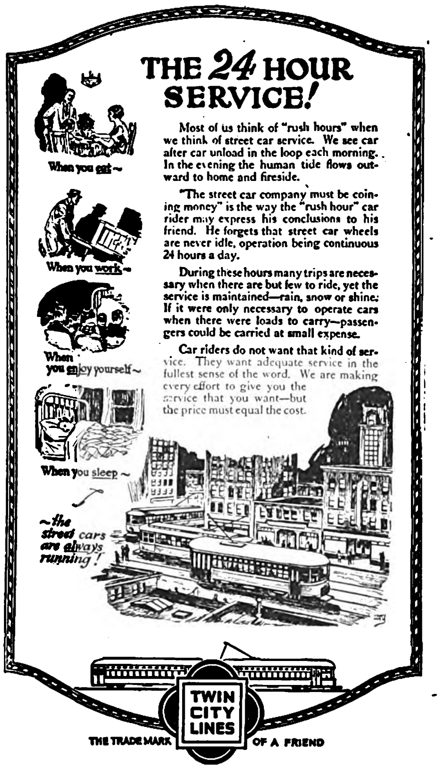
The verdict was rendered on Nov. 11.

Wage Fight in Dayton

Officials and employees of the Dayton Street Railway and the People's Railway of Dayton, Ohio, are in the midst of a wage tangle the present status of which is a deadlock by both sides maintaining their original positions. One of the companies in a bulletin issued recently announced that neither the financial condition nor economic conditions in general warranted an increase in wages; that with regard to the signing of a contract it refused as it always had to operate "a closed shop" but that it was willing at all times to discuss working conditions with its employees. The bulletin was in reply to the submission by the employees of a union agreement calling for "a closed shop" and asking for an increase in wages of 20 cents an hour or 36 per cent. The present scale is 55 cents. The men also sought time and a half for overtime. The advance if granted would mean an increase in the payroll of the Dayton Street Railway of more than $30,000 a year and the People's Railway of $90,000. Reports of strike votes were made, and the company officials stated that the aid of the city would be sought in running the cars. Messrs. Keyes and Powell, officials of the Dayton Street Railway and the People's Railway respectively, announced recently that there was no change in their attitude, that the increased wages could not be granted, but that they would meet with the representatives of the men.

Newspaper Campaign Active in Twin Cities

In addition to the card service on the cars the Twin City Rapid Transit Company is carrying on extensive advertising campaigns in the Twin Cities newspapers. The advertisements give some information on fares collected in various cities of the country and some important statistics on car riding in Minneapolis and St. Paul. Some historical facts on transportation progress in the Twin Cities are recorded. The company states that the passenger revenue has fallen off considerably and that a higher fare will be the result if service and equipment are to be maintained to the standard of the community served. In urging its patrons to ride the cars regularly the company promises a continuation of good management and co-operation.



THE 24 HOUR SERVICE!

Most of us think of "rush hours" when we think of street car service. We see car after car unload in the loop each morning. In the evening the human tide flows outward to home and fireside.

"The street car company must be coining money" is the way the "rush hour" car rider may express his conclusions to his friend. He forgets that street car wheels are never idle, operation being continuous 24 hours a day.

During these hours many trips are necessary when there are but few to ride, yet the service is maintained—rain, snow or shine. If it were only necessary to operate cars when there were loads to carry—passengers could be carried at small expense.

Car riders do not want that kind of service. They want adequate service in the fullest sense of the word. We are making every effort to give you the service that you want—but the price must equal the cost.

One of the Recent Minneapolis Ads

Boston & Maine to Run Buses

The Boston & Maine Railroad has definitely decided to go into the motor truck and passenger bus business. For that purpose it has organized the Boston & Maine Transportation Company with a capital stock of $100,000. James H. Hustis, president, has issued an explanatory statement.

There is no intention of running buses or trucks in competition with steam trains, but the company does believe there is a legitimate field for buses and trucks as an auxiliary to steam service on some of its lines and in place of steam service on other lines. A thorough study is being made of all branch lines of the Boston & Maine system. It is the opinion of the management that the results of this study will prove that on many lines buses and trucks can be used to the advantage both of the public and the railroad.

This activity on the part of the company was referred to in the ELECTRIC RAILWAY JOURNAL for Nov. 8, page 819. Included in the system of the Boston & Maine Railroad are several electric railway properties.

Nine-Cent Fare in Poughkeepsie

The Public Service Commission on Nov. 14 authorized the Poughkeepsie & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., to charge a 9-cent fare in each of its operating zones in Poughkeepsie and nearby territory until June 1, 1925. At that time the order may be reopened upon application for a review as to operating results of the company for 1924, including a six months' period under a 9-cent fare, and for whatever determination may then be deemed necessary. An 8-cent fare is now charged in all of the three operating zones. Under the application of the company decided on Nov. 14 it had asked for the right to charge a 10-cent fare. The fare increase becomes effective on one day's notice.

New Electric Line Projected in Indiana

A new electric railroad to cost $5,000,000 is planned for southern Indiana. This electric line will provide an important traffic connection between the Chicago, Milwaukee & St. Paul and the Southern Railway. It will be primarily a freight-handling road and will tap some of the coal and oil producing sections of southern Indiana and extend across the Ohio River to Kentucky.

It is reported that the road will have terminals at Owensboro, Ky., and Elnora, Ind. It will pass through Rockport, Midway, Tennyson, Montgomery and other places. At Elnora connection will be made with the Chicago, Milwaukee & St. Paul, while at Tennyson a similar connection will be made with the Southern Railway System.

The new project has been submitted to the Interstate Commerce Commission for approval.

In steam railroad circles in Chicago nothing tangible could be learned about the project. According to newspaper reports, the new road is to be financed by British capital. It is said that the project has been under consideration since 1915, but that due to the war and the high cost of materials immediately following the war, the actual construction was deferred until the present time.

No definite date has been set for construction work to start, although the necessary funds are said to be on deposit and the right-of-way options obtained through the various counties for the entire length of the road.

Illinois Central Contracts for Electric Power

A 10-year agreement has been made by the Illinois Central Railroad with the Commonwealth Edison Company for supplying electricity to the railroad within the Chicago terminal district. This contract provides for optional extension to 1947. Under the terms of the agreement, the Commonwealth Edison Company will deliver for traction purposes 1,500 volts d.c. at the railroad right-of-way. The supply is to be available to the railroad by the beginning of the summer of 1926. It will be used for the operation of the Illinois Central suburban service.

Electrification of the company's right-of-way will extend as far as Matteson on the main line and will also include the South Chicago and Blue Island branches. Under the terms of the agreement, the Commonwealth Edison Company will build, maintain and operate seven substations located along the right-of-way. The agreement also provides for the installation in these substations of control equipment for the automatic signal system of the company and also for providing electricity for lighting the small suburban stations and the new central terminal station. Further particulars of this arrangement will be published later.

E. W. Lloyd, general contract agent of the Commonwealth Edison Company, acted for the company in making the agreement. He said:

> The acquisition of this business by the Commonwealth Edison Company means a further step in super-power development in this area. This development, over a long period of years, which has made possible the selling of energy in large quantities to railways, means a marked advance toward the electrification of all railroad terminals.

End of Southern California Power Shortage in Sight

The normal California winter rainfall has set in unusually early. This breaks up an exceptionally prolonged drought. It is believed now that the power shortage, especially the shortage in hydro-electrically produced power, suffered in the State of California for the past five months will soon be eliminated. The Railroad Commission took charge on July 1 of the power shortage matter, instituting a vigorous electric power-saving campaign by ordering reduction of power consumption by all classes of users. Electric railway cars and industries generally are still curtailed approximately 20 per cent.

It is announced that the skip-stop system on the car lines in Los Angeles and other neighboring cities where local car lines are operated will be lifted and normal operation resumed Dec. 15. The Los Angeles Board of Public Utilities, in co-operation with the California State Railroad Commission, ordered the curtailment of service.

Mr. Blair Discusses Co-ordination at Chicago

Henry A. Blair, submitting to a cross-questioning by members of the City Council on his offer to co-ordinate the Chicago Surface Lines with the elevated lines and a city-built subway, said there is no hope for Western utilities to attract money for legitimate investment as long as certain states adhere to short-term franchises.

Mr. Blair was accompanied by Leonard A. Busby, president of the south side lines, which are part of the Surface Lines. He said that his company would not yield a dollar from the price set of $162,000,000, the capital account value. Mr. Blair said:

> Why, we put $70,000,000 into the lines in a six-year period and $106,000,000 in a ten-year period since the 1907 ordinance. That's more than we are asking you to pay.

Mr. Busby backed up Mr. Blair's co-ordination plan and said he had submitted a separate offer for a partial sale only to help the city to see the possibilities in case the co-ordination fails.

The Aldermen also have before them an ordinance providing for universal transfers between elevated and surface cars and for the establishment of a transportation board similar to New York's.

Bus Rights Sought in Toledo

A company headed by New York financial interests has applied to the Ohio Public Utilities Commission for permission to establish bus lines in Toledo. The incorporators of the new company, to be known as the Toledo Peoples Motor Bus Company, are: A. G. Gorley, R. W. Schumaker and J. L. Rhinock, New York, and John W. Winn, Jr., and George R. Effler, the two latter being associated with the law firm of Marshall & Fraser, Spitzer Building.

In its application the company specifies 12 different routes. The application names two types of buses to be used, one being of the double-deck type and the other single deck. The number of vehicles to be installed has not been announced.

City Law Director Dotson said:

> We will resist with all the facilities at our command the injection into the situation of bus competition.

President Ben Adams of the Toledo Traction, Light & Power Company said:

> The traction company handles 50,000,000 passengers a year. The only way we can continue to improve our system and expand and prepare for lower fares is to operate without competition.

The company plans to charge a 10-cent fare with universal transfer if it is permitted to operate.

Hearing Before I.C.C. on 112-Mile Line

A hearing was held on Nov. 5 at Augusta, Me., before Examiner Haskell C. Davis of the Interstate Commerce Commission and the Maine Public Utilities Commission on the application of the Quebec Extension Railway asking for a certificate of public convenience and necessity authorizing it to construct a new line of electric railway from a connection with the Aroostook Valley Railroad at Washburn, Me., to the west line of the State of Maine, in Aroostook County, a distance of 112 miles. The proposed new line will be situated entirely in the County of Aroostook and will connect with the Bangor & Aroostook Railroad at Portage and with the Quebec Central Railroad at the west boundary of the State.

Blame Fixed for International Railway Wreck

Responsibility has been fixed by the Interstate Commerce Commission for the rear-end collision between two three-car trains on the Buffalo-Niagara Falls high-speed line of the International Railway at Ellicott Creek crossing on Oct. 19, when four passengers were killed and many injured. The accident is ascribed as being due to lack of automatic block signals, absence of an adequate automatic train control device and failure of the motorman of the second train to maintain a proper lookout. These reasons are contained in the report of W. P. Borland, director of safety of the Interstate Commerce Commission, who investigated the accident in conjunction with inspectors of the New York State Public Service Commission.

The commission also criticised operating conditions on the Buffalo-Niagara Falls high-speed line with respect to the length of the intervals allowed between trains.

The report of the commission found no neglect on the part of members of the crew of the first train to send back flagmen to warn the second section that the first train was standing still near the bridge over Ellicott Creek.

According to the report of the commission, the motorman of the first section saw the onrushing second section nearing the rear end of his train. He started at once to run toward the head of his own train with the view of moving it out of the way, if possible. At the point of the accident the motors of the second train were turning over at the rate of 55 m.p.h. The commission found, however, the brakes had been set and were in good working order. The commission says the motorman of the second section had a clear view 1,500 ft. ahead, but did not attempt to bring his train to a stop until he reached the flagman 300 ft. behind the rear of the standing section. When he saw a collision was inevitable, he opened the door from the vestibule into the car and yelled to the passengers to move back into the train.

Phoenix Insists on Making Test Case of Paving Issue

The test case of the Phœnix Railway of Arizona against the revoking of its franchise by the city has been referred by the United States District Court back to the state court. Following passage of the ordinance last spring revoking the franchise, the test case was taken to the state court, but there the railway sought intervention of the U. S. Disrict Court, Judge Fred C. Jacobs of the district court has now decided it was not within the jurisdiction of that court, and remanded it back to the state court.

The revoking of the franchise came upon the initiation of Mayor Louis B. Whitney. It was charged by the city that the company had failed to live up to the conditions of its franchise, particularly with respect to carrying out paving work. The controversy was the subject of an editorial in the issue of the ELECTRIC RAILWAY JOURNAL for March 1, 1924.

Buses Compete with Railway in Hammond

Independent bus service was started on Nov. 2 in Hammond, Ind., by the recently organized Calumet Motor Coach Company. Sixteen Yellow buses of the street-car type operate over six routes paralleling the lines of the Hammond, Whiting & East Chicago Railway and the local bus routes of the Gary Street Railway. Both railways furnish interurban as well as local service. One connects with the Chicago Surface Lines and the other operates to Gary. It was to feed the interurban that the Gary Street Railway started bus service some time ago at the Hammond end of its line. These routes do not compete with the local service of the other railway.

Even with this seemingly adequate service for a city of 45,000, jitneys were permitted to operate very much as they pleased. After experiencing a year of this competition, the Hammond, Whiting & East Chicago Railway asked the Board of Public Works for permits to run 10 buses to supplement the railway. It also agreed to add 10 double-truck, one-man cars and otherwise improve service at a cost of $250,000. According to C. E. Lawrence, local manager of the railway, this proposal was not heard by the Board of Public Works.

Recently a bus franchise was issued to Harold Miner, formerly a chiropractic in Hammond. The granting of the franchise was followed quickly by the organization of the Calumet Motor Coach Company and the appearance of 25 new city-type buses. Sixteen of these are used for a regular schedule and are manned by trained, uniformed drivers, directed by a transportation supervisor. According to the local railway people, the source of the financial backing was not divulged at the hearings before the City Council.

Simultaneously with the granting of the bus franchise, the City Council passed an ordinance ruling the jitneys off the streets. Jitney men who operate as taxicabs with meters on their vehicles are being arrested.

After a week of experience under the new conditions it appears that the elimination of the jitneys may partially offset the new competition offered by the buses. During this past week the street cars carried more passengers than during a corresponding period before jitneys were removed.

Property Owners Protest Suggested Removal of Tracks

Voluntary protests have been lodged by property owners, merchants and about 200 individuals against the suggestion made some time ago by Mayor Hylan of New York regarding the likelihood of eventually removing street cars from both Forty-second Street and 125th Street, in which the Third Avenue Railway operates. S. W. Huff, president of the Third Avenue Railway, has also recently taken issue with the Mayor on the matter. Mr. Huff went into the general subject at considerable detail. In referring more specifically to the case of his own company Mr. Huff said that not only would it be impossible to substitute buses to carry the present trolley loads, but that anything like an approximate bus capacity to achieve that result would congest traffic in important thoroughfares immeasurably beyond any congestion that the city has yet known. On the 125th Street line alone 20,000 bus trips a day would be needed to carry the traffic. A similar situation would result on Forty-second Street, Mr. Huff said.

News Notes

Railway Man Helps Fill Community Chest.—In a Community Chest Campaign in Nashville, Tenn., closed on Nov. 3, to raise $225,000 for 30 welfare agencies the Nashville Railway & Light Company ranked highest as a single contributor. It donated $6,000 to the cause. Twenty-one departments of the company also ranked highest, giving 100 per cent for employee subscriptions. The campaign was under the direction of J. P. W. Brown, general superintendent of the company, who was publicity director and general chairman and to whom due credit should be given for its success. The $225,000 sought to be raised was oversubscribed to the amount of $17,580, with 32,360 subscribers. The company assisted in the campaign by advertising on each of its cars the need for the success of the campaign.

Helena Company Would Increase Fares. — Application of the Helena Light & Railway Company, Helena, Mont., for authority to increase the price of railway tickets from four for 25 cents to three for 25 cents and to charge 4 cents for school children's tickets instead of the present 3 cents, was heard on Nov. 6 by the State Public Service Commission. The commission also is asked by the company to annul the bonus provision in the company's city franchise.

Feeder Bus Lines Authorized.—Operation of feeder bus lines in the northern section of Indianapolis, Ind., by the Indianapolis Street Railway has been authorized by Mayor Lew Shank. Citizens of the district complained some weeks ago that they were not receiving adequate transportation facilities on the city lines after A. Smith Bowman, representing the People's Motor Coach Company, asked the Board of Park Commissioners for permission to operate bus lines on a preferred street in order to reach the district. Mayor Shank, however suggested at that time that the railway be given the privilege of operating feeder lines, which Robert I. Todd, president of the car company, said would be done. The buses will be purchased shortly.

In the Interest of Safety. — The Fourth Annual Foreman's School, which is a free course of lectures on industrial safety offered by the Massachusetts Safety Council, was started on Nov. 18 and will continue to Jan. 20 on each Tuesday evening at the Auditorium, 197 Clarendon Street, Boston. Edward Dana, general manager of the Boston Elevated Railway and a vice-president of the Massachusetts Safety Council, will act as chairman of the session scheduled for Dec. 2 and the speaker for that evening will be Cyrus S. Ching, director of personnel United States Rubber Company, New York. His subject will be "Organizing the Plant Safety Committees."

Applies for 10-Cent Fare.—The Oklahoma Railway, Oklahoma City, Okla., which secured an advance in fare from 7 to 8 cents about Oct. 1, will ask the Corporation Commission to grant a further raise of 2 cents, making the proposed rate 10 cents for cash fares, or three rides for 25 cents. John W. Shartel, president of the company, states that the 8-cent fare was followed by a further decline in traffic. The city cars carried 894,052 passengers in October, 34,000 fewer than were carried in August. September was not used in comparison for the reason that the Oklahoma State Fair traffic made the month abnormal. Mr. Shartel expresses the belief that the low point in the decline of traffic has been reached and that a 10-cent fare with three rides for 25 cents will add $8,000 a month to the company's income and be sufficient to save the situation. The 10-cent fare application was filed with the Corporation Commission in September following the bringing of a receivership action in the federal court by bondholders of the company. The 8-cent fare was granted by the commission in the hope that it would prove sufficient and that the application for 10 cents would not have to be pushed, but the company has found this hope of adequate relief futile. The company was authorized to install the $1.25 weekly pass.

Will Operate Buses. — The Tampa Electric Company, Tampa, Fla., is planning to put into effect as soon as present plans can be carried out an extension of the present car system by bus lines to suburban territory. P. O. Knight, president of the company, said that bus service would be started within a short time with six buses. The routes have not been decided on as yet, but the buses will run into the center of the city.

Prepares Rerouting Plan.—The Pittsburgh Railways, Pittsburgh, Pa., has prepared a plan of operating changes for rerouting cars to relieve congestion in the central business area. A preliminary step involves turning or short-looping certain of its lines at the outer edges of the downtown section through the use of its present track facilities. A final step embraces the entire preliminary step and involves short-looping of other lines, part of which require franchises from the city for the laying of tracks on certain thoroughfares which now contain no tracks, also "separation of grades," which suggests the construction and operation of an elevated loop structure on certain streets within the downtown business area. The company has submitted its complete general program to the traction conference board for its approval. Formal protest against the execution of the company's plan for rerouting cars in the downtown district was filed on Nov. 13 by the Retail Merchants' Association.

Foreign News

Earnings Up in Paris

Figures on street car and bus operation of the Paris Transports en Commun for the first six months of 1924 show the mileage greater than that of any other like period of their existence. The tramways operated 25,352,408 car-kilometers, an increase of 24,430 car-kilometers. This slight increase was due to motor bus competition. Motor buses covered 14,355,368 car-kilometers, an increase of 1,461,920 car-kilometers over the previous six months.

Receipts were 102,694,037 francs, an increase of 14,954,356 francs. Except for the fly-boats on the Seine, all operating receipts were satisfactory. These boats are to be discontinued during the winter months.

The number of passengers carried was 238,779,183, an increase of 15,505,750 over those of the previous six months. In spite of the increase in fares in the spring, passenger-kilometers increased 12 per cent.

Glasgow Seeks to Protect Its Tramcar Riders

A demand for a Court of Criminal Appeal in Scotland is being made by the residents of Glasgow. This need has arisen from the frequent violation of the Scottish law providing that no motorist may drive between a standing tramcar and the curb until the roadway is clear of passengers.

In a recent instance a motorist killed a woman leaving a tramcar and severely injured one boarding the car. When the case was tried the jury found the driver not guilty, despite the evidence. This and a number of similar accidents has created the demand for a court to which prosecutors can appeal in case of flagrant violation of the law and unjust verdicts.

In England motorists are allowed to pass tramcars receiving or discharging passengers, although many accidents occur from the lack of legislation prohibiting this practice.

Corsica Develops the Motor Bus

Motor bus services have been extended on the island of Corsica, near Nice, France, is the announcement made by the P. L. M. Railway. Practically every community on the island is now served either by rail or interconnected bus. Primarily intended to develop tourist travel in the Isle of Beauty, these bus services are supplying a real need to the scattered population, which has formerly traveled largely on muleback because of the present lack of any direct means of communication.

Three centers have been established for the head lines of the new service. From Ajaccio to Corte, via Piana, there is service once a week, the journey occupying two days. Another bus makes a once-a-week two-day circuit of Bavella and Bonafacio. From Bastia the trip to Cap Corse is made twice a week, to Orezza once a week and to Saint Florent twice a week. From Corte the Inzecca route runs once a week and a two-day journey once a week includes Corte, Piana and Ajaccio.

Corsica is probably the ideal motorbus touring ground of the world and service is being developed in an intensive way on this basis. It was tried last year as an experiment.

One-Man Express Bus Tried in Paris

The first of the express lines of motor buses in Paris began operation on Sept. 22 on the Passy-Bourse line.

Three stops are made near each terminus to allow passengers to enter and leave. The route of these express buses is somewhat shorter than that of the regular service and avoids the more crowded streets.

Fares are 1 franc for any distance. The passenger pays the driver on entering by the single front entrance, the fare being recorded on the ordinary type fare register. This one-man operation and the registering of fares is the first step in France toward putting fare collection on bus and street car services in line with similar operations in the United States.

The express service will not operate on Sundays or holidays.

Mulhouse, France, Tramway Company Increases Capital

An increase in capital of 1,500,000 francs has been granted the Société des Tramways de Mulhouse, Alsace, France, by the Council General of the Upper Rhine. The new issue is to be used for electrification of the steam road from Mulhouse to Wittenheim and the line is to be continued to Theodore, a mining village. The line from Mulhouse to Battenheim will also be electrified.

Edinburgh Corporation to Build Tramway Equipment

Six car bodies for the Edinburgh Corporation Tramways, Edinburgh, Scotland, are to be constructed in the municipal workshops of that city. This decision was made after receiving bids from manufacturers, the lowest received being £990 each, while the Corporation's estimate was only £750. It is stated that delivery will be much quicker.

Sarthe Tramway to Experiment with Gasoline Car.—A gasoline-propelled passenger car is about to be put into service by the Tramways de la Sarthe in Brittany, France, as an interurban feeder on the line between Grand-Luce and Saint Calais. The vehicle has a 40-hp. gasoline motor and carries 40 passengers, of whom 34 are seated. A trailer for baggage and package freight has a capacity of 7 tons.

London, England, to Experiment with Heating Tramcars.—The experimental fitting of five tramcars with heating apparatus, utilizing the heat from the motor resistances, is under consideration by the highways committee of London County Council. Owing to the mild winters and the large proportion of short-haul passengers few tramcars are equipped with heating apparatus.

Tunnel Under Mersey River Discussed.—Construction of a tunnel under the Mersey from Liverpool, England, to Birkenhead for vehicles and tramways is under consideration. The proposed tunnel would be about 2,400 yd. long and the estimated cost is £7,000,000. There is now a railway tunnel under the Mersey, but vehicles are taken across by ferries, which carry about 2,500 per day.

British Railway to Electrify Another Line.—Electrification of the steam line between Manchester, Oldham and Shaw, England, and a branch line to Royton, a distance of about 12 miles, will be begun at once by the London, Midland & Scottish Railway, according to an announcement made Nov. 4 by the directors. The third rail system is to be used and the cost, including various improvements and steel cars, is estimated at £600,000. This work is an extension of the electrification carried out by the Lancashire & Yorkshire Railway before the consolidation of the two companies.

Havana Car Men Strike.—A 24-hour strike of the platform men of the Havana Electric Railway, Light & Power Company, Havana, Cuba, was called Nov. 8 without warning to the public, as a protest against suspension of six employees charged with minor infraction of rules. Several of the union leaders were arrested, but were later released on bail.

Argentine Railway to Be Modernized.—The street car system of Rosario, Argentina, is to be extended and modernized. As the first step toward this end, the city engineer has issued specifications inviting bids on the work. These specifications, designated as Schedule No. E7210 Street Railways File No. 148834, are available at the Chicago and New York offices of the Bureau of Foreign and Domestic Commerce.

Modern Transportation Planned for Moscow.—Construction of a subway on the American plan, new tramways, the establishment of omnibus systems, taxicab lines and other improvements are being planned by the municipal authorities of Moscow, Russia. Loans to finance these projects are being sought in France, England and Germany.

New Cars in Service on Paris-Versailles Railway.—New motor cars have lately been put in service on the Paris-Versailles branch of the French State Railway. These differ in several important ways from the cars placed in service in 1921. Each car will have four 165-hp. motors, which will give a maximum speed of 70 km.p.h. (42 m.p.h.) The motors are also of a different type and certain changes have been made in their mounting.

Financial and Corporate

Suburban Holders Agree

Last Obstacle to the Reorganization of United Railways, St. Louis, Removed

One of the last obstacles to a complete reorganization of the United Railways, St. Louis, Mo., was removed on Nov. 17 by the announcement that representatives of holders of $6,500,000 of St. Louis & Suburban bonds had agreed to the terms of the reorganization committee for refinancing the railway system. The plan accepted provides for a technical segregation of the suburban property, but for its operation by the same management as the remainder of the United Railways as part of the general city-wide system. The idea behind this arrangement is that if in the future it becomes necessary through default of principal or interest on the bonds foreclosure may be attained with a minimum of legal procedure. The contract will also pro rate the share of the light and power contracts and franchise rights of the companies.

Provision is also made for the immediate payment of the $2,000,000 of Suburban consolidated bonds with interest at 8 per cent from Oct. 1, 1923, the date of default. The general 5 per cent bonds, totaling $4,500,000, will be exchanged for new bonds extended to July 1, 1934, with a sinking fund arrangement that will retire $100,000 of such bonds at par annually until 1934. This is the same maturity date as the issue of $30,300,000 United Railways general 4s and indicates that the reorganizers plan to refinance both issues at the same time. Interest for one year at 5 per cent will also be paid on the Suburban general bonds. In the event that the United Railways desires to retire more than $100,000 of the Suburban bonds in any one year it is to pay more than par for them.

Under the refinancing plan as now agreed upon reorganizers will pay off $4,100,000 of underlying bonds, $2,000,000 of Suburban bonds and $4,200,000 of receiver's certificates. The issue of $9,790,000 of St. Louis Transit Company bonds will be retired at the rate of $300 cash and 5½ shares of new preferred stock for each $1,000 bond, with the privilege of purchasing 10 shares of new common stock at $12.50 a share for each bond.

There will be 53,845 shares of preferred and 352,645 shares of common stock in the reorganized company. Holders of 163,830 shares of the present preferred stock may purchase 1½ shares of new common stock at $12.50 a share for each share of preferred now held. If all exercise this privilege this will bring $4,438,000 cash to the new company.

Such common stock as is not taken by the Transit Company bondholders or preferred stockholders may be purchased by the holders of the present common stock, of which the North American Company owns approximately 72 per cent.

Under this plan the bonded indebtedness of the company would be reduced to $34,800,000, but a new issue of $8,000,000 will bring it to $42,800,000. The company will ask the Missouri Public Service Commission for the privilege of earning 7 per cent on a valuation of $57,200,000 already fixed by that commission.

Four-Mile Line in New York Bankrupt

The Port Jervis Traction Company, operating between Port Jervis and the town of Deerpark, Orange County, N. Y., filed a voluntary petition in bankruptcy on Nov. 17 in the United States District Court. It was stated on behalf of the railway that the indebtedness was $165,419 and the assets $19,033.

Judge Henry W. Goddard appointed Harry T. Crist, Port Jervis, receiver under a $3,000 bond. The company also asked that its bus business be adjudged bankrupt, stating its liabilities amounted to $8,824 and its assets to $4,045.

According to its petition, the company operates on its surface car route 3.985 miles in a community of 10,171 people. Samuel M. Cuddeback, attorney for the company, recorded as one of its big items of indebtedness $70,000 of 5 per cent first mortgage bonds, held by the Orange County Public Service Company, Inc., Middletown, N. Y., with interest unpaid up to Oct. 1 of the current year, amounting to $27,527.

Other items listed as debts include State taxes of $213; taxes to the city of Port Jervis for 1921, $398, and for the current year, $374; county taxes, $3,224, and the Bank of Port Jervis, with an unsecured claim of $8,000.

Some of the assets are real estate, $10,000; receivable accounts, $3,208; vehicles, $5,100, and deposits of $725. Secured claims amount to $97,527 and unsecured claims $62,984.

October Operations in Toledo Show Deficit

While showing a slight improvement over September, operations of the Community Traction Company, Toledo, Ohio, during October this year proved to be far under the similar month a year ago. Commissioner E. L. Graumlich reported a net loss of $27,268, bringing the total deficit to the stabilizing fund to $550,753, including the original $400,000 in the fund. Actual operating expenses were met in October and about half the bond interest and dividends on preferred stock earned.

Increase in passenger revenue over September was $24,373. Operating charges for the month totaled $224,722, including $15,000 set aside for extraordinary maintenance. Last year the operating expense in October was $251,883.

During October 3,831,612 revenue passengers were carried compared with 5,178,069 for October a year ago. September this year showed only 114,383 revenue passengers a day were carried.

Business has continued to pick up for the first half of November with an increase in revenue of $4,500 as compared with a similar period of last month.

Successful Year in 1923

Capital Traction Closes Unusually Active Year with Substantial Increase in Balance

The credit balance of the Capital Traction Company, Washington, D. C., at the close of 1923 was $1,524,240, an increase of $169,673 over the credit balance at the end of the preceding year. More than ordinary activities during 1923 included the taking over of the Kensington Railway, the extension of tracks over the Key Bridge, the installation of bus lines and the large amount of work done on repair, maintenance and construction.

The report states that the increased use of automobiles in and about Washington is still affecting the railway. The average daily number of passengers carried during 1923 was 188,090, which represented a loss of 3.15 per cent over the preceding year. The loss in traffic resulted in a corresponding reduction in revenue. Operating expenses decreased $39,025 despite the fact that much money was utilized in the installation of bus service.

In February, 1923, bus service was substituted for operation on Con-

SUMMARY OF OPERATIONS OF CAPITAL TRACTION COMPANY YEAR ENDED DEC. 31

		1923	1922
Passenger revenue, railway...		$4,797,909	$4,966,341
Bus revenue....................		21,411	....
Special car revenue..........		106	20
Total revenue from transportation.................		4,819,426	4,966,361
Revenue from operation other than transportation........		23,192	27,682
Railway operating revenue.		4,842,619	4,994,044
Operating expenses (64.117 per cent gross revenue).....		3,128,186	3,167,211
Net operating revenue.....		1,714,432	1,826,832
Taxes assignable to railway operation.................		409,031	436,093
Operating income..........		1,305,400	1,390,739
Non-operating income........		34,725	34,906
Gross income..............		$1,340,126	$1,425,645
Deductions from gross income:			
Interest on funded debt...........	$280,300		
Interest on unfunded debt....	22,950		
Miscellaneous rents	1,317		
Rent for leased roads..........	12,832		
Miscellaneous debits..........	4,372		
Total deductions..........		321,773	320,655
Net income...............		$1,018,352	$1,104,992

PROFIT AND LOSS STATEMENT

Credits:			
Balance at beginning of year	$1,354,567		
Net income for year.........	1,018,352		
		2,372,919	
Debits:			
Dividends......	840,000		
Excess cost of reconstructing Kensington Railway tracks	8,669		
Miscellaneous...	10		
		848,679	
Credit balance at close of year..................		$1,524,239	$1,354,567

SUMMARY OF OPERATIONS PER REVENUE PASSENGER IN CENTS

	1923	1922
Passenger revenue	7.02	7.01
Other revenue	.08	.08
Gross revenue	7.10	7.09
Operating expenses	4.56	4.47
Taxes	.59	.61
Interest and other deductions	.47	.45
Operating expenses, taxes, interest, and other deductions	5.62	5.53
Net income	1.48	1.56

SUMMARY OF OPERATIONS PER CAR-MILE IN CENTS

	1923	1922
Passenger revenue	49.55	52.00
Other revenue	.59	.65
Gross revenue	50.14	52.65
Operating expenses	32.16	33.16
Taxes	4.20	4.56
Interest and other deductions	3.31	3.36
Net income	10.47	11.57

REVENUE AND TRANSFER PASSENGERS

Number of passengers carried:	1923	1922
At 8 cents	16,562,845	15,303,295
At 7 cents	....	9,263,546
At 6¼ cents	50,791,651	45,025,583
At 5 cents	923,001	972,779
At 3 cents	304,206	321,724
Number of cash passengers carried on Kensington line	27,555	....
Number of ticket passengers carried on Kensington line.	43,612	....
Total revenue passengers.	68,652,870	70,886,927
Other passengers:		
1-cent intercompany transfer passengers	2,803,125	2,636,136
2-cent bus to car transfer passengers	126,295	1,009
2-cent car to bus transfer passengers	94,814	
2-cent Eastern High School tickets	3,057	
Free car to bus transfer passengers	179,563	202
Capital Traction Company free transfer passengers	17,368,473	18,182,305
Other free passengers:		
Employees	844,715	883,835
Policemen and firemen	*76,403	*82,496
Total passengers	90,149,315	92,672,910

*Exclusive of policemen and firemen riding free while in uniform.

necticut Avenue, on May 17 a bus line was established at Fourteenth and Kennedy Streets and on Aug. 1 the operation of a bus line from Eleventh Street was put under way. Again on Dec. 1 a bus line was established from Seventeenth Street and Pennsylvania Avenue. Eight buses were purchased at a total cost of $56,876. On the subject of bus operation the company states that the operation of these lines must, for the time being at least, result in some loss financially, but the company believes it is essential to establish the policy that all urban transportation should be furnished by the existing street railway companies wherever the need for it is positively shown. The additional transportation can be furnished much cheaper, for the present at least, by buses than electric lines on account of the high cost of conduit track construction.

FUNDED DEBT UNCHANGED

There has been no change in the company's funded debt. Of the total authorized issue of $6,000,000 first mortgage 5 per cent bonds maturing in 1947, $200,000 are held in the treasury and $194,000 have been repurchased and are held in the fire insurance reserve. Capital expenditures for the year amounted to $392,380. No change has been made in the method of accruing depreciation for several years past. The total amount accrued was $424,060. Charges against the reserve were $178,245, leaving a net accrual of $245,815. The balance in reserve on Dec. 31 was $1,665,474, of which $806,000 was invested in United States securities, $48,571 deposited in interest-bearing accounts and $810,902 advanced for capital expenditures. Tax accruals for 1923 were $439,031.

The three-year contract covering wages and working conditions which expired on March 30 was renewed for another three-year period through direct negotiations without the necessity of arbitration. In the history of the Employees' Relief Association, the year 1923 was the most prosperous. After charging off expenditures for sick and death benefits and all other expenditures the year's operation showed a net profit.

The accompanying tables show the year's operation *in toto* and per car-mile and some passenger statistics.

Terms of Holyoke Power House Sale Announced

The stockholders of the Holyoke Street Railway, Holyoke, Mass., meeting there on Nov. 18, ratified the action of the board of directors of the company in arranging for the sale of the railway power plant to the Turners Falls Power Company.

By the terms of the agreement the railway will receive $400,000 for the plant, but will agree to take power from the power company for a period beginning Jan. 1, 1926, and extending to Dec. 31, 1945. It is agreed, however, that the power company can begin to furnish power to the railway prior to the date mentioned if equipped to furnish such service. The power company has already made connections with railway lines at various points, except in Holyoke.

At the base rate of 0.018 cent per kilowatt-hour the minimum payment by the railway for power would be $117,000.

Jitney Competition Hurtful in Atlanta

For the fourth consecutive month the receipts of the railway department of the Georgia Railway & Power Company, Atlanta, Ga., have shown heavy losses as compared with the figures for 1923, the loss for October amounting to $41,269. This is the largest decrease in revenues of any month this year with the exception of September, which showed a loss of $47,000.

With $38,779 for July on the wrong side of the ledger and $35,904 for August, revenues of the railway department for the past four months are now $162,954 under those for the similar period in 1923.

It will be recalled that the railway failed by more than $565,000 in 1922 and by more than $589,000 in 1923 to earn the amount set by the State Public Service Commission as a fair return on the commission's minimum valuation of the property. This year it will fail by a much greater amount to yield a fair return.

In view of these conditions the company has again called attention to the petition before the City Council asking that steps be taken to put the railway on a self-sustaining basis. The company says that the figures for the past four months should be convincing proof of the statements contained in the petition and made by officials at the public hearings last January that unless relief is given it will be impossible to continue the railway service. The losses are considered to be due largely to unfair jitney competition.

Date of Conspectus Announced.—The Conspectus of Indexes prepared by Albert S. Richey will be published in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 29.

Railway Buys Bus Line.—The Jamestown-Dunkirk Transit Company, which operates several buses between Jamestown and Dunkirk, has been sold to the Buffalo & Erie Railway, Buffalo, N. Y., according to advices of George MacLeod, general manager of the transit company. It is planned to operate the bus line in conjunction with the railway company.

Service Discontinued.—Service on the South Side loop of the Jamestown Street Railway, Jamestown, N. Y., has been discontinued. The territory is now served by a bus line, except during the rush hour, when the trolley cars will run. The South Side trolley line was built many years ago and is one of the lines on which horse cars were first used. The line was electrified about 1890.

Passenger Revenue Increases.—For the ten-month period ended Oct. 31, 1924, the Philadelphia Rapid Transit Company, Philadelphia, Pa., had a net income of $1,709,590 against $1,705,163 for a similar ten-month period ended Oct. 31, last year. The number of passengers carried showed a falling off, being 755,724,687 in 1924 and 758,262,226 in 1923. The passenger revenue, however, increased. It was $36,494,359 for the ten months of 1923 and $36,659,484 for the period of January through October, 1924.

Makes Offer to Sell Toronto Line.—The York Township Council has received an offer from Sir Henry Thornton, head of the Canadian National Railway, to sell on behalf of that system the section of the Toronto Suburban Railway lying between the city limits and Weston. The price is given as $15,000. Sir Henry's suggestion also included bettering transportation conditions in the district. Prices mentioned were $25,000 for the portion of the radial within the Weston town limits and $15,000 for the southern end running through Mount Dennis into the township. A point in the offer was that the municipalities were not obliged to take over any of the present rolling stock of the radial line. It was stated that the Toronto Transportation Commission was willing to assume operation of the line provided satisfactory financial arrangements were made.

Net Income Increases.—For the four-month period ended Oct. 31, 1924, the Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., and its affiliated companies had a total operating revenue of $14,360,028 against $13,020,657 for a similar period of last year. The expenses showed an increase from $8,645,726 for the four-month period ended Oct. 31 of last year to $9,424,390 for the four months of the current year. The net income advanced from $1,184,168 for the four-month period ended Oct. 31, 1923, to $1,681,863 for the similar four months of the current year.

Operating Ratio 75 per Cent.—The report of the Madison Railways, Madison, Wis., for the year up to Aug. 31, shows total revenues at $411,679, while operating expenses, not including interest or depreciation charges, were $311,352, or a little more than 75 per cent of the total amount taken in. The number of revenue passengers carried during the year decreased 190,000 over the two preceding years. These facts were contained in a recent audit made by the Railroad Commission. The company some weeks ago announced a comprehensive program of replacements and extensions to its system.

Deficit Increased.—For the nine-month period ended Sept. 30, 1924, the International Railway, Buffalo, N. Y., reported an operating income of $7,741,174 against $8,065,828 for the similar nine months in 1921. The operation and taxes showed a falling off, being $7,062,555 in 1921 and $7,043,486 in 1924. The gross income fell off from $1,033,769 in 1921 to $736,435 in 1924. After the consideration of income deductions the nine-month period of 1924 showed a deficit of $353,963 against a deficit in 1921 of $91,209. The company states that because of the strike in 1922 and its effect on the revenue and operating costs of the year 1923 the calendar year 1921 is used for comparative purposes.

Holdings Transferred. — The stockholdings of the Barnsdall Corporation of New York, which controlled the Moncton Tramways, Electric & Gas Company, Moncton, N. B., Canada, have been transferred to the Stevens & Wood interests of New York. Reference to the Canadian undertaking changing hands was made in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 4, 1924. About 2.5 miles of electric railway in Moncton are involved. The Barnsdall Corporation disposed of its interests for approximately $500,000. This stock was carried on the company's balance sheet at $105,780.

Changes Hands. — The Wellsburg, Bethany & Washington Railway, Wellsburg, W. Va., has recently changed hands and plans have already been laid by the new owners, the Buffalo Valley Collieries Company, to extend the line to Washington, Pa. For many years there has been discussion about this extension. The leasing of the line was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 23, 1924.

New Manhattan Railway Directors.—At the annual meeting of stockholders of the Manhattan Railway, New York, on Nov. 12, James F. Hughes, William Dean Embree and John Nordhouse were elected to fill vacancies on the board of directors. The Manhattan Railway owns 140 miles of elevated railway leased by the Interborough Rapid Transit Company.

Personal Items

A. J. Manson Advanced

Well-Known Westinghouse Official Is Made Manager of Company's Heavy Traction Division

A. J. Manson, manager of the transportation division of the New York office of the Westinghouse Electric & Manufacturing Company for the past four years, has been promoted to manager of the heavy traction division of the railway department with headquarters at East Pittsburgh.

Mr. Manson is considered one of America's foremost authorities on railroad electrification. He joined the Westinghuose company through its engineering apprenticeship course about nineteen years ago. Just before that he was graduated as an electrical engineer from the Massachusetts Institute of Technology.

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A. J. Manson

His long service with the Westinghouse company has included every branch, from construction to sales. As a result Mr. Manson has been connected with the work of solving nearly all of the important electric transportation problems in the eastern part of the United States. They include helping to build and test the first New Haven locomotive; being assigned to the electrification work of the New York, New Haven & Hartford Railroad in the spring of 1907 and aiding in the inauguration of electric service; instructing steam engineers in their duties as electric enginemen, and qualifying the early ones for electric service, and being associated with the preliminary test conducted by the Pennsylvania Railroad on Long Island prior to the decision as to the system to be used in the Pennsylvania tunnels entering New York City.

Another accomplishment of Mr. Manson was assisting F. H. Shepard, director of heavy traction of the Westinghouse company, in connection with the Pennsylvania-New York tunnel electrification. This installation included power house, substations and locomotives. Mr. Manson is well known throughout the electrical and railway world through his book "Railroad Electrification."

R. L. Peterman in Charge of Spartanburg Property

R. L. Peterman has assumed charge of the local utilities at Spartanburg, S. C., recently bought up by W. S. Barstow & Company. Mr. Peterman entered the utility field at Charleston, in the electric light division of the utilities company. He later went to Binghamton, N. Y., with the Binghamton Light, Heat & Power Company, another Barstow property, as general manager, succeeding Robert N. Hodgson. At one time Mr. Peterman was superintendent of the Pennsylvania Utilities Company.

As vice-president and general manager of the South Carolina Gas & Electric Company in Spartanburg Mr. Peterman has the problem of restoring railway service, which has been abandoned on practically all lines for the past few years. One of his first steps on assuming charge of the Spartanburg property was to petition the City Council for permission to operate bus lines in conjunction with the railway lines. In addition to his duties in Spartanburg Mr. Peterman also has charge of the Columbia Railway, Gas & Electric Company, another recently purchased Barstow property.

G. E. Emmons Retires from General Electric

George E. Emmons has asked to be relieved of his duties as vice-president of the General Electric Company in charge of manufacturing. Mr. Emmons is a pioneer in the electrical industry. He has been actively engaged in the management and development of the production department of the General Electric for nearly thirty years. During his administration the Schenectady plant attained its present immense proportions, and he has also been instrumental in the development of the company's plants in other places. He began his electrical work with the old Thomson-Houston Company in 1886. When that organization was merged with the General Electric Company he was retained on the staff.

In 1895 he was made general manager of the plant at Schenectady and in 1916 was elected to the office of vice-president. Two years ago Mr. Emmons was decorated by the Japanese government in recognition of his services in introducing electrical machinery into Japan and of his contributions to the development of the electrical industry in that country.

In commenting on his resignation Gerard Swope, president of the company, said:

> Mr. Emmons has served the company loyally, whole-heartedly and indefatigably

for almost forty years. He has met his arduous responsibilities not only with outstanding ability, but in a manner which has won and held the respect and affection of workers in all grades of service throughout the organization.

Willis A. Lovejoy New Superintendent of Maine Property

Willis A. Lovejoy has succeeded Sterling T. Dow as superintendent of the York Utilities Company, operating between Sanford and Biddeford and from Town House to Kennebunkport and Cape Porpoise, Me. Mr. Dow, whose resignation was referred to recently in the ELECTRIC RAILWAY JOURNAL, has accepted a similar position in Portland. His successor was elected at a meeting of the board of directors on Oct. 29, but the promotion did not become effective until Nov. 1. Mr. Lovejoy has been associated with the Maine property, formerly the Atlantic Shore Line, for twelve years. He was first employed as shop foreman at Dover, N. H., when the Dover and Portsmouth branch was in operation, and later as master mechanic at Town House. Mr. Lovejoy originally went to the Atlantic Shore Line from Lewiston, where he was in charge of the carhouse of the old Lewiston, Brunswick & Bath Railroad.

George Hanscomb, for many years connected with the York Utilities Company, both in the operating and executive departments, was chosen assistant superintendent.

E. L. McCulloch, who was assistant to C. D. S. Johnson, president of the old Denver & Laramie Railroad and the Seeing Denver Electric Railway Company, and who piloted the canvass of Rice Means until he was elected United States Senator in the November election, has been appointed secretary to Colonel Means. Mr. McCulloch is a former newspaper man.

Carl Bacon, for the past four years chief electrical engineer of the Olean, Bradford & Salamanca Railway, with headquarters at Olean, N. Y., has resigned. He will become connected with the Texas Company, New York.

H. G. Butler would seem to be nearing the end of his duties as state power supervisor in California. The emergency during which he has been serving has about passed. With the impending finish of the necessity for power saving, much praise is to be extended for the qualities of firmness, tact, consideration and quiet efficiency shown by Mr. Butler. The State Railroad Commission had full jurisdiction over the power-saving campaign, and that body selected him for the position of state power supervisor principally due to the skill he displayed in similar executive work during war-time conservation. In the work now drawing to a close Mr. Butler has, more or less, occupied a buffer position between the public utilities, including the electric railways, and consumers, and he has performed the near miracle of apparently satisfying all parties and bringing about civic teamwork. Under a less competent hand, confusion might easily have resulted. Mr. Butler is a consulting engineer in private practice in San Francisco.

Mr. Butler Named Senator

Electric Railway President Appointed by Governor to Succeed the Late Mr. Lodge of Massachusetts

William M. Butler, president of the Boston & Worcester Street Railway, Framingham, Mass., and the Boston & Worcester Electric Companies, was appointed on Nov. 13 by Governor Cox of Massachusetts to fill until the next general State election in 1926 the seat in the United States Senate left vacant by the death of Henry Cabot Lodge. Mr. Butler led Calvin Coolidge's pre-convention campaign for the Presidential nomination and was chairman of the Republican national committee in the recent election. He will continue in that capacity.

From the eighth floor suite of offices at 77 Franklin Street, Boston, Mr. Butler has long kept a watchful eye on the operations of his several textile properties, an electric railway and the political horizon. Visitors concerned with one or another of these fields of activity come and go in a constant stream. Like the late Senator Crane and like the silent man of the White House, Mr. Butler is a doer rather than a talker. By his own efforts he has made a fortune in the textile industry, controlling some of the best properties in New England, and has found time to take an effective part in politics, state and national. for many years. He has a vigorous physique, is alert of mind and is endowed with charm of personality.

A year ago, before Mr. Butler threw himself into the Coolidge campaign, it was said of him that politics was his hobby, his recreation. It was said that he loved the game, but that he was merely a fan. However, he proved himself to be an adept at the game when he took it upon himself to participate as a player.

Mr. Butler is a minister's son. His father, James D. Butler, was formerly a sea captain of New Bedford, and later was ordained a clergyman in the Methodist Episcopal Church. His mother was Eliza B. Place. William was born in New Bedford on Jan. 29, 1861. He received his education there, and before deciding to make law his life profession, worked as a bookkeeper. Then he attended Boston University, graduating with his law degree in 1884, and setting up an office in New Bedford. He got his first taste of politics by being elected to the New Bedford City Council and to the State Legislature. But he was Councilman, Representative, Senator, and then he quit being a candidate for office and became a manager. It was then that Senator Crane took charge of his destiny.

Mr. Butler moved to Boston and his law practice expanded. He acquired interests in various business concerns, chiefly textile interests and the Boston & Worcester Street Railway. He kept in touch with legislation and took up politics as his hobby. When Crane was in Washington Mr. Butler was his spokesman in Massachusetts.

Besides being president of the Boston & Worcester Street Railway, Mr. Butler is head of the Butler Mill, Hoosac Cotton Mills, New Bedford Cotton Mills Corporation, and Quissett Mill. He has been a trustee of Boston University and a member of a half dozen exclusive clubs.

In urging the appointment of Mr. Butler to public office the Boston *News Bureau* paid him this fine compliment:

> Nobody is better equipped, nobody has shown higher talent, to uphold the Coolidge program than William M. Butler. He may not want the task. Private business is calling for his attention, as it is calling for the attention of many valuable members of the Cabinet. But is it not a duty for them all to sacrifice still further personal considerations and plant the United States solidly on world reconstruction with reduction of government interference and reduction of taxation?
>
> Is not one of the keynotes of this situation the appointment of William M. Butler by Mr. Cox to uphold the hands of the administration and the policies of President Coolidge? And is it not the duty of Mr. Butler to accept?

Obituary

Martin F. Delahanty died suddenly on Oct. 23 at his home in Buffalo, following a stroke the day before. He had been connected with the International Railway, Buffalo, for 27 years in various capacities. At the time of his death Mr. Delahanty was foreman of the electrical department.

E. A. Gregory, district sales manager of the American Brake Shoe & Foundry Company, New York, with headquarters and residence at Houston, Tex., died on Nov. 1 in New York, following a severe illness and operation. Mr. Gregory was a most lovable character and a general favorite with a large number of friends, acquaintances and railroad officials, particularly in territory comprising the States of Louisiana, Mississippi, Texas, Arkansas and Oklahoma. He was born in Nashville, Tenn., on March 22, 1877, and took up railroad work in 1900 with the Nashville, Chattanooga & St. Louis Railway. In 1903 he was appointed foreman of terminals of the Louisville & Nashville Railway at Nashville, Tenn., which position he held until he entered the employ of the American Brake Shoe & Foundry Company on Jan. 15, 1909. On March 1, 1923, he was appointed district manager of the company, with headquarters at Houston.

Frederick Alfred Boutelle, a pioneer in the electric railway industry, died on Nov. 4 at the home of his daughter in Portland, Me. He was identified with transportation companies on the Atlantic coast, the Pacific coast and in the central states for more than 45 years. At the age of 18 years, he entered the employ of the Delaware & Hudson Canal Company in the capacity of telegrapher. Some years later he was promoted to chief dispatcher. He continued in this position until 1901, when he resigned to become general superintendent of the Hudson Valley Electric Railway, Glens Falls, N. Y. In 1902 he became superintendent of transportation of the Columbus, Buckeye Lake & Newark Traction Company and the Columbus, Newark & Zanesville Electric Railway. In 1905 he resigned this position to become general superintendent of the Tacoma Railway & Power Company and the Puget Sound Electric Railway at Tacoma, Wash. He held this position until he retired in 1913. Mr. Boutelle was 73 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Electrification Progressing in Europe

Roads Are Planning to Handle Greater Traffic and Already Have in Use Over 3,000,000 Hp. of Locomotives

Marked activity in electrification all over Continental Europe was observed by Frank H. Shepard, director of heavy traction of the Westinghouse Electric & Manufacturing Company, who returned to New York last week after a month's trip to France, Italy, Spain, Switzerland, Czechoslovakia, Germany, Holland and England. In an interview with representatives of this paper he said that the work of electrification on the Continent is in full swing. Plans are being made for the future, so that the railroads can handle greatly increased traffic.

Installations in progress or already in operation on the railways in Norway, Sweden, Germany, Austria, Switzerland and Italy, using alternating-current trolley systems, single-phase or three-phase, now have in use or on order locomotives totaling some 2,500,000 hp. In France, England, Spain and Holland, where the direct-current systems are used, some 600,000 hp. of locomotives are built or building.

While in the past American manufacturers have supplied considerable electrification material for European roads, Mr. Shepard is of the opinion that in future the nationalist movements in the leading European countries will result in the production locally of more and more of their equipment. This movement has even gone so far as to affect the decision for electrification systems, particularly in France, where direct current was adopted in part to prevent interchangeability with Germany, which uses the single-phase system.

AMERICAN EXPERIENCE STILL NEEDED

Mr. Shepard felt that despite the movement for patronizing home industries, American engineering experience and the leading position of this country in the electrical industry will make the assistance of our manufacturers essential, so that they may expect to participate in European electrification work for a long time to come. Of course, he said, we must bear in mind that foreign countries have gone much further than America in electrification work, having three to four times as many miles operated in this manner, although the United States has over half the world's railroad mileage.

What is needed here, he said, is that the railroads get away from the present plan of going along day by day, which has come as a result of over-regulation and adverse legislation, and adopt a broad policy looking toward the future. Greater stability in the political situation should bring this nearer than it has been. Electrification should then be considered not as a means of replacing steam but of giving a service impossible with present operating methods.

$8,250,000 for New Equipment

The Illinois Central Railroad on Nov. 19 awarded contracts for $8,250,000 of new equipment. This includes 130 motor cars to be built by the Pullman Car & Manufacturing Company and 85 trailers by the Standard Steel Car Company. The contract for the entire electric control equipment was awarded to the General Electric Company. The motor order was divided between the General Electric Company and the Westinghouse Electric & Manufacturing Company, each company to furnish 50 per cent. Deliveries of cars and electric equipment shall start March 1, 1926, and shall be completed by July 1, 1926. Except for the electric equipment these cars will be similar to the 45 purchased during the last three years, which are now hauled by steam engines. The motor cars will carry pantographs and will be arranged for multiple-unit control from either motor or trail car.

Brooklyn Car Order Placed

Final decision has been reached by the Brooklyn City Railroad, Brooklyn, N. Y., concerning the placing of its order for 335 double-truck four-motor cars. Of these 150 will be built by the J. G. Brill Company, the trucks being built by Brill; 100 by the St. Louis Car Company and 85 by the Osgood-Bradley Car Company. Motors for the entire complement will be supplied by the Westinghouse Electric & Manufacturing Company. Westinghouse Air Brake Company will furnish the air brakes. Some details of the other equipment of the cars remain to be settled and announcement concerning them probably will be made in the near future.

Metal, Coal and Material Prices

Metals—New York	Nov. 18, 1924
Copper, electrolytic, cents per lb	13.938
Copper wire base, cents per lb	16.25
Lead, cents per lb	8.65
Zinc, cents per lb	7.25
Tin, Straits, cents per lb	54.75
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	2.05
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.375
Central, Ill., screenings, Chicago, net tons	1.275
Kansas screenings, Kansas City, net tons	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.65
Weatherproof wire base, N. Y., cents per lb.	18.25
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal	$1.13
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.152
Turpentine (bbl. lots), N. Y., per gal	0.85

Local Firm Favored for Detroit Bus Bid

Following a hearing on Nov. 14 before the Detroit City Council in committee, it was decided to award a contract for 50 double-deck buses for the Department of Street Railways to the Standard Motor Truck Company, a local concern. The Street Railway Commission had previously recommended that the bid of the Yellow Coach Company, Chicago, be accepted, although that concern's bid was $11,250 a bus and the Standard Company's bid was $9,500. Final action has not yet been taken. Even after the contract is awarded the Council can reconsider its action any time within several days.

Ross Schram, general manager, suggested that if it was desired to encourage the bus building industry in Detroit, the Council should reject the bids now under consideration and re-advertise so as to purchase 25 buses of known quality from the Chicago firm and distribute contracts for 25 among the Detroit manufacturers. He suggested that the commission be permitted to provide new specifications.

It was pointed out by the commission that Yellow Coach buses were wanted by the Street Railway Department in extending its transportation service because those buses met all the requirements specified by D.S.R. engineers and were manufactured by a concern which has put out hundreds of buses similar to those desired for use in Detroit, while the Standard company has made only single-deck buses.

Mr. Schram also questioned the assumption that the Standard's bid was the lowest. He cited that the bid was on a type of bus that differed in five or six important details from that of the other company.

A tentative agreement has been reached by the D.S.R. under which the department may rent single-deck buses from Dodge Brothers, Inc., for suburban use with the understanding that the rental paid may be applied on the ultimate purchase price if the city decides to buy the buses. The D.S.R. has been given authority to advertise for open bids on such a rental project.

Glasgow Corporation Rejects American Bid

The Glasgow Corporation turned down on Nov. 13 the recommendation of the tramway committee to place a contract for special trackwork with the United States Steel Products Company. Its offer was £7,850, or £800 less than the lowest British offer, which the corporation decided to accept. The vote of the corporation was 73 against acceptance to 17 in favor.

In making his motion that the work be given to the lowest British bidder, Counselor Walker said that the American company refused to recognize the elementary right of workmen of combining to protect their interests and that the Americans were throwing their goods in England at lower prices than they charged in the home market so as to destroy any revival of trade in Britain.

Car Order Delayed

Grand Rapids Railway Intends to Conduct Test of Vehicles Supplied by Three Manufacturers

Louis J. DeLamarter, vice-president and general manager of the Grand Rapids Railway, has announced he has secured the co-operation of three of the leading car builders in the country for a comprehensive test on the lines of his company of three types of street car which will embody the latest ideas in car construction.

Cars will be entered in the competition by the Light Weight Noiseless Electric Street Car Company, Minneapolis; the St. Louis Car Company, St. Louis, Mo., and the J. G. Brill Company, Philadelphia. These cars are to be light-weight, double-truck, single-end type, arranged for both one-man and two-man operation. Definite details of the cars in the contest have not been settled. It is expected the cars will be delivered to the railway about Feb. 1, 1925. They will be operated through the winter, given the severest tests possible and a decision reached in the early spring by the railway with respect to the award of a large order for new cars.

The average weight of the cars to be replaced is about 47,000 lb. The new cars will weigh about 24,000 lb., but will have the same seating capacity as the cars it is intended they shall replace. They will be 36 ft. 8 in. long, equipped with double folding front and rear doors. The roof will be of the plain arched type and will be made of Haskelite. The interiors will be finished in mahogany.

One or more of the cars will be equipped with Mead cushion wheels, a new departure in street car construction. This wheel has a steel tire with rubber core, designed to eliminate any shock. Another feature is to be a brake band which will operate on large brake drums attached directly to the axles, the same as on automobiles. In order to install the band brake it has been necessary to redesign the truck to make it inside hung and not outside as at present. An adjustment device is to be so arranged that any slack in the brakes may be quickly taken up from time to time. One of the cars doubtless will be equipped with hydraulic brakes. Four 25-hp. motors will be installed on each car.

There are to be emergency door openings at the rear, but the operator will be prevented from starting the car until the emergency door has been closed. The cars are also to be equipped with an outside control valve to permit a street man to open the rear door from the outside, collect fares, let passengers on and otherwise speed up car loading. In addition to the air brake the cars will be equipped with a Peacock staffless hand brake for emergency use.

The windows will be made to be raised instead of being lowered into a slot. Footrests are to be designed for just the proper height and reach for restful posture. The seats will be extra wide. The seats and backs will be spring filled and made of rattan. One of the cars will have plain floors and another will have mosaic rubber tiling. Electric heaters will be used. There will also be a new and improved design of wheel guard and fender.

Air-operated track scrapers will facilitate the work of keeping the right-of-way open after heavy snowfalls. The latest approved safety car electric lighting fixtures will adorn the new cars. For the local service it was considered advisable to adopt the folding step to which the riding public is accustomed. Large illuminated destination and routing signs will be used, the destination sign on the upper part of the vestibule, the route sign on the dash. All the car trimmings will be in bronze, polished and lacquered.

A new feature of at least one of the cars will be the observation end. The rear vestibule will be provided with seats all around, giving an unobstructed view of both sides of the street.

During the test period the cars will be painted different colors to distinguish them and make it easy for the public to give each a trial.

Rolling Stock

Indiana Service Corporation, Fort Wayne, Ind., is in the market for the purchase of 15 new light-weight interurban cars.

Detroit United Railway, Detroit, Mich., has placed an order with the G. C. Kuhlman Car Company for the construction of 10 new light-weight interurban cars which will be similar in design to the last group of cars built by the Kuhlman company for the Detroit United.

Portsmouth Public Service Company, Portsmouth, Ohio, is changing over six light-weight double-truck cars for one-man operation. These cars will be equipped with Safety Car Devices Company equipment and will have the exit at the rear. They will be similar to the three new cars now being built for this company by the Cincinnati Car Company.

Track and Line

Community Traction Company, Toledo, Ohio, is doing temporary repair work on Cherry and Summit Streets. It is planned to renew the track next summer.

South Carolina Gas & Electric Company, Spartanburg, S. C., is repairing street paving between its tracks on East Main Street and Morgan Square. Tracks are being reconditioned and new copper bonds to hold the rail sections are being put in place. This work is preparatory to resumption of railway operation by the new management.

Key System Transit Company, Oakland, Cal., has opened the new extension of the Piedmont electric train line into Piedmont, to serve that city and give through service to San Francisco. The extension into Piedmont runs from the old terminal at Piedmont Avenue and Fortieth Street over the present street car tracks to Manor station, and then over a new right-of-way and new tracks to Oakland Avenue. The extension cost $65,000. The Key System company has also begun work on two other projects in its program of track replacement and extension. The first was started on West Twelfth Street between Wood and Market Streets, Oakland. This involves the reconstruction of the tracks and the laying of permanent pavements. The estimated cost is $103,000. The second project covers double tracking of the Lakeshore Avenue line on Walla Vista Avenue from the end of the present double trackage system at Lakeshore Avenue to a point about 1,700 ft. beyond.

Trade Notes

Armin Elmendorf, who during the war was in charge of the plywood section of the Forest Products laboratory at Madison, Wis., has rejoined the engineering staff of the Haskelite Manufacturing Corporation, Chicago, Ill. Mr. Elmendorf has been in Europe for the past two years investigating the electric railway, bus and commercial body fields. During his stay there he collected a great deal of interesting data on car construction. Mr. Elmendorf reports that the one-piece Haskelite roof has proved satisfactory on the street cars of London and that at the present time there are more than 2,000 buses on the streets of London using Haskelite.

T. R. Langan, manager of the transportation division of the Westinghouse Electric & Manufacturing Company at Buffalo, N. Y., will succeed A. J. Manson as manager of the transportation division of the New York office of the Westinghouse Electric & Manufacturing Company. As noted elsewhere in this issue Mr. Manson has been made manager of the heavy traction division of the company with offices in Pittsburgh.

Howard J. Whittman, Toledo, Ohio, has been appointed district representative of the Kuhlman Electric Company of Bay City, Mich. Mr. Whittman will have northwestern Ohio as his territory.

Westinghouse Air Brake Company, Wilmerding, Pa., automotive division, has announced the opening of a new automotive air brake sales and service branch at Detroit in the General Motors Building, with C. D. LeFevre in charge. Mr. LeFevre is well known in the automotive industry, having served for several years as assistant secretary of the Society of Automotive Engineers. A little more than two years ago he became Eastern manager of manufacturers' sales for the Westinghouse Union Battery Company and was later made special factory representative. He was graduated from Cornell as a mechanical engineer in 1911.

New Advertising Literature

J. G. Brill Company, Philadelphia, Pa., has issued Bulletin No. 280, describing its 27-M. C. B. truck.

Crouse-Hinds Company, Syracuse, N. Y., has issued folder No. 20, entitled Safety Switch Condulets (tumbler type).

New York, Saturday, November 29, 1924

Electric Railway Journal

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Number 22

Separate Accounts Desirable for Combined Utilities

A TENDENCY has been in evidence in some quarters for railway men to rejoice in the fact that their particular companies were financially associated with and under the same general management as electric light and power companies. The reason for taking satisfaction in this arrangement was the idea that the electric light company would probably make a big profit and could make good whatever losses the railway might incur. A safeguard of this kind may have merit in the eyes of those engaged in marketing the railway securities. It is generally admitted, however, that such a combination, where the profitable department carries the unprofitable one, is unsound as an economic proposition. Aside from that fact, there are also practical difficulties which are sometimes overlooked.

It is very difficult to imbue the employees of a railway associated with a lighting company with the idea that they must unceasingly try for efficient operation. Their attitude seems to be that the electric company will foot the bill and they need not worry. In numerous cases combined railway and electric companies are more careless and slipshod in their methods than are the railways which must depend exclusively on their own resources.

Where a combination of utilities exists under one management, best results come with separate books for the individual services. Not only is this advisable for executive purposes, but the individual figures are available for use in advising both the employees and the public of the earnings status of each utility.

Depreciation Is Real and Must Be Recognized

THE brief on the subject of depreciation submitted some time ago in behalf of the steam railroads in their case before the Interstate Commerce Commission shows a studied effort to prepare an argument to avoid setting up depreciation funds. This was made on purely legal grounds without giving sufficient weight to engineering facts. The argument is that the average American trunk line is so large and so diversified that any depreciation that may have accrued is balanced by new construction. In other words, they claim the net result is that there is no depreciation. This does not square with the position taken by the American Electric Railway Association that a reserve for depreciation should be set up.

As a matter of fact, depreciation is something that does exist. A locomotive that has seen service for 30 years cannot be as good as ever, regardless of the quality of repair work done on it. Maybe it will function well enough to haul trains, but it is not the machine that it was when purchased. No amount of repair, be it ever so good, will suffice to put it in that condition.

Then there is the question of adequacy. This is so closely bound up with depreciation that it is difficult to separate the two. There comes a time when it no longer pays to patch up the old machine, because there is available on the market something that will do the work so much better that it is folly to spend the money necessary to keep the old machine in working order. The old machine may be "in 100 per cent condition" today, as the steam road brief argues, but actually it is a 100 per cent machine as of 30 years ago.

It naturally is impossible to determine with mathematical accuracy the date on which a certain piece of apparatus will reach the point where it will fail to do the work and must be replaced. Any allowance to cover such reduction in value as will accrue from the action of time, wear and the elements must be made very roughly approximate. Certainly it is possible to show examples of equipment that, through careful repair, have been able to give service over a long period of years. On the other hand, other equipment will wear out very quickly, or will be involved in accidents which will shorten its life materially. To get at the proper accruals for depreciation is quite similar to the calculation of life insurance rates. The amount to be set aside for the individual element is taken from the average of a large number of such units. Enough information is available to enable an accountant to determine the proper accruals for depreciation of the average car, locomotive or piece of track.

On a large property the amount of new construction may offset the amount of depreciation, but unless the cost of the new work is charged to operation rather than to capital it does not cancel the depreciation.

What the "Automobile Guest" Does to the Electric Railway

THE New Orleans *Times Picayune*, in a recent issue, disagrees with an electric railway statement that automobile drivers are too generous when they invite neighbors to accompany them to and from town and thereby deprive the railway of customers. This newspaper declares that the host in this case would not extend such an invitation unless he expected to gain by it—the usual motive being companionship for the ride—and that it would be an economic waste for such an automobile owner to use a car suitable to carry five or more persons for the transportation of but one. Hence, both driver and guest benefit.

No one will deny that the automobile owner is within his rights when he invites his neighbor to ride with him. Unfortunately it is also a fact that an electric railway in a community cannot continue to give good service unless it receives sufficient patronage. Possibly the existence of such a line in their community is a matter of indifference to the automobile owner and guests in question. But the continuance of trolley service for the remainder of the community is of real concern to them. Without it they would find the business of their town, including their own, stagnated. Their servants and the tradesmen and workmen who serve them would not be able to reach their places of employment. The great bulk of the buyers would not be able to get back and forth to the stores. So it is true that even the man who provides his own transportation has good reason to avoid a practice which, if multiplied enough times in a community, will impair continuance of the public transportation system.

Another point raised in the editorial mentioned is the economic waste of operating a large automobile for the transportation of one person only. This point is well taken, but if the automobile owner accepts this view, there is hope he will soon realize that it is almost as much an economic waste to operate his automobile for the conveyance of two or three persons, and that in most circumstances he and his friends will save money (and often time) by riding in the trolley rather than in a private car. This has not always been the case in the past, but with more stringent parking regulations it will become more true in the future. The private automobile has its important place in the daily life of the American family, but usually its place is not that of a vehicle to take the owner to and from his daily work.

Pruning Off the Dead Branches Has Strengthened the Tree

BETWEEN 1917 and the end of 1923 service was suspended on more than 400 miles of electric railway track in Massachusetts, mostly in the eastern part of the state. Since the beginning of 1924 there have been additional, but less extensive, abandonments. No public transportation of any kind is furnished over some of the abandoned routes, but in most cases buses are now running where cars formerly were operated. The opinion is held among electric railway men in this territory, however, that the replacement of rail lines by bus lines has gone about as far as it is likely to go.

Suspension of service on these many miles of track was the natural outcome of an unduly optimistic program of railway building a generation ago. This fever ran even higher in Massachusetts than it did elsewhere. Instead of being content with the construction of one rail line between important points, promoters built two and three. As a result the service and traffic were divided. Other lines were built through such sparsely settled territories that they were never profitable. The advent of the passenger automobile which retarded the natural growth of railway traffic, and the era of high costs prevailing since the war, made the operation of these routes a heavy burden.

Now, however, most of the unprofitable lines which duplicated the service supplied on other routes, or which ran through "no man's land," have been lopped off. This pruning process has undoubtedly strengthened the railway systems, and the lines that remain are now on a sound basis. In the main, they are earning a fair return and it appears unlikely that any considerable additional mileage will be abandoned or replaced with buses in this state.

That is not to say, however, that bus transportation in this territory has reached the limit of its development. Buses are being used more and more on feeder and cross-route lines and to furnish express service. An example of the latter is the Boston and Lowell route operated by the Eastern Massachusetts Street Railway. The Boston & Worcester Street Railway is considering the establishment of a similar service between those cities. The Boston Elevated Railway is already operating a number of feeder bus lines and is considering others. In New Bedford the Union Street Railway operates buses through districts not served by its cars. Further developments of this kind may be expected, even though the railways continue to operate cars, on most of the present track.

The New Standard of Comparison Sets Requirements Higher for Public Vehicles

AT A RECENT sectional association convention a master mechanic described in detail how the operating and mechanical departments on his road co-operated so that the attention of maintenance men would be directed to rattling sash or squeaking bodies on the buses operated by the railway. He elaborated on the importance of eliminating such squeaks and rattles from the standpoint of pleasing the patrons of the line.

Now this master mechanic was undoubtedly right. He knew from experience what an annoyance a squeak or rattle in a private automobile produces. It was the sales value of quiet operation that stimulated the development of the passenger automobile from an extremely noisy vehicle to its present almost noiseless operation. This development took place in the face of severe inherent difficulties. The sales value of quietness, however, furnished the necessary stimulus to carry out the improvement in the face of the difficulties. The master mechanic appreciated the sales value of quietness in his buses because of their direct outgrowth from the automobile, because he and his passengers apply the standards of automobile comfort in judging the comfort of his buses.

But how many railway men are fully aware that railway passengers are also judging the comfort of a railway ride by automobile standards? No wonder we hear much these days of "the rubber urge" and "the desire to ride on rubber." That desire is largely a desire to ride quietly. Although operation on steel rails imbedded in concrete presents many complications from the standpoint of quiet operation, surely an application of the painstaking care described by this master mechanic in connection with the maintenance of buses would also produce improved conditions on railway cars. Tight sash and the elimination of body and truck squeaks and rattles would make the average electric railway car a more pleasant and desirable vehicle in which to ride.

It is entirely a matter of viewpoint. It is easy to appreciate the importance of quiet operation of a bus. The same sales value also attaches to the same factor in railway cars. Surely more careful attention to these squeaks and rattles would work a substantial improvement, pending further development of body and truck construction with a view toward quiet operation.

Buses Amplify Transportation in Decatur, Ill.

Unified Car-Bus System Gives Transportation Service to Illinois City of 45,000—Fifteen Modern Buses Supplement Street Cars with Free Transfer Privileges—Transfer House in Center of Business District Is Starting Point for All Cars and Buses

SINCE the inauguration of bus operation in Decatur on Aug. 1, 1924, by the Illinois Power & Light Corporation, this city of 45,000 population has had a unified and co-ordinated transportation system. All parts of the city are served at a single fare and free transfers are issued between cars and buses. For a short distance from the center of the city cars and buses operate over the same street, but the routes soon diverge. A number of the bus routes serve sections of the city not conveniently provided with railway facilities, while others supplement the service in districts already reached by the street cars.

The history of the transportation situation in Decatur is not unlike that of a number of other cities where the public has underestimated the value to it of the street railway and has allowed competition to run riot. Since 1920 independent bus operation has developed with great rapidity on a 5-cent fare, while the railway fare was 6 cents or 9 tickets for 50 cents. The city administration has endeavored to make political capital of the difference in fare. The buses prospered, and while they did not operate entirely on the same streets as the railway, the effect of the added transportation service was felt by the company.

After these conditions had continued for three years the railway undertook an extensive investigation of the entire transportation problem in Decatur. A consulting engineer was called in and he submitted a report to the management and to the City Council. Among the suggestions embodied in his report was one to the effect that the railway should operate buses as auxiliaries and feeders.

Following out this suggestion the railway procured from the Illinois Commerce Commission a certificate of convenience and necessity for operating buses. This was done with the definite understanding that the competitive lines would be purchased before operation was started. Negotiations between the railway and the independent bus operators resulted in the latter obtaining fair prices, considering the depreciated value of the equipment and an additional amount for good will. The railway management believes that legal action to end the competition would have been unpopular with the people of the city, as would have been the inauguration of competitive bus service.

The new equipment purchased consisted of 10 Model Z 29-passenger Yellow Coach Company's buses and 5 Mack 25-passenger buses. These vehicles represent an expenditure of $120,000. They are painted according to the company's standard color scheme of yellow and orange. The seal of the railway appears on the letterboard. In the interior no hand straps have been provided, although it is customary at times to carry standees. Fare collection is accomplished by means of a Woods farebox.

A number of the former independent operators have been taken into the employ of the railway. These men were carefully trained in the operation of the new equipment and with a few exceptions have proved satisfactory. The remaining bus drivers were secured from outside except two men who transferred from the car service. The uniform worn by the bus drivers is made of Oxford gray whipcord with breeches and leather leggings.

All bus and car routes start from the transfer house in the central square. This terminal serves as a hub for the co-ordinated transportation system and is a convenient place for transfer between bus and car. Six the transfer house. Loading points are designated by signs and the police department keeps this area free from parked automobiles.

Bus lines intersect the street car lines only in the center of the city and transfers are issued between the two only at the transfer house, as the bus routing is such that transfers at other points are not needed. All bus routes are comparatively short, the longest being that to Nelson Park, a distance of 2.72 miles. The present arrangement of bus and car routes is shown in the accompanying map. The total route mileage of the buses is 11.44. The base schedule calls for 10 buses and the running time is 10 m.p.h., as compared with a schedule speed of 8 m.p.h. under independent operation. All routes with the exception of the Nelson Park line operate over paved streets. This line is operated over a gravel road from the city limits to the park, but as the road is in fair condition, the buses experience no difficulty. Nelson Park is an attraction on Saturday evenings and Sundays. The base schedule, which is normally handled by one bus covering the route every 30 minutes, is augmented by five additional vehicles during the peak periods on Saturday afternoons and Sundays. Often a bus is called upon to carry as many as 65 passengers to or from the park. While such heavy traffic might be handled more economically by street cars, the overloading is of short duration, and the normal traffic during the week is handled easily by one 29-passenger bus.

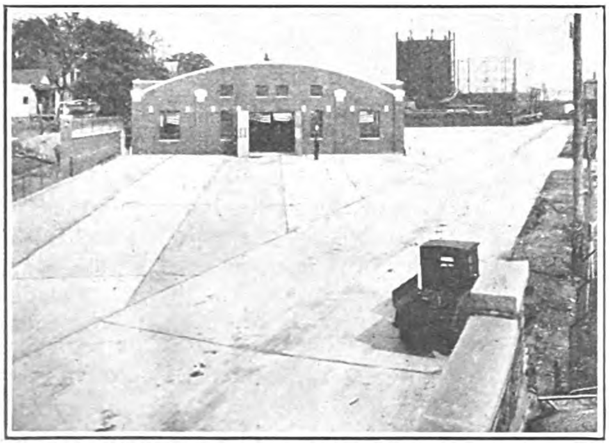
and running time are shown in the accompanying table.

The street car system consists of a total of 15.75 miles of route covered by 25 cars the majority of which are single-truck safety cars. Headways vary from 10 to 20 minutes. Most of the lines are single track with turnouts.

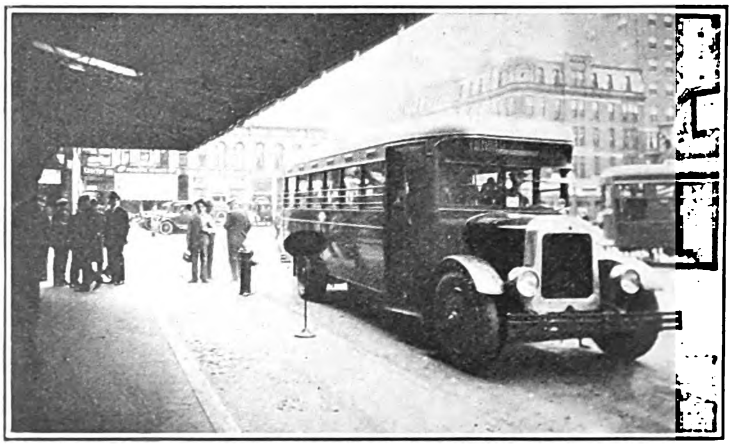
During the first month the buses operated by the railway carried an average of 9,000 passengers per day, a notable increase over the average number carried by the former independent operators. In the opinion of the management this increase was due to the more comfortable and attractive vehicles operated and to the co-ordinated service. At the same time the street cars also showed an increase in the number of passengers carried.

No.	Name	Round Trip Miles	Base Vehicles	Round Trip Time, Minutes	Scheduled Headway, Minutes
1	Franklin..........	2.23	1	15	15
2	East Main..........	2.42	2	20	10
3	Nelson Park.......	5.44	1	30	30
4	North Jasper......	3.73	2	24	12
5	North Monroe.....	4.62	2	30	15
6	West Decatur......	3.44	2	20	10

To give the new service a favorable start full-page advertisements announcing the plan were published in the local newspapers. Later advertisements were used to announce the actual beginning of bus operation and to familiarize the people with the routes and the rates of fare. While the present fare of 6 cents cash or 9 tickets for 50 cents is a slight increase over the



The Storage Space Outside the Garage Is Equal in Area to that Inside



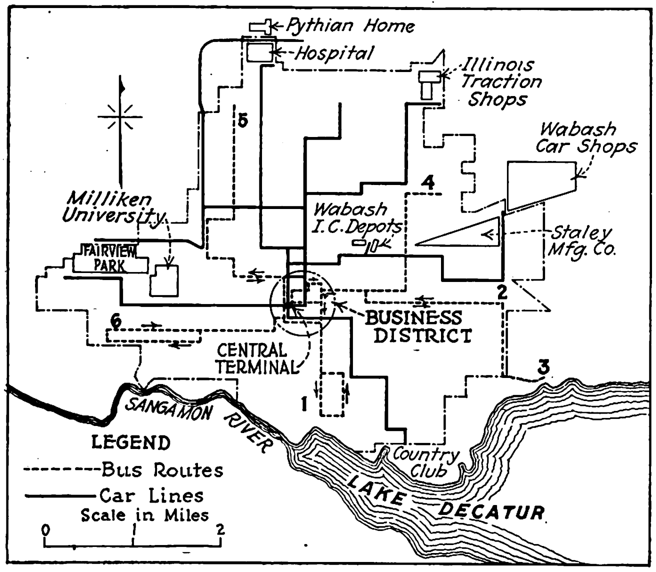
Loading Spaces Have Been Provided by the City at Various Points Along the Curb at the Central Square

5-cent fare formerly charged, no complaints have been received.

A new garage costing $60,000 was built for the buses on property adjacent to the railway carhouse. This building is 200 ft. long and 80 ft. wide and is so situated that entrance can be had through a door at the south end, while egress from the building is by nine double swinging doors on the east side. The garage has been located upon a triangular piece of property in such a way that it has been possible to pave the remainder of the land, thus affording a large amount of outside storage space. In order to make a convenient approach to the property, 300 ft. of street was paved and at the same time one-half of the width of the street on the east side of the property was paved to afford an exit. Property owners along this street paid for the paving for the other half.

Red brick with white limestone trimmings was used for the building. A single span arch roof is carried on steel trusses spaced at 20-ft. centers. The curve of the roof has been carried out in the construction of the end wall, giving the building a pleasing appearance. The east wall consists of the nine double doors already mentioned. On the west, 60 per cent of the wall space is taken by windows with small panes set in steel frames.

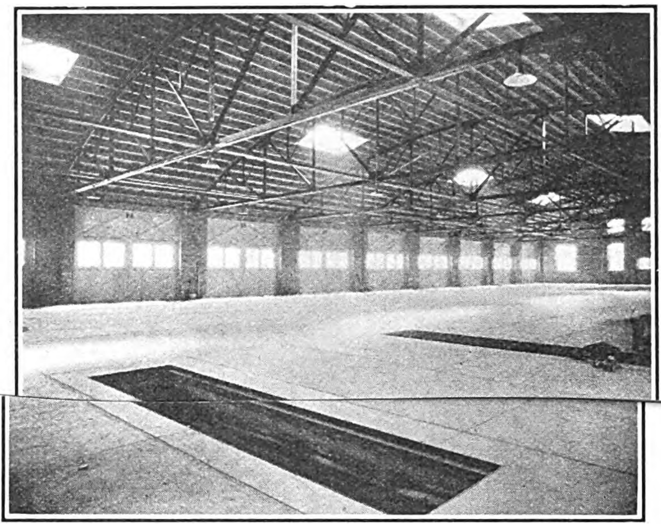
The interior of the garage is open for almost its entire length. The last bay at the north end is occupied by an office, stockroom, locker room and toilet. Fuel for the buses is stored in two 1,000-gal. tanks buried outside the building. The washrack is immediately inside of the entrance door at the south end. This rack drains into a trough 14 in. wide and 12 in. deep, covered with steel grating and connected with the sewer. Swivel pipe connections and hose and washing utensils are mounted on two of the overhead trusses.



Routes of the Co-ordinated Bus and Car Service in Decatur
1—Franklin; 2—East Main; 3—Nelson Park; 4—North Jasper; 5—North Monroe; 6—West Decatur.

Two inspection pits 3 ft. 4 in. wide x 4 ft. 3 in. deep and 18 ft. long are located near the north end of the building. These are covered with removable gratings made up in sections 1 ft. long. Near these pits are located the work benches, test racks and battery charging outfits. No machine tools are in the garage because the railway machine shop is adjacent. The garage is heated by hot air forced over steam pipes and delivered through ducts at a pressure of about 5 in. of water. Inasmuch as the garage will be used mostly at night, ample illumination has been provided by means of three 100-watt shaded lamps on each roof truss. A similar shaded lamp is mounted above each doorway outside the building.

The plan is to have the buses fueled outside, washed immediately after entering the building and then stored in a double row, starting at the north end and facing toward the side with the doors. With this arrangement it is possible to accommodate conveniently 30 buses and an equal number can be parked outside. When the buses pull out in the morning no backing or turning will be necessary inside the garage, but the vehicles can move straight ahead through the double doors. In an emergency all doors can be opened and the buses pushed out by hand, this being possible because there is a slight grade to the land surrounding the building. The doorways and roof trusses have a clearance of 14 ft. 6 in., which is sufficient to permit the passage of a double-deck bus.



Interior of the Garage at Decatur, Showing the Inspection Pits

Detroit Car Cards

THE following are copies of car cards or bulletins used by the Department of Street Railways in Detroit during the past few weeks:

Cross Car Tracks Cautiously! Leaves Falling on the Track Cause Slippery Rails and Prevent Quick Stops.

Street Space.—"There is sufficient space in the average street to take care of two lines of traffic comfortably or three lines in emergency. When cars are parked against the curb on both sides, the available space will be sufficient for only one line of traffic. It is inevitable that congestion and delays must follow."—*Dominick Henry, Deputy Chief Inspector in charge of New York traffic.*

Lost Articles—During the month of September, 1,611 articles were left on the cars of this system. All articles found on D.S.R. cars are sent to the Lost Article Department, which is located at Room 328, 165 Congress Street. If you lose or think you might have left an article on a street car, inquire at the above address, or call Cadillac 2551. This information is given for your convenience and to forestall the ever-increasing number of calls, both personal and telephone, to the various carhouses in regard to lost articles.

Awaiting Common Council Action! D.S.R. is preparing to furnish new motor bus service as soon as a purchase contract is approved. Service will operate to unserved outlying districts direct from the business centers. Six-cylinder pneumatic tires, fully inclosed upper deck. We want the best vehicles—made in Detroit if possible—but the best at any cost.

Changing a Deficit Into a Profit*

In Four Years the Charleston Consolidated Railway & Lighting Company Has Reduced Its Operating Expenses per Car-Mile 35 per Cent, While Its Gross Earnings Decreased Approximately 30 per Cent

HOW to operate the street railway in Charleston, S. C., and make both ends meet has been a problem ever since the World War. In 1920 the population served by the Charleston Consolidated Railway & Lighting Company was approximately 84,000. The next year it had dropped to 78,000. In 1922 it was 72,000, in 1923 it was 66,000, and at the present time it is estimated to be only 58,000. In the face of these conditions it was inevitable that the earnings of the railway should decrease. The reduction in revenue per car-mile from 43.17 cents in 1920 to 29.95 in 1924, a decrease of approximately 30 per cent, is, in fact, slightly less than the per cent decrease in population of the city.

ORGANIZATION OF RAILWAY DEPARTMENT

	July, 1923	January, 1924	July, 1924
Railway			
Superintendent	1	1	1
Clerks	2	2	1½
Claim Department			
Adjuster	1	1	1
Investigator	1	..	..
Clerk	1	1	½
Transportation Department			
Supervisor	1	1	..
Dispatcher	..	..	1
Receivers	2	2	2
Inspectors	6	3	4
Trainmen	140	108	90
Mechanical Department			
Master mechanic	1	1	..
General foreman	..	..	1
Electrical foreman	1	1	1
Electrical workmen	5	2	1
Machine shop foreman	1	1	1
Machine shop workmen	..	..	..
Air-brake foreman	1	1	1
Air-brake workmen	5	2	1
Paint shop foreman	1	1	1
Paint shop workmen	2	2	1
Carpenter foreman	1	1	1
Carpenter workmen	8	4	2
Carhouse foreman	1	1	1
Carhouse workmen	23	19	18
Night foreman	1	1	1
Night workmen	11	8	6
Total	220	166	141

To meet this situation the railway has had to curtail its expenses heavily. This has been done by the inauguration of one-man operation, reducing the number of men employed in the shops, and by reducing the number of car-miles operated. An important saving has also been made in the amount paid for damage claims.

In 1923 the percentage of one-man cars operated to total cars was 51.3, while in 1924 the percentage of one-man cars was 91.3 of the whole. This has made it possible to reduce the number of trainmen from 140 to 90. At the same time radical revisions have been made in the supervisory force and the personnel of the mechanical department. Details of these changes are given in an accompanying table.

The results have been to reduce purely transportation costs per month approximately 20 cents per car-mile down to about 11 cents per car-mile. During the same period the maintenance of equipment has been reduced from 5 cents per car-mile to about 3 cents. In the first six months of 1923 $26,402 was paid in claims. In the same period of 1924 the amount was $6,810. The combined results of these savings has been to convert a deficit of $4,796.70 for June, 1923, into a profit of $4,209.41 for June, 1924.

Classifications	June, 1920	June, 1921	June, 1922	June, 1923	January, 1924	June, 1924
Gross earnings	$76,849.46	$66,234.13	$53,429.62	$45,126.65	$36,426.47	$35,745.68
Operating expenses including taxes	$72,692.42	$60,330.40	$53,420.99	$49,923.35	$35,361.67	$31,536.27
Net income from operations	$4,157.04	$5,903.73	$8.63	*$4,796.70**	$1,064.80	$4,209.41
Gross earnings per car-mile, cents	43.17	39.38	35.52	31.16	29.58	29.95
Operating expenses per car-mile, cents	40.84	35.87	35.51	34.47	28.72	26.42
Income from operation per car-mile, cents	2.33	3.51	.01	*3.31**	.86	3.53
Per cent operating expenses to gross	94.59	91.09	99.98	110.63	97.08	88.22

* Deficit.

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*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

Oklahoma City Enlarges Passenger Station

This Station, Built in 1911, Had Become Outgrown and Has Just Been Enlarged—It Now Has Six Through Tracks—A New Freight ~~Station Has~~ Also Been Built

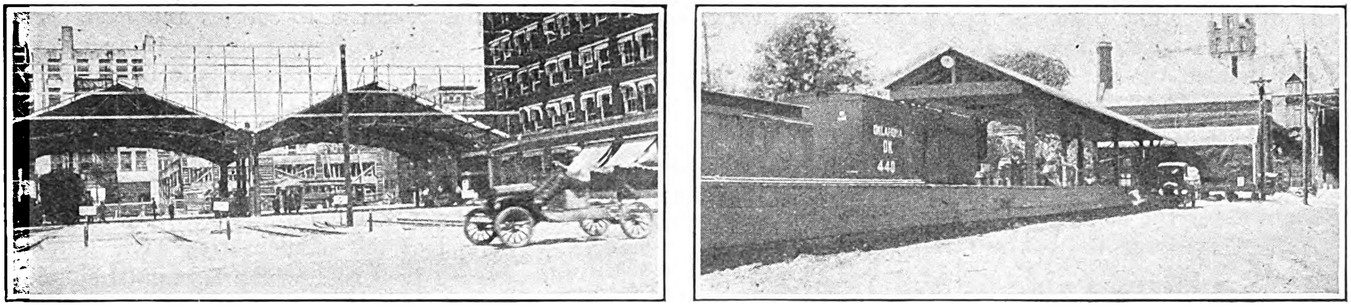
THE Oklahoma Railway recently completed the rearranging and separation of its passenger and freight terminal facilities in Oklahoma City. The old passenger terminal station, which was constructed in 1911, had become inadequate for the volume of traffic passing through it. This was particularly true during the morning and evening rush hours and with the advent of the small one-man safety cars.

In the original layout, the freight station was located just west of and adjoining the passenger station and was served by two short tracks entering from Hudson Street. These two tracks were laid out with short radius curves and would not take all standard equipment. No provision was made for teaming, as the trackage allowed the loading of package freight cars only from the dock. Baggage and express shipments were handled in a small building on the west side of the passenger terminal inclosure.

The original passenger terminal contained two through tracks from Main Street to Grand Avenue, two passing tracks out of these through tracks, and four stub sidings for car storage.

The city and interurban cars were routed to enter the terminal from both directions, and the two outside tracks were reserved for interurban traffic. This condition caused more or less trouble because, when two interurban cars were in and loading, only the two through tracks were available for the city cars.

In the new layout there are six through tracks in the passenger terminal, as shown in the plan. The city cars use the four easterly tracks and the interurban cars the fifth and sixth tracks. All traffic through the new terminal is one way, all cars entering from Grand Avenue. There is also a stub siding, leading off from the sixth track, for the storage of interurban trailers. There is dock room and team space on the west side of the sixth track to provide for the minimum of handling between truck and car.



At Left, New Passenger Terminal Under Construction. At Right, Team Side of New Freight House

All the new special trackwork on Grand Avenue, made necessary by these changes, is laid with wood ties and ballast, while all tracks, including special work within the terminal inclosure, are on steel ties, Carnegie H section, with a reinforced-concrete beam under each rail. Paving brick was placed outside the rail for a border, and one row of brick was placed inside the rail to provide for the flangeway. The old train shed was divided into two sections, and these two sections were placed alongside each other, thus providing overhead protection for the entire six tracks.

A 4-in. slab of concrete was poured alongside the tracks for platform space.

Concrete pits were installed at the south end of the terminal and just inside the north property line on Grand Avenue. These pits are to be kept filled with water and are illuminated at night with a series of red lights to keep trespassers out.

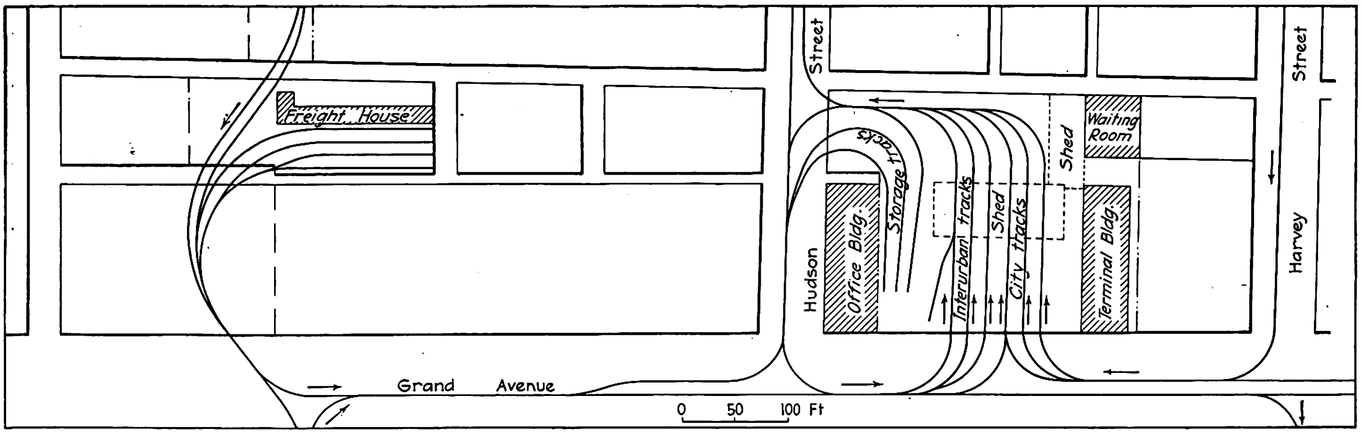
The tracks shown in the plan as entering the terminal from Hudson Street on the west side formerly served the old freight terminal. These tracks, later, are to be lengthened and used for storage tracks.

Several electric track switches have been installed. One is at the turnout to the interurban tracks on Grand Avenue, one at the wye just off Hudson Street at the west side of the terminal yard, and one at the wye at Main and Hudson Streets. Some additional track had also to be built to route the cars one way through the terminal. No change has been made in the method of handling passengers into and out of the terminal inclosure.

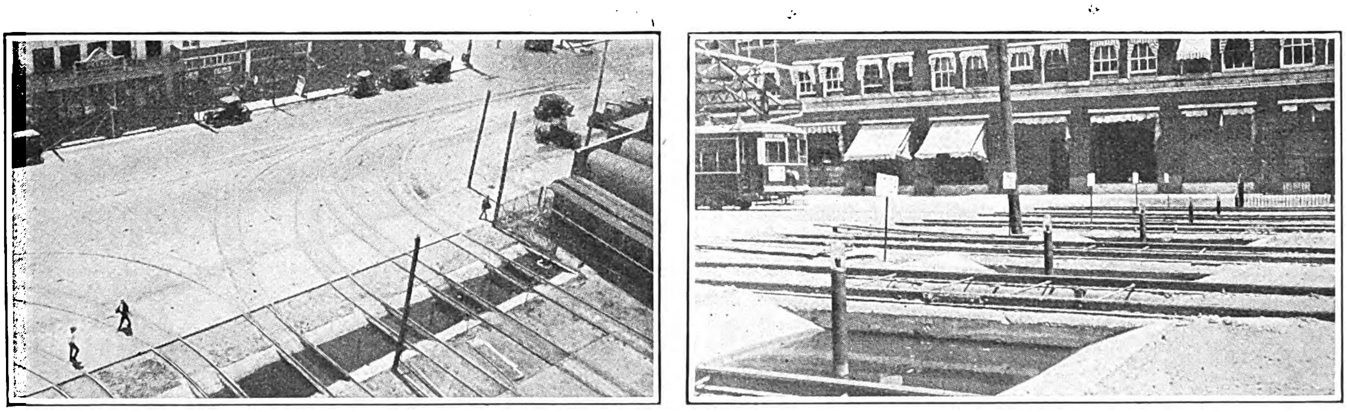
A NEW FREIGHT HOUSE BUILT

The new freight house is located one block west of the passenger station and is served by one through track from Main Street to Grand Avenue and one passing track.

The freight dock is 20 ft. x 130 ft. and has 80 ft. under roof. The driveways to the dock and team tracks are ballasted with crushed rock, the rock being covered with limestone screenings and the screenings with crude oil to give a good surface and to keep down the dust. Freight offices and a warehouse were constructed at the west end of the freight dock. The alleys on both



Plan Showing New Station Layout, Oklahoma City



Arrangement of Pits and Red Lights to Prevent Unauthorized Entrance to Passenger Terminal from Street sides of the freight station are paved with brick, which makes the dock accessible in all kinds of weather.

All labor on the passenger and freight stations was done with company forces. With the exception of the special work layout at the north end of the passenger terminal, which was purchased new, the special work required was taken from material on hand and assembled for the various locations.

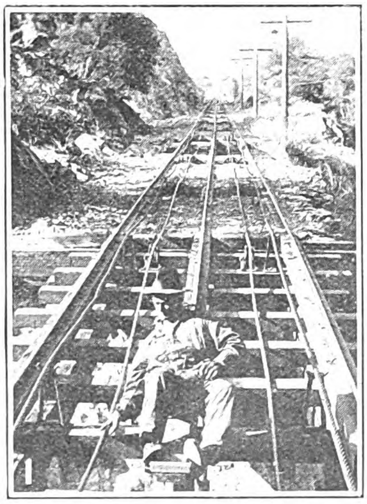
Replacing Cable on the Mount Lowe Incline

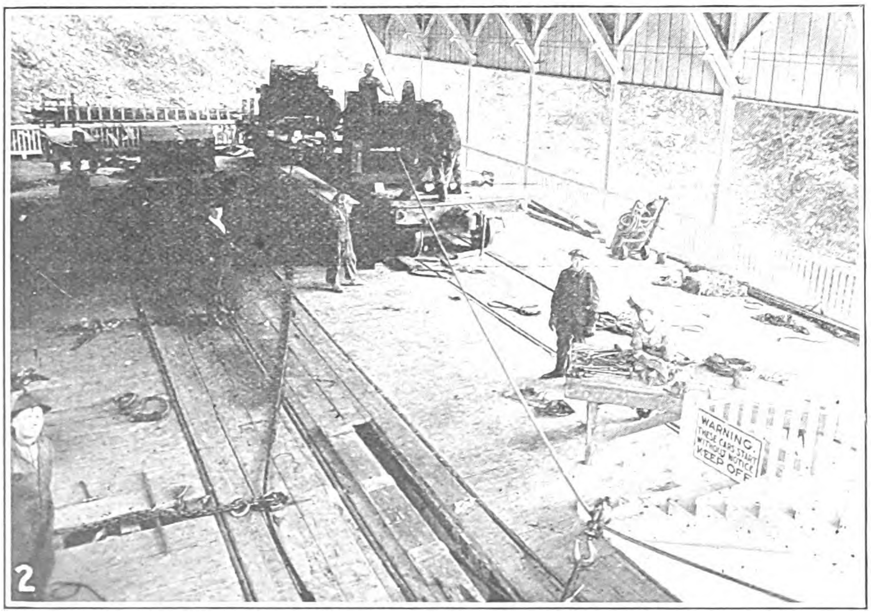
THE replacement of the pulling cable on the Mount Lowe Incline, a 62-deg. grade between Rubio and Echo Mountain on the Pacific Electric Railway scenic route in southern California, was accomplished some time ago by the mechanical department of the company. On account of the grade and unique physical conditions existing the replacement of this cable was a difficult engineering feat. This route was constructed in 1893 and has been operated since that time by the Pacific Electric Railway. Two passenger cars are operated on this incline to convey sightseers to Alpine Tavern, a mile up the mountain.

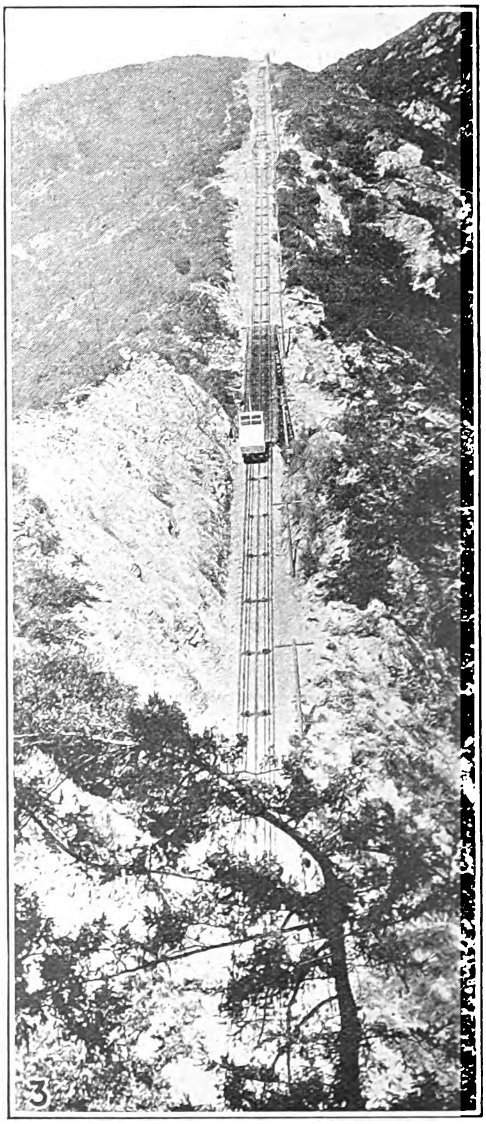
The pulling cable on the incline is 3,000 ft. in length and weighs more than 6 tons. It is replaced at intervals ranging from two to three years, its condition being determined by hand inspection and examination over its entire length every week. Extensive preparations, considerable equipment and a trained crew of 12 mechanics are required to make the change. A 35-hp. motor is used to drive a revolving cable reel capable of receiving the entire 6 tons of discarded cable. The motor and reel, together with the reel containing the new cable, are mounted on a flat car anchored at the foot of the incline, as shown in an accompanying illustration.

The cable is in the form of a loop, the section ahead of the car being known as the "pulling cable" because it carries the load. The section behind the car is known as the compensating cable because its only function is to take up the slack. When preliminaries have been completed the pulling cable is cut with an acetylene torch at a point about 60 ft. behind the lower car. The new cable is then spliced into the old pulling cable. The cars are chained into position on the incline before the pulling clamps are removed. The end of the compensating cable is made fast to the power-driven reel, which is started simultaneously with the cable winding machinery at the top of the mountain. While the new cable is being pulled into position the old cable is being reeled up. Care must be taken that the speed of the reel coincides with the speed of the winding machinery. The entire length of the incline must be under observation while the change is being made to make sure that the new cable does not jam or leave the guiding pulley.

The job was done under the direction of J. W. Haughton, assistant mechanical superintendent, who has supervised this work since 1909. Several members of the crew have taken part in this work for the past 20 years. In spite of the familiarity of the men with the work it requires about 20 hours before the line is again ready for service.







Features of Cable Replacement on the Mount Lowe Incline, Pacific Electric Railway

No. 1. Mechanics make a weekly inspection of the cable, using a special sled.

No. 2. A motor-driven reel to wind up the old cable and another reel containing the new cable are mounted on a flat car at the foot of the incline.

No. 3. A new cable was recently installed on the Mount Lowe Incline, which rises 1,300 ft. at a 62-deg. grade.

Modern Planning System in Detroit Shops

Department of Street Railways Has Developed System for Checking Progress of Work on Cars in Various Departments of Highland Park Shops — Cumulative Curves Give Daily Information on Production

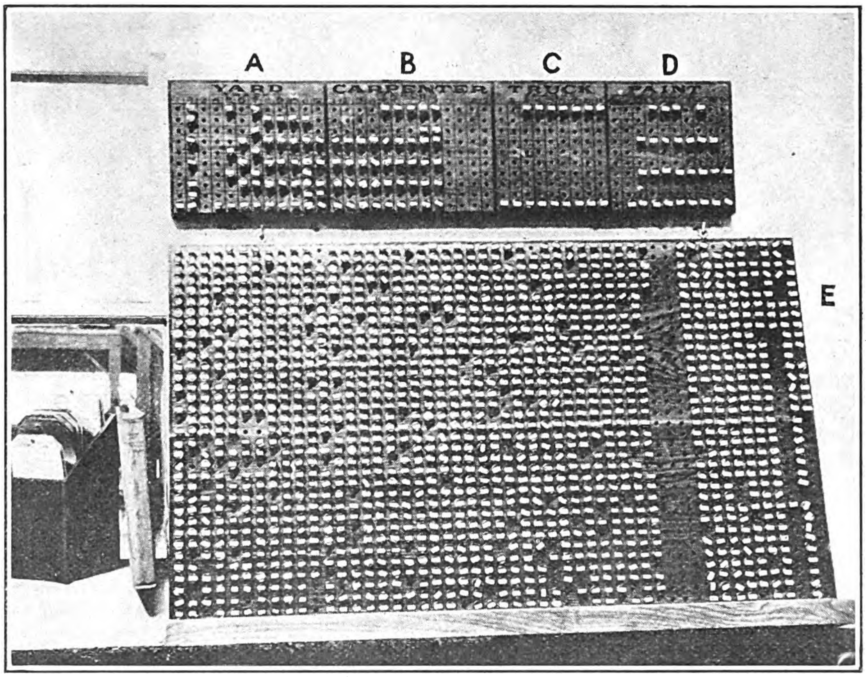
By G. L. Ohmart

General Foreman Highland Park Shops,
Department of Street Railways, Detroit, Mich.

CENTRALIZED planning and production control are necessary for a well-regulated and efficient business. The planning systems in use in the large manufacturing plants have demonstrated their worth over and over again. While the methods employed in planning for a manufacturing plant can be only partially applied to a maintenance shop, the principles involved are the same in both cases.

Up to the present time the functions of the planning department in the Highland Park shops of the Detroit Department of Street Railways are confined to the handling of cars from the time they come to the shops until they are taken away, and to keeping such records and charts as have been found useful in carrying out the work. No attempt as yet has been made to do the detailed planning of the work of each shop department, although this is under consideration.

When a car is sent to the shops for any class of work, a form, shown in an accompanying illustration, is filled out by the carhouse foreman with car number, name of the carhouse, and a general notation of the reason for the car being sent in. This card (Form 246) is then turned over to the yard master of the operating department, who fills out the detachable part of the card with the car number, time the car leaves the carhouse, and the badge numbers of the crew which will take the car to the shop. The card is taken to the shops with the car and turned over to the planning clerk, who enters on the detachable part of the card the time the car is received, and signs the card. This stub is then detached and taken back to the yard master. It not only serves as a record of the movement of the car, but also as a receipt of the delivery of the car to the shops and a check on the time the crew arrived.



Car Numbers on Plugs Show Where the Cars Are in the Shops

Location of all cars in the shop is indicated on the upper plug board. This is divided into four sections to indicate the various departments. The holes in each section correspond with the car locations on each track in that department of the shop. The lower and larger board indicates cars in service at carhouses, and contains plugs arranged in numerical order for quick reference.

The planning clerk, who is in touch with all the shop foremen, enters on Form 246 the account numbers for each class of work and a description of the various classes of work to be done, such as wiring changes, overhauling trucks, painting, etc. This card is then fastened to the car to remain until all the work is finished and the car is ready to leave the shop.

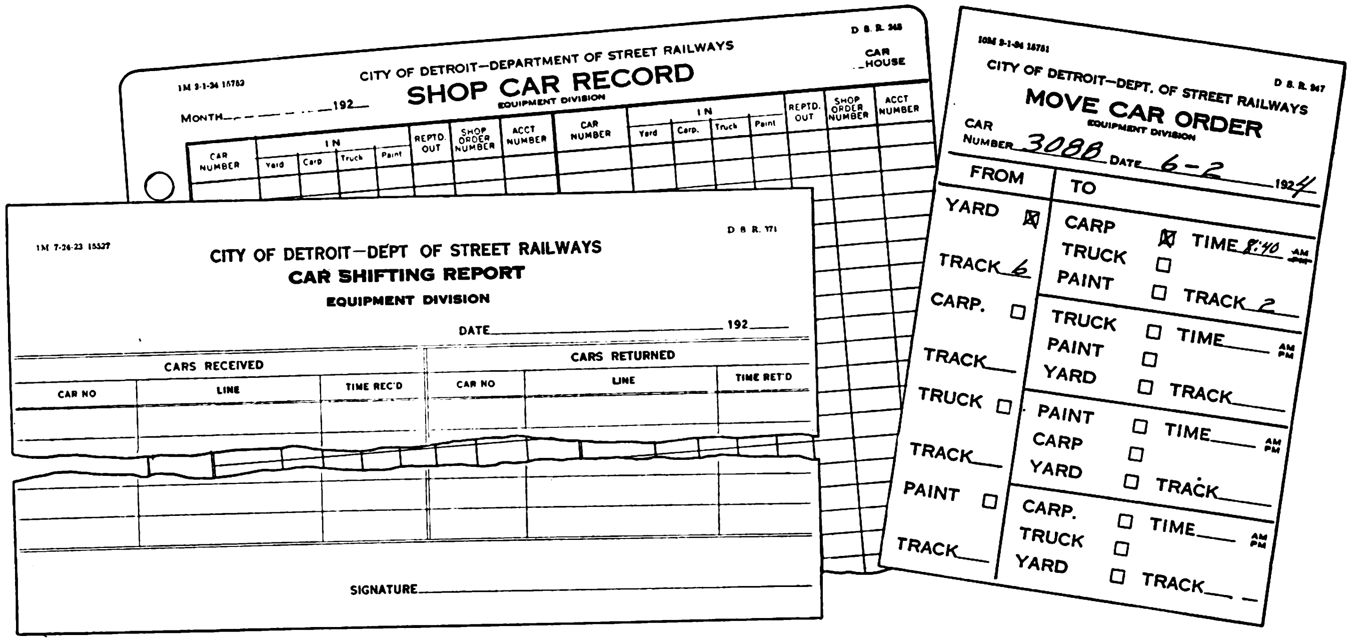
PLANNING PROGRESS OF THE CAR

When a car is delivered to the shop, it is left in the yard by the train crew. The planning clerk has direct charge of the movement (shifting) of all cars at the shops and also of the men (shifters) who do this work. Assuming that work on the car is to be started in the carpenter shop, Form 247, shown in another illustration, is used to instruct the shifters. This form is made up on green paper in pads 4 in. x 6 in. size. It will be noted that spaces are provided for car number, date, and two series of locations; "from," which indicates present location of the car, and "to," indicating where it is be moved.

Assume that the car is on Track 9 in the yard, and is to be moved to Track 2 in the carpenter shop. Under "From" the planning clerk checks an "X" opposite "yard" and writes in "Track 9." Under column headed "To" he checks "X" opposite "Carp," writes in "Track 2" and gives the time. This form is turned over to one of the shifting crew and furnishes complete information regarding the movement of the car. He delivers the car to the proper track in the carpenter shop and turns over Form 247 to the carpenter foreman. This is notification to the foreman that the car is in his department, at a certain location, ready for work.

When any particular job is completed on a car, the foreman in charge of this work enters in the column headed "Repairs made by" the badge number of the man or men who did the work, and also signs his own initials,

Forms for Highland Park Shops Give Complete Record of Work



1M 3-1-24 15763

D. S. R. 248

CITY OF DETROIT—DEPARTMENT OF STREET RAILWAYS
SHOP CAR RECORD
EQUIPMENT DIVISION

MONTH__________192__

CAR HOUSE

CAR NUMBER	IN Yard	IN Carp	IN Truck	IN Paint	REPTD. OUT	SHOP ORDER NUMBER	ACCT NUMBER	CAR NUMBER	IN Yard	IN Carp.	IN Truck	IN Paint	REPTD. OUT	SHOP ORDER NUMBER	ACCT NUMBER

1M 7-26-23 15527

D. S. R. 371

CITY OF DETROIT—DEPT OF STREET RAILWAYS
CAR SHIFTING REPORT
EQUIPMENT DIVISION

DATE__________192__

CARS RECEIVED			CARS RETURNED		
CAR NO	LINE	TIME REC'D	CAR NO	LINE	TIME RET'D

SIGNATURE__________

10M 9-1-24 18781

D. S. R. 247

CITY OF DETROIT—DEPT. OF STREET RAILWAYS
MOVE CAR ORDER
EQUIPMENT DIVISION

CAR NUMBER 3088 DATE 6-2 1924

FROM	TO
YARD ☒ TRACK 6	CARP ☒ TIME 8:40 AM TRUCK ☐ PAINT ☐ TRACK 2
CARP. ☐ TRACK__	TRUCK ☐ TIME__ AM PM PAINT ☐ YARD ☐ TRACK__
TRUCK ☐ TRACK__	PAINT ☐ TIME__ AM PM CARP ☐ YARD ☐ TRACK__
PAINT ☐ TRACK__	CARP. ☐ TIME__ AM PM TRUCK ☐ YARD ☐ TRACK__

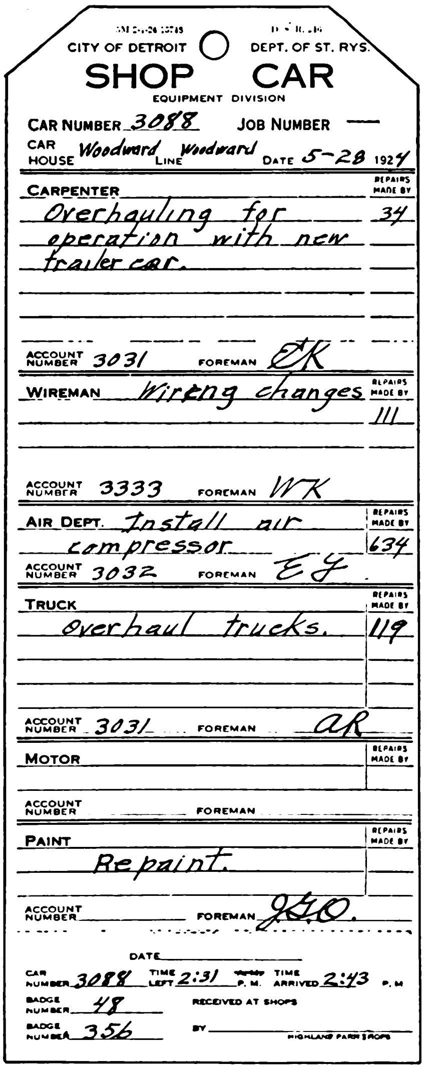
At top (Form 248)—Form used by the planning clerk in connection with his work. This serves as a permanent record of the location of all cars in the shop.

Below (Form 371)—A complete record of all car movements to and from the shop is kept on these daily sheets, which are signed by car crews.

(Form 247)—The planning clerk issues instructions on this form for shifting cars between departments in the shop.

indicating that the work has been completed properly. When all the work to be done by that department is completed on the car the foreman notifies the planning clerk by telephone that it is ready to leave his department, gives its present location and the next department to which it is to be moved. The planning clerk again uses Form 247 to notify one of the shifting crews that this particular car is on Track 2 in the carpenter shop and is to be moved to Track 4 in the truck shop. The shifter moves the car and turns over the form to the truck shop foreman. This procedure is repeated for each movement of the car.

When all the work of the various shop departments is completed, the car goes back to the yard ready to be taken to the carhouse. Form 246 is now removed and filed for future reference, as it gives a complete record of work done, workmen's numbers, job numbers, account numbers to which labor and material were charged, the date, and the foremen's signatures, indicating that the work was carried out properly.



CITY OF DETROIT DEPT. OF ST. RYS.
SHOP CAR
EQUIPMENT DIVISION

CAR NUMBER 3088 JOB NUMBER —

CAR HOUSE Woodward LINE Woodward DATE 5-28 1924

CARPENTER — REPAIRS MADE BY

Overhauling for operation with new trailer car. — 34

ACCOUNT NUMBER 3031 FOREMAN EK

WIREMAN Wiring changes — REPAIRS MADE BY 111

ACCOUNT NUMBER 3333 FOREMAN WK

AIR DEPT. Install air compressor — REPAIRS MADE BY 634

ACCOUNT NUMBER 3032 FOREMAN EJ

TRUCK — REPAIRS MADE BY

Overhaul trucks. — 119

ACCOUNT NUMBER 3031 FOREMAN AR

MOTOR — REPAIRS MADE BY

ACCOUNT NUMBER______ FOREMAN______

PAINT — REPAIRS MADE BY

Repaint.

ACCOUNT NUMBER______ FOREMAN JGO.

DATE__________

CAR NUMBER 3088 TIME LEFT 2:31 P. M. TIME ARRIVED 2:43 P. M

BADGE NUMBER 48 RECEIVED AT SHOPS

BADGE NUMBER 356 BY__________ HIGHLAND PARK SHOPS

(Form 246)—This form indicates the work to be done in each department, the badge numbers of the men, the account chargeable and the signature of the foreman who approved the completed job. The stub at the bottom is sent back to the carhouse as a receipt when the car is delivered to the shop.

The location of all cars in the shops is indicated on a board in the planning clerk's office by means of plugs having the car numbers stamped on them. The board has a series of holes for each track in the yard and the various shop departments. An accompanying illustration shows the arrangement. It can be seen from this that the upper board is divided into four sections. Section A represents the yard, B the carpenter shop, C the truck shop, and D the paint shop. The large board E, below, holds the plugs for all the cars which are in service at the various carhouses. The plugs in the large board are arranged in numerical order so that it is easy to pick out any particular car number wanted.

Simultaneously with the movement of the car, the plug with that car number on it is moved to the proper place to indicate the location of the car. This part of the system is very useful, both to the planning department and to the executives, who can tell at a glance exactly where a car is located, as well as the number of cars in the different shop departments.

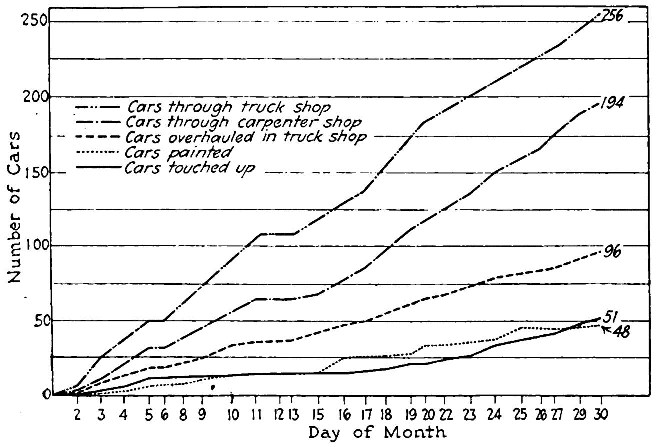
In the case of a car which has been in an accident and on which all costs of repairing due to the accident are kept separate from regular maintenance, a separate job number is issued. Form 245, which is a tag exactly like 246 except that it is red instead of yellow, is used either separately or in conjunction with the latter to give the job number and account numbers on the work done due to the accident. When both regular maintenance work and work due to accident are necessary on a car, both cards are clipped together and placed in the car for the information of the shop men concerned.

Two other forms are used by the planning department to keep records. Form 371, also shown in an illustration, is a sign-in and out sheet. All entries on this sheet are made by the crews of the transportation department who take cars to and from the shops, a new sheet being used each day. The operator enters in the proper columns the car number, the line on which the car is operated regularly, and the time it arrives at or leaves the shop, as the case may be.

Form 248 is used by the planning clerk chiefly for his own information in carrying out the details of his work. When a car is received at the shop, the car number is entered in the proper column and the date under "Yard." Then as the car goes through the various shop departments, the date is checked under the proper column when it enters that department. When the car is finished, the date is entered when the car is reported out to the carhouse. There are also columns for shop order and account numbers.

PRODUCTION CURVES PLOTTED MONTHLY

In connection with the planning, a number of progress or production curves are kept daily for periods of a month each. A typical curve sheet is illustrated. These curves are plotted cumulatively so that at the end of any period, beginning with the first of the month, the total is given to date. The abscissas represent the actual number of working days in the month, whole days and half days being given proper value. The ordinates give the number of cars. By one subtraction, the production for any other period of time can be obtained. A straight line drawn through zero and the point at the end of any period gives the average daily production. In case there is a definite production to work to for a month, a straight line through zero and the total value for the month represents the actual average amount required per day, and the deviation of the actual production curve from the straight line represents at any time the exact amount that production is ahead of, or behind, the requirements.



Charts Show Daily Production of Each Department

Cumulative curves are used to record production and show the monthly totals up to any given date. These sheets are made up 9 in. x 12 in., and the various items of production are shown in different colored lines.

At the present time curves are being made up for the following items: Total cars received, total cars out of shops, cars through the carpenter shop, cars through truck shop, cars through paint shop, accident cars through the shops, car wheels welded, car wheels bored, car wheels pressed on, car wheels pressed off, motor gears changed, car wheels turned, car wheels ground, stoves replaced and stoves rebuilt.

Similar curves can be worked out to meet the particular needs of any shop, and may be used to keep daily progress on any kind of shop work. The value of such curves to the shop executives can hardly be overestimated. They furnish him in a moment's time with a simple picture which tells him just what each shop department is doing and enables him to co-ordinate readily the shop work with the requirements.

The Readers' Forum

Sixteen Hundred Butt Welds in Philadelphia

THE LORAIN STEEL COMPANY
JOHNSTOWN, PA., Nov. 21, 1924.

To the Editors:

In the article on "Rapid Track Reconstruction with Butt-Welded Joints," which appeared in the Nov. 15 issue of the ELECTRIC RAILWAY JOURNAL, the statement is made that butt-welded joints were tried in Boston and in Philadelphia, about 500 joints being made in each place. While this is correct as far as Boston is concerned, more than three times this number were made in Philadelphia. To be exact, 1,607 butt welds have been installed in the latter city.

H. F. A. KLEINSCHMIDT,
Superintendent Track Welding Department.

Canadian Highway Tax Not Discriminatory

HYDRO-ELECTRIC POWER COMMISSION
OF ONTARIO
Hydro-Electric Railways Operating Department

TORONTO, ONT., OCT. 31, 1924.

To the Editors:

After commenting on the conditions of electric railway operation in Canada in ELECTRIC RAILWAY JOURNAL for Oct. 25, page 749, you refer to a statement of the *Canadian Financial Post* in the last part of which it is stated that the bus license fee is not an equitable tax inasmuch as it is not on the same basis for all bus lines. The statement also contends that the buses in direct competition with hydro radials are being taxed so high and in such an arbitrary manner as to prevent them giving adequate service. For your information I would say that the tax is imposed by the Department of Provincial Highways and is, according to its statement, the same on all provincial highways, no discrimination being shown in any way against the bus lines operating in opposition to the Hydro-Electric Railways—in fact, it really is to the contrary. The act became effective and was enforced commencing June 1, 1924. We have three lines in competition with buses. On our Scarboro division the tax became effective on June 1; on the Metropolitan division it did not become effective until Sept. 1, while on the Mimico division, where we are affected most, it is not in effect as yet but it is expected that it will become effective on Nov. 15.

This certainly does not show discrimination in favor of the Hydro, and I am satisfied that by calling your attention to this misstatement you will correct the impression that was unwittingly created.

This is the type of propaganda which is being used against the Hydro at all times by those opposed to public ownership.

W. R. ROBERTSON,
General Superintendent.

American Association News

Committee Appointments for 1924-1925, American and Engineering Associations

COMMITTEE appointments for the American Electric Railway Association are virtually complete. Appointments to Engineering Association committees are also completed with a few exceptions. The committee membership of the Accountants, Claims and Transportation and Traffic Associations are not yet available. The personnel of the American and Engineering Association committees follows:

American Association

Finance

R. P. Stevens, president Republic Railway & Light Company, New York, N. Y., chairman.
B. A. Hegeman, Jr., New York, N. Y.
L. S. Storrs, New Haven, Conn.

Policy

F. R. Coates, president the Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio. Mailing address, H. L. Doherty & Company, New York, N. Y., chairman.
J. G. Barry, Schenectady, N. Y.
Britton I. Budd, Chicago, Ill.
C. D. Emmons, Baltimore, Md.
Harry Reid, Indianapolis, Ind.
W. H. Sawyer, East St. Louis, Ill.
Paul Shoup, San Francisco, Cal.
H. D. Shute, East Pittsburgh, Pa.
R. P. Stevens, New York, N. Y.
L. S. Storrs, New Haven, Conn.
Robert I. Todd, Indianapolis, Ind.

National Relations

Harry Reid, president Interstate Public Service Company, Inc., Indianapolis, Ind., chairman.
E. J. Bechtel, New York, N. Y.
H. G. Bradlee, Boston, Mass.
Ralph R. Bradley, Chicago, Ill.
Arthur W. Brady, Anderson, Ind.
C. D. Cass, Waterloo, Ia.
Samuel Curwen, Philadelphia, Pa.
F. C. Hamilton, New York, N. Y.
J. H. Hanna, Washington, D. C.
G. H. Harries, Chicago, Ill.
Charles L. Henry, Indianapolis, Ind.
Frank Karr, Los Angeles, Cal.
H. A. Mitchell, Oakland, Cal.
Frank Silliman, Jr., New York, N. Y.
D. W. Snyder, Jr., Springfield, Ill.
A. F. Van Deinse, Marion, Ohio.

Subjects and Meetings

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
H. D. Briggs, Newark, N. J.
Harry L. Brown, New York, N. Y.
F. D. Burpee, Ottawa, Ontario, Canada.
T. C. Cherry, Syracuse, N. Y.
C. H. Clark, Cleveland, Ohio.
Harlow C. Clark, Newark, N. J.
W. L. Davis, Allentown, Pa.
F. W. Doolittle, New York, N. Y.
C. R. Ellicott, New York, N. Y.
J. H. Hanna, Washington, D. C.
G. H. Harries, Chicago, Ill.
C. W. Kellogg, Boston, Mass.
A. S. Richey, Worcester, Mass.
R. B. Stearns, Boston, Mass.
E. F. Wickwire, Mansfield, Ohio.

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Barron Collier, New York, N. Y., vice-chairman.
W. R. Alberger, Oakland, Cal.
Frank L. Blanchard, New York, N. Y.
J. S. Bleecker, Philadelphia, Pa.
Robert Dougan, Washington, D. C.
P. H. Gadsden, Philadelphia, Pa.
L. E. Gould, Chicago, Ill.
J. P. Griffin, Dallas, Tex.
W. H. Hodge, Chicago, Ill.
H. M. Lytle, Chicago, Ill.
J. C. McQuiston, East Pittsburgh, Pa.
J. P. Pulliam, Milwaukee, Wis.
M. P. Rice, Schenectady, N. Y.
L. S. Storrs, New Haven, Conn.
W. P. Strandborg, Portland, Ore.
F. L. Thompson, New York, N. Y.
Robert G. Tucker, Indianapolis, Ind.
E. F. Wickwire, Mansfield, Ohio.

Publications

C. D. Emmons, president the United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
G. B. Anderson, Los Angeles, Cal.
F. G. Buffe, Kansas City, Mo.
Thomas W. Casey, New York, N. Y.
Harlow C. Clark, Newark, N. J.
B. J. Denman, Davenport, Ia.
Edwin C. Faber, New York, N. Y.
Myles B. Lambert, East Pittsburgh, Pa.
M. McCants, San Francisco, Cal.
C. C. Peirce, Boston, Mass.
E. Stenger, Denver, Col.
Robert I. Todd, Indianapolis, Ind.

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R. P. Stevens, New York, N. Y.
A. G. Hoyt, New York, N. Y.
H. L. Stuart, Chicago, Ill.
M. W. Gaines, New York, N. Y.

Charles A. Coffin Prize

J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., chairman.
F. R. Coates, Toledo, Ohio.
J. H. McGraw, New York, N. Y.
Committee to co-operate with the above, J. G. Barry and A. H. Jackson, Schenectady, N. Y.

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A. M. Patten, Topeka, Kan.
J. S. Pevear, Birmingham, Ala.
William Phipps, Meridian, Miss.
J. P. Pulliam, Milwaukee, Wis.
J. C. Schade, Green Bay, Wis.
O. J. Shaw, Lincoln, Neb.
T. H. Tutwiler, Memphis, Tenn.
E. A. West, Denver, Col.
C. V. Wood, Springfield, Mass.

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C. H. Beck, New York, N. Y.
C. P. Billings, Pittsburgh, Pa.
F. G. Buffe, Kansas City, Mo.
H. O. Butler, St. Louis, Mo.
T. C. Cherry, Syracuse, N. Y.
C. H. Clark, Cleveland, Ohio.
W. H. Heulings, Jr., Philadelphia, Pa.
S. B. Irelan, St. Joseph, Mo.
A. E. Potter, Providence, R. I.
Martin Schreiber, Camden, N. J.
S. B. Way, Milwaukee, Wis.

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George B. Anderson, Los Angeles, Cal.
George A. Barnes, New York, N. Y.
V. W. Berry, Fort Worth, Tex.
Horatio Bigelow, Charleston, S. C.
G. B. Cade, Asbury Park, N. J.
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Richard J. Lockwood, St. Louis, Mo.
M. McCants, San Francisco, Cal.
H. H. Norris, New York, N. Y.
A. B. Paterson, New Orleans, La.
Samuel Riddle, Louisville, Ky.
A. J. Rowland, Milwaukee, Wis.
R. Schaddelee, Grand Rapids, Mich.
J. V. Sullivan, Chicago, Ill.
E. M. Walker, Schenectady, N. Y.

INSURANCE

P. E. Wilson, secretary Cleveland Railway, Cleveland, Ohio, chairman.
W. R. Alberger, Oakland, Cal.
O. H. Bernd, Des Moines, Ia.
Granville H. Bourne, New York, N. Y.
C. E. Brown, Napa, Cal.
E. J. Burdick, Detroit, Mich.
Norman McD. Crawford, Columbus, Ohio.
N. H. Daniels, Boston, Mass.
F. M. Hamilton, Chicago, Ill.
A. D. Knox, New Haven, Conn.
John H. Moran, Boston, Mass.
C. E. Morgan, Brooklyn, N. Y.
L. D. Pellissier, Holyoke, Mass.
F. J. Petura, New York, N. Y.

LOCATION OF MIDYEAR MEETING AND CONVENTION

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
M. R. Boylan, Newark, N. J.
H. L. Brown, New York, N. Y.
C. C. Castle, New York, N. Y.
S. J. Cotsworth, Philadelphia, Pa.
E. C. Faber, New York, N. Y.
Thomas Finigan, Chicago, Ill.
Thomas Fitzgerald, Pittsburgh, Pa.
H. B. Flowers, New Orleans, La.
Edward M. Graham, Bangor, Me.
A. A. Hale, New York, N. Y.
J. C. McQuiston, East Pittsburgh, Pa.
C. E. Morgan, Brooklyn, N. Y.
Paul Shoup, San Francisco, Cal.
Claus Spreckels, San Diego, Cal.
E. P. Waller, Schenectady, N. Y.
T. W. Wilson, Wilmington, Del.

REVISION OF CONSTITUTION AND BY-LAWS

L. S. Storrs, president The Connecticut Company, New Haven, Conn., chairman.
H. C. Clark, Newark, N. J.
C. R. Ellicott, New York, N. Y.
C. D. Emmons, Baltimore, Md.
J. G. Barry, Schenectady, N. Y.

SPECIAL TAXES

W. H. Maltbie, special counsel United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
F. C. Chambers, Des Moines, Iowa.
F. W. Coen, Sandusky, Ohio.
A. T. Davison, New York, N. Y.
Thomas Fitzgerald, Pittsburgh, Pa.
R. M. Feustel, Fort Wayne, Ind.
A. Flor, New York, N. Y.
Edwin Gruhl, New York, N. Y.
Harry H. Hanson, Newtonville, Mass.
Raymond Hunt, Wilmington, N. C.
A. G. Neal, Washington, D. C.
A. M. Robertson, Duluth, Minn.
H. B. Sawyer, Boston, Mass.
A. C. Watt, New York, N. Y.
T. W. Wilson, Wilmington, Del.

VALUATION

F. W. Doolittle, vice-president North American Company, New York, N. Y., chairman.
E. J. Bechtel, New York, N. Y.
Francis Blossom, New York, N. Y.
H. M. Brinckeroff, New York, N. Y.
H. A. Clarke, New York, N. Y.
Thomas Conway, Jr., Philadelphia, Pa.
J. A. Emery, New York, N. Y.
W. Findlay Downs, Philadelphia, Pa.
T. E. Francis, St. Louis, Mo.
C. W. Gillespie, Staten Island, New York, N. Y.
F. C. Hamilton, New York, N. Y.
W. H. Maltbie, Baltimore, Md.
L. R. Nash, Boston, Mass.
A. S. Richey, Worcester, Mass.
Frank Silliman, New York, N. Y.
Ernest Stenger, Denver, Col.
W. B. Tuttle, San Antonio, Tex.
E. D. Uhlendorf, Chicago, Ill.
James Walker, Chicago, Ill.

UNITED STATES CHAMBER OF COMMERCE REPRESENTATIVES

J. H. Hanna, vice-president Capital Traction Company, Washington, D. C., national councillor.

C. E. Morgan, vice-president and general manager Brooklyn City Railroad, Brooklyn, N. Y., substitute national councillor.

JOINT COMMITTEE OF THE NATIONAL UTILITY ASSOCIATIONS

Randal Morgan, chairman of the executive and finance committee United Gas Improvement Company, Philadelphia, Pa., chairman.
F. R. Coates, Toledo, Ohio.
C. D. Emmons, Baltimore, Md.
P. H. Gadsden, Philadelphia, Pa.
J. H. Pardee, New York, N. Y.
J. N. Shannahan, Hampton, Va.
R. P. Stevens, New York, N. Y.
L. S. Storrs, New Haven, Conn.
James W. Welsh, New York, N. Y.

CO-OPERATION WITH THE NATIONAL SAFETY COUNCIL

J. P. Barnes, president Louisville Railway, Louisville, Ky., chairman.

The following American committees and representatives on national organization's committees were continued from last year without change in personnel:

American Committee on Electrolysis.
American Committee on Inductive Co-ordination.
Conference on Street and Highway Safety.
Mail Pay Committee.
National Defense.
National Industrial Conference Board.
Sub-Committee of the Committee on National Relation on Depreciation.

Engineering Association

AUTOMATIC SUBSTATIONS

Adrian Hughes, Jr., superintendent of power United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
L. D. Bale, Cleveland, Ohio.
W. E. Bryan, St. Louis, Mo.
C. A. Butcher, East Pittsburgh, Pa.
C. H. Jones, Chicago, Ill.
F. W. Peters, Schenectady, N. Y.
Ralph H. Rice, Chicago, Ill.
L. R. Wagner, Detroit, Mich.
E. H. Scofield, Minneapolis, Minn., sponsor.

BUILDINGS AND STRUCTURES

W. F. Graves, chief engineer Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., chairman.
E. D. Eckroad, Akron, Ohio.
George H. Hodges, New York, N. Y.
J. D. Kent, New York, N. Y.
J. R. McKay, Fort Wayne, Ind.
F. H. Miller, Louisville, Ky., sponsor.
E. S. Myers, New Orleans, La.

H. R. Stamm, New Haven, Conn.
S. J. Steiner, Aurora, Ill.
Judson Zimmer, Gloversville, N. Y.

Car and Carhouse Wiring

H. H. Adams, superintendent shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.
R. S. Beers, Schenectady, N. Y.
A. T. Clark, Baltimore, Md.
H. C. Eddy, Newark, N. J.
C. G. Keen, Philadelphia, Pa.
John Lindall, Boston, Mass., vice-chairman.
J. D. McKee, Champaign, Ill.
G. H. McKelway, Brooklyn, N. Y.
G. M. Woods, East Pittsburgh, Pa.

Engineering Accounting

(Joint Committee)

R. B. Rifenberick, valuation engineer United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
E. J. Dickson, Providence, R. I.
N. E. Drexler, Hampton, Va.
E. D. Dreyfus, Pittsburgh, Pa.
C. R. Harte, New Haven, Conn., sponsor.
F. R. Phillips, Pittsburgh, Pa.
A. S. Richey, Worcester, Mass.
H. E. Riggs, Ann Arbor, Mich.

Engineering Manual

R. C. Cram, engineer surface roadway Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., chairman.
Daniel Durie, Connellsville, Pa.
C. R. Harte, New Haven, Conn.

Equipment

P. V. C. See, superintendent car equipment Northern Ohio Traction & Light Company, Akron, Ohio, chairman.
W. S. Adams, Philadelphia, Pa.
W. W. Brown, Brooklyn, N. Y.
R. S. Bull, Pittsburgh, Pa.
A. T. Clark, Baltimore, Md., vice-chairman.
Daniel Durie, Connellsville, Pa., sponsor.
Lawford H. Fry, Burnham, Pa.
J. L. Gould, New York, N. Y.
J. M. Hipple, East Pittsburgh, Pa.
A. C. Jordan, Elmira, N. Y.
J. H. Lucas, Milwaukee, Wis.
W. H. McAloney, Atlanta, Ga.
J. C. McCune, New York, N. Y.
A. D. McWhorter, Memphis, Tenn.
J. F. Miller, Pittsburgh, Pa.
M. O'Brien, St. Louis, Mo.
E. D. Priest, Schenectady, N. Y.
E. S. Sawtelle, Cincinnati, Ohio.
R. B. Smyth, Boston, Mass.
C. W. Squier, New York, N. Y., secretary.
W. G. Stuck, Lexington, Ky.
H. S. Sweet, Utica, N. Y.
H. S. Williams, Detroit, Mich.
J. M. Yount, San Francisco, Cal.

Heavy Electric Traction

John C. Davidson, engineer electric traction Norfolk & Western Railway, Bluefield, W. Va., chairman.
A. H. Armstrong, Schenectady, N. Y.
J. M. Bosenbury, Springfield, Ill.
C. E. Brown, Napa, Cal.
H. F. Brown, New Haven, Conn., secretary.
Morris Buck, New York, N. Y.
H. W. Cope, East Pittsburgh, Pa.
A. B. Daus, Chicago, Ill.
J. H. Davis, Baltimore, Md.
J. V. B. Duer, Altoona, Pa.
J. T. Hamilton, New York, N. Y.
Charles R. Harte, New Haven, Conn., sponsor.
E. C. Johnson, Los Angeles, Cal.
Norman Litchfield, New York, N. Y.
J. O. Madison, New York, N. Y.
L. S. Wells, New York, N. Y.
R. B. White, New York, N. Y.

Power Generation and Conversion

L. D. Bale, superintendent of substations Cleveland Railway, Cleveland, Ohio, chairman.
C. E. Bennett, Atlanta, Ga.
W. E. Bryan, St. Louis, Mo., vice-chairman.
C. A. Butcher, East Pittsburgh, Pa.
H. W. Codding, Newark, N. J.
H. T. Connolly, Annapolis, Md.
H. E. Davis, Utica, N. Y.
H. A. Kidder, New York, N. Y.
E. D. G. Kline, Allentown, Pa.
N. R. Love, Denver, Col.
F. W. Peters, Schenectady, N. Y.
G. G. Post, Milwaukee, Wis.
G. W. Saathoff, New York, N. Y.
E. H. Scofield, Minneapolis, Minn., sponsor.
L. G. Tighe, Akron, Ohio.
L. J. Turley, Los Angeles, Cal.
R. L. Weber, Boston, Mass.
G. I. Wright, Chicago, Ill.

Power Transmission and Distribution

Charles H. Jones, electrical engineer Chicago Rapid Transit Company, Chicago, Ill., chairman.
J. Walter Allen, Boston, Mass.
R. L. Allen, Syracuse, N. Y.
S. H. Anderson, Los Angeles, Cal.
W. H. Bassett, Waterbury, Conn.
M. W. Cooke, Pittsburgh, Pa.
S. M. Day, Rochester, N. Y.
J. H. Drew, Mansfield, Ohio.
Ralph W. Eaton, Providence, R. I.
D. D. Ewing, Lafayette, Ind.
Charles Gilman, New York, N. Y.
H. W. Griffin, New York, N. Y.
C. L. Hancock, Bridgeport, Conn.
C. J. Hixson, Schenectady, N. Y.
W. E. Huber, Cleveland, Ohio.
Adrian Hughes, Jr., Baltimore, Md.
John Leisenring, Springfield, Ill.
F. McVittie, Rochester, N. Y.
H. S. Murphy, Philadelphia, Pa.
C. P. Nachod, Louisville, Ky.
J. F. Neild, Toronto, Ontario, Canada.
W. J. Quinn, New York, N. Y.
M. B. Rosevear, Newark, N. J., sponsor.
W. Schaake, East Pittsburgh, Pa.
A. Schlesinger, Indianapolis, Ind.
J. M. Waldron, New York, N. Y.
F. J. White, New York, N. Y.

Purchases and Stores

H. H. Lloyd, purchasing agent Indianapolis Street Railway, Indianapolis, Ind., chairman.
J. Y. Bayliss, Richmond, Va.
R. H. Dalgleish, Washington, D. C., sponsor.
M. L. Evans, Columbus, Ohio.
J. Fleming, Washington, D. C.
W. N. Ford, Memphis, Tenn.
C. A. Harris, Pittsburgh, Pa.
A. E. Hatton, Pittsburgh, Pa.
F. A. Jordon, Atlanta, Ga.
A. C. Kennedy, Cleveland, Ohio.
P. F. McCall, Highwood, Ill.
A. A. Ordway, Boston, Mass.
C. Thorburn, Los Angeles, Cal.
F. L. Wheaton, Detroit, Mich.

Standards

Charles Rufus Harte, construction engineer The Connecticut Company, New Haven, Conn., chairman.
H. L. Andrews, Schenectady, N. Y.
C. C. Beck, Mansfield, Ohio.
J. A. Brooks, Philadelphia, Pa.
L. C. Datz, Memphis, Tenn.
W. G. Gove, Brooklyn, N. Y.
H. A. Johnson, Chicago, Ill.
C. G. Keen, Philadelphia, Pa.
John Lindall, Boston, Mass.
G. A. Peabody, Cleveland, Ohio.
F. R. Phillips, Pittsburgh, Pa.
M. B. Rosevear, Newark, N. J.
H. M. Steward, Boston, Mass.
N. W. Storer, East Pittsburgh, Pa.
N. B. Trist, Pittsburgh, Pa.

Subjects

Charles Rufus Harte, construction engineer The Connecticut Company, New Haven, Conn., chairman.
Morris Buck, New York, N. Y.
R. C. Cram, Brooklyn, N. Y.
R. H. Dalgleish, Washington, D. C.
Daniel Durie, Connellsville, Pa.

Unification of Car Design

H. H. Adams, superintendent shops and equipment, Chicago Surface Lines, Chicago, Ill., chairman.
J. A. Brooks, Philadelphia, Pa.
R. H. Dalgleish, Washington, D. C., sponsor.
L. J. Davis, Brooklyn, N. Y.
Charles Gordon, Chicago, Ill.
W. F. Graves, Indianapolis, Ind.
J. W. Hulme, New York, N. Y.
G. L. Kippenberger, St. Louis, Mo.
John Lindall, Boston, Mass.
Victor Willoughby, New York, N. Y.

Way Matters

H. H. George, engineer maintenance of way Public Service Railway, Newark, N. J., chairman.
V. Angerer, Easton, Pa.
C. A. Alden, Steelton, Pa.
S. C. Baker, East St. Louis, Ill.
E. E. Barnard, Lynchburg, Va.
H. E. Bean, Syracuse, N. Y.
R. H. Dalgleish, Washington, D. C., sponsor.
H. H. Dartt, Williamsport, Pa.
T. H. David, Indianapolis, Ind.
W. R. Dunham, Jr., Detroit, Mich.
E. B. Entwisle, Johnstown, Pa.
T. A. Ferneding, Dayton, Ohio.
R. B. Fisher, Harvey, Ill.
C. F. Gailor, New York, N. Y.
Fred Glenton, Jr., Toronto, Canada.
D. J. Graham, Youngstown, Ohio.
C. L. Hawkins, St. Louis, Mo.
J. H. Haylow, Memphis, Tenn.
H. C. Heaton, Philadelphia, Pa.
N. M. Hench, Pittsburgh, Pa.
M. M. Johnston, New Haven, Conn.
T. J. Lavan, Cleveland, Ohio.
B. P. Legare, San Francisco, Cal.
E. L. Lockman, Boston, Mass.
H. F. Merker, Brooklyn, N. Y.
L. A. Mitchell, Anderson, Ind.
R. H. Pinkley, Milwaukee, Wis.
E. M. T. Ryder, New York, N. Y.
A. T. Spencer, Toronto, Ontario, Canada.

J. B. Tinnon, New York, N. Y.
W. W. Wysor, Baltimore, Md.

U. S. DEPARTMENT OF COMMERCE COMMITTEE TO CO-OPERATE ON SUBJECT OF STANDARDIZATION

R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C., chairman.
C. S. Kimball, Washington, D. C.
W. W. Wysor, Baltimore, Md.

SPECIAL COMMITTEE ON AIR RESERVOIR SPECIFICATIONS TO CO-OPERATE WITH THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

R. H. Dalgleish, chief engineer Capital Traction Company, Washington, D. C., chairman.
L. J. Davis, Brooklyn, N. Y.
C. A. Ives, Erie, Pa.
J. A. Leeper, Wilmerding, Pa.
J. S. McWhirter, New York, N. Y.

WOOD PRESERVATION

A. P. Way, electrical engineer American Electric Power Company, Philadelphia, Pa., chairman.
R. C. Cram, Brooklyn, N. Y., sponsor.
M. J. Curtin, Boston, Mass.
J. L. Fritsch, Pittsburgh, Pa.
W. H. Fulweiler, Philadelphia, Pa.
E. F. Hartman, New York, N. Y.
W. L. Harwood, Springfield, Mass.
E. L. Morier, New York, N. Y.
L. P. Scanlan, Newark, N. J.
C. A. Smith, Atlanta, Ga.
R. P. Woods, Kansas City, Mo.

Subjects and Meetings

A MEETING of the subjects and meetings committee was held in New York on Nov. 20, with the following members present: Chairman W. H. Sawyer, President Shannahan, T. C. Cherry, C. R. Ellicott, J. H. Hanna, Harry L. Brown, J. W. Colton, H. C. Clark, and Secretary J. W. Welsh.

The nature of the morning, afternoon and evening sessions for the Midyear Meeting at Washington were outlined and speakers considered. It was the general consensus that a forum discussion would be highly desirable and a portion of both morning and afternoon sessions will be set aside for this purpose. Certain subjects will be suggested for these discussions—subjects on which it is likely that a difference of opinion will exist—so that the delegates will be inspired to express their views and thus tend to bring out some worth-while points of view for the benefit of the members.

The next meeting will be on Dec. 19 in New York.

Special Trackwork Committee

THE A.E.S.C. sectional committee on specifications for special trackwork met at New York on Nov. 24. Those present were V. Angerer, chairman; R. C. Cram, H. H. George, C. A. Alden, E. B. Entwisle, G. L. Fowler, C. L. Hawkins, R. E. Hess, E. P. Rounder, E. M. T. Ryder, J. B. Strong, and G. C. Hecker.

Specifications for special track were discussed and the form of report to be made was considered.

News of Other Associations

Public Relations Discussed at West Virginia Convention

Water Power and Regulation Were Other Topics at a Two-Day Meeting of the West Virginia Public Utilities Association, Held in Charleston on Nov. 14-15.

WATER-POWER problems and the difficulties of the street railway and telephone companies were discussed at the seventh annual convention of the West Virginia Public Utilities Association, which was held at Charleston Nov. 14 and 15. It was attended by 120 utility executives. The convention lasted two days, the first day's session ending with a banquet, while on the afternoon of the second day the delegates attended the annual football clash between West Virginia and Washington and Lee.

Officers elected were: President, Mentor Hetzer, vice-president and general manager Moundsville Water Company; first vice-president, W. R. Power, manager Consolidated Heat, Light & Power Company, Huntington; second vice-president, J. E. Harsh, vice-president Virginia Power Company, Charleston; third vice-president, J. D. Whittemore, general manager Monongahela-West Penn Public Service Corporation, Fairmont; secretary, A. Bliss McCrum, Charleston; treasurer, A. M. Hill, Charleston.

D. I. McCahill, general counsel West Penn System, said it was an accepted fact that public service could best be rendered by a company, and that the investments of public service companies should be protected against wasteful competition. No monopoly was necessary, but "fly-by-night" opposition was taboo. He said that it was also recognized that unfair regulation of these companies would be more unfair to the public, which would suffer because of the lack of investment in the company and hence the curtailment of the service.

"Unless companies are allowed to prosper sufficiently to attract capital the public will suffer," he said. "That is why a liberal policy has always been the desire of public service corporations and reasonable rates have been assured the public. This policy stabilizes business and enables the utilities to give the utmost service.

"But every utility must have a publicity bureau to let its works be known. The troubles of utilities are nearly always because of misunderstandings with the public, because they do not know how to express themselves. The legislatures are made up of patrons of the public utilities. If the public utilities have not taken their patrons into their confidence or won their good will, they can never expect legislatures that will understand their works. The public utilities must tell the whole truth to the public and the newspapers are the only mediums."

In extending cordial welcome to the delegates Mayor Wertz said, among other things: "When I was a lawyer I was nothing loath to begin suits against the cold-blooded corporations. In those years you couldn't reason with public utility officials. It was simply a case of smacking down the papers in court. Today when such a suit threatens it is only necessary to call up the utility company at fault and every effort is made to redress the misfortune. It is because you have human officials and the human idea in business, and let me assure you that the public appreciates that spirit."

John B. Garden of Wheeling, manager Wheeling Electric Company, said Wheeling was the fourth city in the United States to have electric cars in operation. He traced the early advent of power into Wheeling, which was the first stand of the electric utilities, and said that it was by no means a rosy road to success.

A talk on "Electric Railways of Today" was delivered by R. P. Stevens, president Republic Railway & Light Company of New York, who said that the street railways of America have an investment in this country of $5,000,000,000 and carry 15,000,000,000 passengers annually. He said that such an investment and service would never be surpassed and that any talk of bus service superseding the railways was already known to be of the idle myth variety.

"Our problems are of today and not of yesterday," he said. He explained the "come-back" of the railways following the World War. Prior to that time too many companies were ready to sit silent and let the demagog threaten. The public got thinking that where there was so much smoke there must be fire and judged the amount of fire by the uncontradicted accusations. It became difficult for the companies to do business, and in their frantic zeal to stay in the game they cut fares to secure new extensions and leases, and then the government's statisticians found that the companies were really trying to operate while losing money. Then came the reaction.

For a time while this reaction to a sane level was in progress, there developed a second cloud in the form of bus transportation, he said. But every city in the United States of more than 50,000 population that had tried bus service exclusively has asked the street railways to come back. However, the companies are finding more and more success by using buses as auxiliaries.

Mr. Stevens said the municipal ownership failures that could be cited were legion. The people knew of all these and the one-time clamor had subsided. Independent control of the railways or supervision by a public utility commission safeguarded the public, and where roads were under such supervision they usually were popular, he said. He advocated a step further, pointing out that if government control wasn't desired, neither was ownership of utilities by a few men. He advocated customer ownership and pointed out that the public wants to buy such stock. He said that 25 offerings of 21 companies, aggregating $75,000,000, had been gobbled up by investors who knew that their money was safe.

A. Bliss McCrum, executive secretary of the association, briefly reviewed the work of the body since its formation on Sept. 16, 1915. He explained that the association was a clearing house for ideas of the same business of the whole world. New ideas, from whatever source, were passed on to the members, and in turn any suggestions from the members would be appreciated.

James Weir, field secretary of the West Virginia Publishers and Employing Printers' Association, said that the public utilities must advertise to tell of their service. He told about some companies whose excellent service is absolutely unappreciated, because the public has not been kept informed. This is because the companies are short-sighted enough to think that advertising is an expense instead of an investment. However, if companies advertise and then do not follow up with good servive, that advertising is futile. But, the speaker said, the growth of service among public utilities has been such that the public has ceased criticising, even though the reason might not always be understood.

Efficient Bus Lighting[*]

By L. C. Porter and A. C. Roy

Commercial Engineering Department, General Electric Company, Harrison, N. J.

A GENERAL survey of bus lighting conditions as they existed in 1923 indicated that the average bus contained: (1) Six inefficient inclosed dome fixtures, generally badly in need of cleaning and usually with one inoperative, due to a burnt-out or missing lamp; (2) 2 or 4-cp. lamps of inferior quality in the dome fixtures; (3) medium color finish on walls and ceiling; (4) wire of sizes too small to carry the lighting load without excessive drop in voltage, and (5) battery of inadequate capacity.

After analyzing the data that had been collected, tests were made in a motor bus body and results showed that sufficient light must be provided to insure the safety of the passengers upon entering or leaving the bus. Elderly people, ladies and those carrying babies require much more light than the younger or more active persons. To prevent eyestrain in case the passengers chose to read, more illumination must be provided in buses than is found in trolley cars because of the more intense vibration and subjection to jolts with the subsequent shifting of print. To secure the maximum value from the ad cards plenty of light is required. As an aid in creating the "riding habit" the interior should present a cheerful and inviting atmosphere. In order to care for all of these points an intensity of about 7 foot-candles upon the reading plane is necessary. Under ideal conditions 1 watt per square foot of floor space will give approximately 4.7 foot-candles of illumination. To secure 7 foot-candles of illumination in a 21-ft. body it is necessary to provide 1.5 watts per square foot or a total of 178.5 watts.

Of the lamps available the 21-cp. gas-filled Mazda lamp is to be preferred. The 6-8-volt 21-cp. lamp consumes 17.84 watts, while the 12-16-volt lamp consumes 16.82 watts. The number of lamps required is 10.

As the incandescent filaments of lamps have a high brilliancy, it is necessary, in producing comfortable illumination, that the eye be shielded from this source. Reflectors serve to obscure the filament or diffuse the light, so that it is not directly visible from usual visual angles. As a means of protecting the lamp bulb from breakage, a reflector is also of great assistance.

Light-directing fixtures for motor coach lighting may be classed as (1) Reflector units or those made of glass and open at the bottom, and (2) Dome units in which the lamp is totally inclosed.

Since the question of proper maintenance is a vital factor in good lighting practice, it is desirable to consider these questions: Is it of a shape that will tend to collect dirt? Does it have a metal reflector that will tarnish with age? Are there deep crevices which will be difficult to clean? Are the surfaces roughened and hence dust catchers requiring scrubbing to be made clean? Are there many parts to remove in order to clean the glassware properly and replace the lamps? Do these parts fit easily or are they held in place by small screws, clips, or other devices requiring considerable "juggling"? Are the fixtures constructed so as to withstand the severe vibration to which they will be subjected?

Number and Arrangement of Ceiling Outlets. The number and arrangement of ceiling outlets is governed primarily by the hanging height, i.e., the distance from the floor to the ceiling. The headroom in the average bus is seldom over 6 ft. 3 in. If reflector fixtures are installed the distance from the floor to the lower edge of the fixture will be less than 6 ft. Tall passengers will undoubtedly strike their heads on them. With fixtures that are placed up in the roof and flush with the ceiling there is still a very undesirable condition that cannot be overcome with fixtures in the central position. Standing passengers cut off the light that normally should reach the seats and the entire lighting plan is defeated. If, however, there were a headroom of 7 ft. as is found in trolley cars the central fixture would be more suitable. Lamps placed in two rows with each row from 12 to 15 in. from the side of the bus is by far the most desirable arrangement. Here, the reflectors will be out of the way of the standing passengers or those entering or leaving the bus, and the light will not be hindered from reaching the reading plane about the seats.

To insure an even distribution of light the fixtures should be placed from 3 to 3½ ft. apart. The last fixture should be placed about 1½ ft. from the rear wall and the others spaced accordingly. In general, the following number of ceiling outlets should be provided in the bodies listed:

Length of Body	Number Ceiling Outlets	Minimum Candle-power of Lamps
16 ft. to 18 ft.	6	21
18 ft. to 20 ft.	8	21
20 ft. to 22 ft.	10	21

No matter how carefully designed a lighting system may be as to type and size of lamps, type and make of reflector, spacing, height, etc., if the surroundings are not adapted to reflecting such light as strikes them, an inefficient system may result. The question of proper painting of walls and ceilings is therefore of great importance.

The results of tests of the effect of color of walls and ceilings made in a motor bus are listed in the following table:

INCREASE IN FOOT-CANDLE INTENSITIES PER CENT

	Dark Ceiling Dark Walls	White Ceiling Dark Walls	White Ceiling Light Walls
Eight bare lamps......	Std. 0.0	71.0	.....
Eight dome units......	58.0	61.0	71.0
Eight reflector units...	84.0	110.0	132.0

Lamps of 21-cp. were employed in each of these tests. For the same expenditure of energy the per cent increase in foot-candle intensities is clearly shown. Assuming eight bare lamps as a basis of comparison in a bus having dark oak walls and ceiling an increase of 84 per cent in intensity may be obtained simply by placing reflectors over the lamps. By painting the ceiling glossy white and the walls light oak and using reflectors over the same eight lamps the intensity may be increased 132 per cent.

Step Lighting — Step lighting on motor buses has never been really adequate but the need for such lighting is clearly evident from the safety aspect. Passengers frequently get off a bus facing the rear. It is hard enough to regain one's balance in broad daylight if the bus should give a start, but at night with no light to see by it is still more difficult. As a consequence passengers hang onto the grip or hand rail longer when getting off. This is particularly noticeable in inclement weather. When getting on a dark step of a bus there is a natural pause.

These things were observed and studied in detail, and actual stop-watch checks were made of the time required to take on and discharge passengers on various runs in the city of Newark. These tests showed that the time taken to get on a bus which had no step light was 11.4 per cent greater than where a good step light was used. Also it was found that 14.8 per cent longer time was required to get off from an unlighted step. With respect to poorly lighted buses, it would appear that in the course of an evening's run, considerable time could be saved by the bus operator if he had his bus equipped with a good step light. Certainly for the sake of safety and convenience to his passengers he should provide this.

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[*] Abstract of paper presented before the New York section of the Illuminating Engineering Society, Nov. 13, 1924.

While much has been said regarding the standardization of higher voltages it would appear, after considerable study of the matter, that the 12-volt system embodies most of the points necessary for successful operation as far as the lighting is concerned. It is doubted if buses will ever be constructed to seat more than 70 or 75 people. A double-deck bus of this capacity would require the following number and sizes of lamps:

	Candle-power	Amperes
LOWER DECK		
Nine ceiling	21	10.44
Two headlights	21	2.32
Two platform	21	2.32
One dash	2	0.19
One rear	2	0.19
Three destination	2	0.57
UPPER DECK		
Ten ceiling	21	11.60
One platform	21	1.16
Two danger signals	21	2.32
One periscope	21	1.16
Total lighting load		32.27
Buzzers, stop light, etc., intermittent load		1.00
		33.27

Reduced to watts this is 33.27 × 14.5 = 482.4 watts. The 600-watt generator, which is in standard production at the present time, would amply take care of 483 watts, lighting and buzzer load and have 117 watts excess power. This amount of power will light seven additional 21-cp. lamps. Starting loads have been neglected, for the total number of ampere-hours required is very small.

The subject of voltage drop is very serious. On a 110-volt circuit 1 or 2 volts drop means only 1 or 2 per cent drop, but where only 6 volts are used, as in buses, 1 volt amounts to 16⅔ per cent. The effect of decreased voltages upon the candle-power output of both the 6 and 12-volt, 21-cp. Mazda lamps is as follows:

Voltage at Lamp Socket	Candle-Power Output of Lamp
6-8 Volt Lamps	
7.00	23.0
6.50	21.0
6.25	19.3
6.00	15.5
5.75	13.8
5.50	11.5
5.25	9.2
5.00	7.8
12-16 Volt Lamps	
15.0	23.0
14.5	21.0
14.0	19.3
13.5	16.8
13.0	14.7
12.5	12.6
12.0	10.5

The average jitney was wired with No. 16 stranded wire. A recommended list of wire sizes follows:

Size American Wire Gage	Aera Circular-Mils	Current* Capacity in Amperes Rubber Insulation
14	4.110	0–5
12	6.530	6–8
10	10.400	9–15
8	16.500	16–24
6	26.300	25–30

*The ampere-capacity range given in the table above is suggested in order to reduce the voltage drop throughout the lighting circuit to a minimum.

WIRING FOR 21-FT. BUS BODY HAVING 8 to 10 21-C.P. CEILING LAMPS

Points of Connection	Size of Stranded Wire 6 Volts	12 Volts
Battery to ground	6	8
Battery to ammeter	6	8
Ammeter to switch busbar	6	8
Switch throughout circuit	10	12
Connections to lamp sockets	14	14
Common return to ground	6	8

Lamp Sockets—With the application of miniature lamps to automobile service, it was found that the screw bases originally in use worked loose in the sockets due to vibration. The bayonet base was introduced to overcome this objection and provide the positive positioning of the light source required in headlights and spotlights. The lamps are based with the pins at right angles to the plane of the filament. The single-contact bayonet socket has now been standardized by practically all manufacturers because of economy in wiring, lower voltage drop, simplified socket construction; and other mechanical and electrical advantages.

The total ampere drain on the storage battery exclusive of starting is shown in the following table.

Continuous Lighting Load	Candle-power	Total Amperes 6 Volts	12 Volts
Two headlight lamps	21	5.62	2.32
One rear lamp	2	0.47	0.19
One dash lamp	2	0.47	0.19
One gen. indicating lamp	2	0.47	0.19
One fare box lamp	2	0.47	0.19
One step light lamp	21	2.81	1.16
Ten ceiling lamps	21	28.10	11.60
Total continuous lighting load		38.41	15.84

Other Intermittent Operating Devices	Candle-power	Total Amperes 6 Volts	12 Volt
One stop light telltale	2	0.47	0.19
One stop light	21	2.81	1.16
Buzzers	..	....	....
Total intermittent load in amperes		3.28	1.35

Assuming that on continuous discharge the intermittent load as given would amount to 2 amp. at 6 volts or 1 amp. at 12 volts the total load on the generator would be 40.41 amp. for the 6-volt system or 16.84 amp. for the 12-volt system. The starting load would amount to considerably less than 1 amp.-hr. and so it has been neglected in these computations.

It is recommended that a battery of such size as will carry the entire lighting load for from 6 to 8 hours with the generator idle be selected. This is particularly desirable where the bus is operating on short runs with long layovers. Choosing the mean of 7 hours and multiplying this by the number of amperes required the ampere-hour capacity of the required battery is 280 amp.-hr. and 119 amp.-hr. respectively for the 6 and 12-volt systems.

In summarizing, the following is recommended as the best practice in motor bus lighting.

1. That 21-cp. Mazda C lamps be used in the ceiling fixtures.
2. That 21-cp. Mazda C lamps be used in the step light.
3. The single contact bayonet base case of the type recommended be accepted as standard.
4. Two types of lamps be standardized, viz.: 2 and 21-cp.
5. Reflector fixtures be employed foi the ceiling lights.
6. The ceiling be painted gloss white.
7. Six ceiling lamps of 21 cp. be used in bodies 16 to 18 ft. long; eight ceiling lamps of 21 cp. be used in bodies 18 to 20 ft. long; 10 ceiling lamps of 21 cp. be used in bodies 20 to 22 ft. long.
8. Ceiling outlets be arranged on two circuits and be placed on the ceiling 12 to 15 in. from the side walls.
9. Wire of the recommended sizes be employed throughout.
10. All wire joints to be soldered.
11. Battery and ground connections be made as outlined.
12. Switches of ample size be installed.
13. All lighting circuits fused.
14. A suitable switch and fuse panel be adopted.
15. A battery of sufficient capacity to carry the lamp load for from 6 to 8 hours exclusive of generator be provided.
16. The generator be of ample capacity to keep battery charged.
17. Voltage regulation be provided.
18. The 12-volt system be standardized.

New England Club Meeting

THE December meeting of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, Mass., on Dec. 4. The afternoon meeting, which will be called to order at 4 o'clock, will be devoted to a paper on "Maintenance Costs of Car Equipment," by Henry S. Day of the Westinghouse Electric & Manufacturing Company.

Two papers will be read at the evening meeting: "Maintenance of Street Railway Personnel," by S. F. Fannon, director division of public service, Sherman Service, Inc., Boston; and "Street Railway Economics," by T. N. Carver, professor of economics Harvard University.

Motor Freight Tariffs in C. E. R. A. Territory

AT THE last meeting of the Central Electric Traffic Association the committee on freight tariffs and rates agreed to secure information from the various states with regard to I. C. C. Cause No. 14,828. The committee reports:

> In Indiana the Public Service Commission has no jurisdiction over trucks and for that reason no tariffs can be filed in connection with trucking companies where they are made participating carriers. The only way this can be handled is to consider any points reached by them as a station on the line of the railroad which issues the tariff and operates in connection with the truck line.
>
> In Michigan it is entirely legal for any line to start this service provided a permit is first obtained from the Michigan Public Utilities Commission, and there is nothing in the law tending to restrict joint service between electric lines and truck lines.
>
> In Ohio the truck companies are under the jurisdiction of the Public Utilities Commission and joint tariffs may be filed covering service in both directions in connection with them.

City Fares in Northern and Central Europe*

The Use of Flat and Zone Fares Is Fairly Equal—In Addition There Is General Use of Special Rates for Workmen and Wholesale Riders, Either with Individual Ride or Season Tickets

By August Winter
Vienna Municipal Railway

Owing to the catastrophic fall in German exchange during the year 1923, this paper can present only a fraction of the conclusions which would otherwise have been possible with regard to the influence of different fare systems. Furthermore, the results which are presented require subdivision because of the unequal influence of the World War on the economic status of members in Germany, the neutral states (viz., Norway, Sweden, Denmark, Holland and Switzerland) and in the Austro-Hungarian succession states. The subdivision as to population follows:

CLASSIFICATION OF STREET RAILWAYS REPLYING TO FARE QUESTIONS

Number of Cities of: Population	Germany	Neutral States	Succession States	Total
Over 1,000,000	2	..	1	3
700,000-800,000	1	1	..	2
600,000-700,000	2	1	..	3
500,000-600,000	2	.	..	2
400,000-500,000	3	..	..	3
300,000-400,000	3	1	..	4
200,000-300,000	2	2	..	4
100,000-200,000	6	5	3	14
Under 100,000	3	5	4	12
Total........	24	15	8	47

Of the reporting properties 30, or 64 per cent, are municipally owned; 11 properties, or 23 per cent, are owned entirely by private capital; and in the case of the remaining six properties, or 13 per cent, the city is the controlling shareholder to the extent of at least 50 per cent.

Three-fourths of the reporting street railways handle all the mass transport of their cities except for a little steam traffic. Competition is of account only in 12 cities, and outside of Berlin and Hamburg rarely amounts to more than 25 per cent of the total traffic. In Germany's largest two cities the subdivision of traffic is as follows:

	Berlin	Hamburg
Street railways ...	51.68	40.1
Steam railroads (electrified at Hamburg)........	32.6	43.2
Elevated........	12.47	15.7
Buses........	3.25	0.31
Boats........	......	0.65

Vienna is unique in that its nearly 2,000,000 inhabitants have no rapid transit, so that the street railways carry about 95 per cent of the traffic. While a rapid transit system was laid out just before the war, the nearest approach to rapid transit is the coming electrification of the old steam Stadtbahn, which has been leased by the government to the city of Vienna. This railway is 38.8 km. (24 miles) long. Its layout is unfavorable for rapid transit, but it did carry about 40,000,000 passengers (8 per cent of the total traffic) a year up to the time of its shutdown on Dec. 8, 1918.

Flat and Zone-Fare Systems

A tabulation of fare systems shows that of the 47 undertakings, 22 had unit fares and 25 some form of distance fare. In Germany the proportion was as 10: 14; in the neutral states as 11: 4; in the succession states as 1: 7.

The totals show that the unit and zone-fare systems are fairly equal in number. The effectiveness of one or the other most depend upon local conditions and on the degree to which the public has become accustomed to either. In general, the unit fare preponderates in northern Europe and the zone fare in central Europe, as in Switzerland and the succession states. Berlin is on a flat-fare basis, while Hamburg favors distance fares. [Editors' Note—The original Berlin franchises called for a 10-pfennig fare in the city proper and 15-pfennig fares on the western suburban routes.]

Proportion that Fare Bears to Wages

The most desirable measure of the relative highness of fares in different communities appears to be the ratio of the fare to the weekly earnings of an average workman. If F is taken to represent the average fare and W the weekly wage the following table appears for the value $\frac{F}{W}$:

Cities	$F \div W$ in Ten-thousandths
Scandinavian........	20 to 25
Dutch........	24 to 29
Swiss........	15 to 23
Succession states........	30 to 38

German cities have been omitted from the foregoing table because the economic situation was too unsettled at the time this paper was prepared. In any event, the proportion for them is believed to be greater in most cases than in those included.

Another relation is the annual expenditure for fare compared to the local weekly wage. Let n represent the number of rides per annum. Then the annual expenditure will be "$F \times n$". The relationship to the weekly wage W is given by the equation $x = \frac{Fn}{W}$. As the value of $\frac{F}{W}$ for any given group of cities has already been determined as a constant K, we can write our equation as

$$x = Kn$$

We know, of course, that the number of rides ("n") per inhabitant per annum tends to increase with increase of population and area. Taking Vienna as an example, we have:

$F = 1370$ Kroner.
$W = 630{,}000$ Kroner.
$n = 285$.

Then

$$x = \frac{Fn}{W} = 0.62$$

Eliminating the German cities, it is found that the value of x in the smaller cities is 0.16 to 0.20; and in the larger cities, 0.5 to 0.6. In certain German cities, x attains as high a value as 0.8. This value brings the annual expenditure per inhabitant in comparison to the weekly wage up to the limits usually found only in world cities such as London. For example, Lord Ashfield in the June, 1921, *Nineteenth Century and After*, figured that a typical London family of five persons spend £16 a year, or four weekly wage payments, for transport. This amount corresponds to the value $x = 0.8$, since 0.8 multiplied by 5 (persons) = 4 (weekly wages). In Vienna, the value of 0.62 multiplied by 5 (persons) = 3.1 (weekly wages); but in some months of 1922 and 1923 the limit of 4 was attained.

Most of the undertakings reported that different rates of fare were charged according to time of day. About one-fifth of the properties (chiefly in the neutral states) sell individual reduced-rate rides for workmen; but all of the others except five cities have a substitute for this in the form of weekly cards or similar wholesale purchase concessions. The workmen's rates are usually valid up to times varying between 7:30 a.m. and 8:45 a.m. The reduction ranges from 30 to 50 per cent.

Limited-ride weekly cards are most common in German cities but season tickets, punch cards, tear-off coupons or ticket books are used in individual cases. One undertaking sells a workman's card which is valid during the morning hours to 8 o'clock; between 12 noon and 2 p.m.; and between 5 and 7 p.m. Another railway runs special workmen's cars from 3 a.m. onward at a reduction of 25 per cent. Only one property has departed from the peak-hour, reduced-rate custom by granting a lower rate between 9 and 12 a.m. when traffic needs most encouragement.

Higher fares for night hours begin, in some cases, as early is 7 p.m., but the usual hours are 9 to 10 p.m. with a few choosing an hour or two later. The night fare is generally one and one-half to two times the ordinary fares. In the case of after-midnight or owl service, there are seven properties which charge double to triple the ordinary rates. A detail tabulation follows:

PER CENT FARE DIFFERENTIALS ACCORDING TO HOURS AND HOLIDAYS

	Number of Railways	Reduction — or Increase +
Early morning........	10	30 to 50—
Late forenoon........	1	37—
Late evening........	19	14 to 100+
Owl........	7	20 to 230+
Round trip........	3	25 to 50—
Sundays and holidays........	2	21 to 25—
	5	46 to 100+

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*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Individual round-trip tickets (sold at 28 per cent reduction) are used in but one city. On two other properties, the holder of a transfer costing nothing to 50 per cent more is at liberty to return or to take a second ride at any time during the day.

It will be noted that seven systems have a different fare on Sundays and holidays, two making a reduction and five an increase in the rates. In some cases, the rate on holiday afternoons is double that of the morning, but not higher than the standard weekday fares.

On 31 properties transfers are free; on eight they cost 20 to 50 per cent more and on five they are not granted at all. The rules vary greatly as to the permissible number of car changes. A check at Vienna of season ticket or pass users revealed a transfer ratio of 80 per cent as follows:

20 per cent used no transfers.
46.7 per cent transferred once.
24.5 per cent transferred twice.
7.3 per cent transferred thrice.
1.5 per cent transferred four times.

In other cities, the transfer ratio is generally 25 to 30 per cent, with some cities below this range and others as high as 50 per cent. [EDITORS' NOTE—The transfer indentifications as described in the paper are similiar to those of American practice.] In a few cases the time limits are good for two hours or even for the entire day.

Children are carried free up to ages varying from two to six years or, in some instances, if they are not more than 1 m. (39.4 in.) tall. Most railways grant a concession to children up to twelve or fourteen years of age or, in some cases, if they are not more than 1.3 m. (51.2 in.) tall. The average reduction is 50 per cent, with some as low as 25 per cent and one as high as 88 per cent.

Three cities charge foreigners double to triple the standard rates.

A standard fare is the customary extra charge for parcels, only four undertakings charging by dimensions and three by weight. Twenty-three out of 33 which answered this question made no charge for small parcels. Twenty-five charged for large parcels and one carried them free with the understanding that the motorman would receive a tip. Large parcels are carried on the front platform.

Lap dogs are generally carried free, but sometimes a children's or a standard fare is exacted. Large dogs must ride on the front platform.

PREPAY TICKETS BECAUSE OF PAPER MONEY

Following the eliminatioon of metal money up to 80 per cent of the properties came to sell prepayment tickets to avoid the bother of paper money. The reduction for these prepaid fares averages 25 per cent; and the proportion of prepaid riders from 30 to 40 per cent. Swiss properties make use of both ticket books and punch cards. The books contain 18 to 33 (occasionally 50) individual tickets sold at reductions of 16 to 30 per cent. All but 10 of the German roads sell books of 10 tickets ordinarily and in other cases of five, six, 12 or 25 tickets. In but one case are these books non-transferable and usable only with the purchaser's photograph. These German books are sold at cuts of 7 to 20 per cent and they bring 15 to 25 per cent of the rides.

Of cities with more than 1,000,000 inhabitants, Vienna offers the only example of an important ratio of prepaid tickets. It has 21 varieties to account for 25 per cent of the traffic. The reduction ranges from 6 to 10 per cent for adults; and to 50 per cent for children.

Nine properties use punch cards and a still smaller number use tear-off coupons. Five properties issue paper tickets, but these are sold without any reduction in rate.

Four of the northern properties are using fare boxes and two of these also have automatic change-makers. Fare receipts are issued in many varieties with or without commercial advertising. On 15 properties in Germany, the fare receipts bear a simplified routing plan which is helpful to both passenger and conductor.

Almost all properties provide their conductors with punches and money satchels; with blue pencils for cancellation of receipts, transfers and tickets and with boxes for carrying the latter, etc. Practices concerning use of cancellation punch, tear-off and blue pencil vary greatly. Conductors are charged out daily with the value of tickets taken and they must make daily reports; but final settlement in most cases is made monthly, except on the smallest properties where daily settlements are the rule.

WEEKLY CARDS AND SEASON TICKETS SHOW WIDE DIVERSITY

Weekly cards and season tickets for periods ranging from half a month to a year are sold on all but nine properties. The weekly cards are for either 12 or 24 trips, such numbers as 13 and 14 being exceptional. Only 13 properties impose a non-transferability rule and of these but three require photographs of the original buyer. These weekly cards are usually limited to given routes and times of day. Exceptions include a weekly card which permits one ride on six successive Sundays. Weekly cards for students are sold at reductions up to 50 per cent.

As regards season tickets or passes there is a wide diversity in the extent to which they are used by the owners. It is assumed that a system-pass buyer will ride 100 to 200 times a month, and in some cases, 250 to 300 times. A traffic check made in Vienna during 1923 showed that the monthly cards were used about 200 times a month. [This includes the 80 per cent transfer ratio previously mentioned by the author.—EDS.] Individual route cards varied in use from 100 to 150 rides a month to a maximum of 210. The same habits are predicated of semi-annual and annual cards, but few are sold for such long periods. As transferable passes are assumed to have more use than personal passes, they cost 50 to 100 per cent more. Swiss properties sell passes on the basis of a decreasing charge for successive months within the same year.

To avoid the uncertainty of unlimited-ride transportation, some railways sell season tickets limited to two or four rides a day, which makes them similar to punch cards.

The popularity of the weekly cards and season tickets is shown by the fact that they account for 18 to 27 per cent of the rides in the large cities and 44 per cent of the rides in the other cities. The weekly cards secure about two-thirds of this wholesale traffic, attaining in some cases to 30 per cent of all traffic in a given community. In the metropolitan cities, the weekly cards account for only 3.5 to 8.5 per cent of the traffic. The proportion of system to individual route cards is as 2:3.

A comparison of the year 1923 with 1913 shows that most railways are doing a bigger share of their business with these wholesaling plans than in the past. In Vienna the increase has been fourfold, due chiefly to the inauguration of such cards for shorthaul riding. The latter type of cards in themselves account for 11 per cent of the traffic. Many cities have doubled their use of these cards and a few have trebled.

Season tickets are almost always non-transferable, and of the non-transferable type, 49 per cent must bear the buyer's photograph. The cards are renewed from month to month by means of stamps or, where no photographs are used, by purchase of entirely new cards. Season tickets are generally good on all days of the week; otherwise some increment is charged for Sunday all day or afternoon riding. They are sold at special reductions to employees of the public services, students, war cripples, blind, feebleminded, etc.

NUMBER OF PASSENGERS PER CONDUCTOR

From the author's researches, the number of passengers per conductor employed seems to average one per 105,000 passengers per annum. Only eight of the reporting properties used secret service in addition to the uniformed inspectors. On 15 properties, the ride-stealing passenger may be fined twice to ten times the standard fare.

The economic disturbances caused by the World War are shown at their worst in Germany where there were some 64 changes in rates, 30 to 40 of which occurred during the year 1923. During 1924, the gold standard mark (Rentenmark) was restored, and to date two to three reductions, amounting to 20 to 25 per cent, have usually been made in fares—sometimes three to five reductions. The succession states have had fewer variations in fares from pre-war days, viz., seven to 28. Vienna has had 22 changes in fares since 1913 of which nine came in 1922, when it was possible to make reductions of 5.9 per cent and 6.3 per cent.

The standard base fare in Germany before the war was 10 pfennigs (2½ cents). The present base fare on the gold standard is usually 15 pfennigs (3⅝ cents). Sometimes, the base fare is now figured on one instead of two initial sections or on a shortened initial section. Some properties charge double the original fare but have lengthened the ride for the base fare. In the neutral countries, present fares are 1.6 to 2 times the pre-war rates, and in one case they are 2.33 times as much.

These increases in fare were necessitated by increases in materials and wages. Befor the war, wages amounted to 40 per cent of total expenses; during the war and after, to 70 per cent and more. In the neutral states, the ratio of wage increase to fare increase was as 1.7-2.3 to 1; and in the succession states as 1.6-2.2 to 1.

The only thing that enabled some undertakings to continue business under these conditions was that the density of traffic was raised in proportions like the following:

Cities	Passengers per Car—Kilometer 1913	Passengers per Car—Kilometer 1923
Scandinavian.......	3.4—4.5	3.3—7.5
Dutch.............	4.0—4.3	3.6—5.3*
Swiss.............	3.9—5.2	3.9—6.0
Succession states....	2.1—3.9	3.4—4.9

* Year 1924

During the worst period of the exchange situation, 47 German street railways ceased operation. Nineteen of these were restored by May, 1924.

CONCLUSIONS

The changes which have occurred since 1913 have not been confined entirely to fares, although the tremendous upheaval caused by the war led to much experimentation back and forth—zone properties trying unit fares and vice versa. It is significant that in most cases the original system was restored, although compared with 1913 there seems to be a small increase in the number of unit fare systems.

Equipment and Possibilities of One-Man Cars[*]

More Than Half the Operators Use One-Man Cars—The Amsterdam Design Has Electro-Mechanical Safety Devices and, Like Malmo, Uses Passenger Stop-Light Instead of Bell or Buzzer Signals

BY T. EGBERT VAN PUTTEN AND EINAR HULTMAN
Amsterdam, Holland Malmö, Sweden

AFTER reviewing the course of one-man car development in the United States, the authors state that the consequences of the World War did not permit Europeans to follow with the same broad use of automatic equipment. The majority of one-man cars were simply the original vehicles with one man less and with entrance and exit (usually) at the front platform only. The delays so caused were not relished by the public nor did the operators themselves show enthusiasm for a system that increased their labors.

Nevertheless, the economies of one-man operation have been so great, even in the crudest installations, that every effort must be made to overcome these difficulties. This is obvious when one considers that on 55 properties which replied to the questionnaire and which operate very largely with two-man cars, the cost of platform labor averages 36 per cent of the income and 41 per cent of the outgo.

In view of this, it is desirable to introduce one-man operation gradually on many systems and, where possible, increase the service so that the rate of personnel reduction will not exceed the normal proportion of resignations. The authors of the paper, in submitting replies to the questions following, note that as conditions are rapidly changing, the answers received some time ago might be modified now.

Out of 57 replies to the question, "Do you believe that the increasing competition of motor buses will influence one-man car operation, aside from the general financial troubles now prevailing?" 35 were negative, 10 positive and 12 were either in doubt or considered the problem did not touch them. The authors state that owing to the large increase in motor-bus competition during the preceding year, a round robin at this time might prove more instructive. They believe that the motor bus now run in part as one-man vehicles, can become a very serious competitor. The buses are allowed to operate under more favorable conditions, notably in having no responsibility for paving expense; and in not being as yet subject to the stringent regulations concerning labor, upkeep, etc., that have been the lot of street railways for decades. A number of bus installations have shown far less reliability and continuity of service than the older rail lines, but some are operated on almost as high standards as the tramways. While municipal authorities may be persuaded to limit parasitical competition, it is the duty of the existing transport undertaking to operate motor buses where necessary and to take fullest advantage of one-man car opportunities.

Out of 58 undertakings operating or contemplating the use of one-man cars, 25 had complete or partial installation, two gave up such operation, 14 intend it. The remaining 17 are not contemplating such cars. In most cases, the change has been made merely by blocking off the rear platform. In one instance, where operation is two-man in the city and one-man in the suburbs, a detachable door is carried on the car for addition and removal on the rear platform. In another instance, exit but not entrance is permitted on an unguarded rear platform.

Safety appliances are considered necessary on rebuilt cars by 17 out of 41 undertakings, while 21 do not and three favor them to a limited degree.

Out of 41 managements, six believe in the deadman's handle, 29 do not and six think such a controller desirable although not absolutely necessary. One argument is that a safety device not practicable on the trackless bus surely cannot be considered essential to a vehicle bound to a definite path.

Door and step control by the car operator, whether manual, electric or pneumatic, is favored by 18 out of 38 properties replying. Another 18 do not favor them and two are in doubt as to which is most practicable. The 18 which favor door and step control are divided as to the merits of manual, electric or air operation.

Out of 38 replies, 15 consider it necessary to have distinct entrance and exit aisles. Of these, 14 would even use a barrier. Eighteen are against separation and 19 against barriers. Five see some usefulness in separation during rush hours.

As to the feasibility of having entrance at the front and exit at the rear with possible provision against entrance at the rear, of 36 managements, 14 say it is and 18 deny this, while four consider it difficult because of the small amount of supervision. To avoid loss of time from conflicting streams of passengers, it is suggested that during rush hours rebuilt cars might be operated with rear gates and eventually with rear doors under control of the car operator.

A mirror is considered practicable in case of rear-platform operation by 20 out of 36 replies, while 14 do not consider it practicable and two are without a definite opinion.

Doors opening automatically in emergencies are favored by only one in 38 replies, although all the others said that as a matter of course the doors, gates, etc., should be arranged for easy opening by the passengers.

Out of 37 undertakings, 11 favor a passenger-operated emergency brake with cords or levers, although one observes that an emergency connection of this kind is needless with deadman's control; 24 do not favor this and two are in doubt. The authors point out that unnecessary application of the emergency brake may cause damage. They suggest that a circuit-breaking connection might serve on properties in level country, leaving some passenger to manipulate the regular hand brake. However, it would be generally desirable to have some form of emergency connection which would both cut off power and operate the brakes.

Vestibuled platforms are felt to be a necessity on one-man cars by 30 out of 39 replies and unnecessary be nine, although some of the latter admit that vestibuling might prove advantageous. The authors favor vestibuling because this permits the removal of body doors and bulkheads to facilitate passenger movement and because a man handling paper money and receipts needs protection against drafts.

Out of 38 replies, five favor a seat for the operator, 27 do not and six are in doubt. There is a division of opinion as to where the seat should be placed. The authors suggest some type that can be moved when it is embarrassing to the operator.

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[*] Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Of 33 replies, 19 favor bulkheads and some even consider them a necessity. Eleven regard bulkheads as superfluous and three merely report that their present cars are so built. Those which consider bulkheads a necessity have platforms varying from 1 to 2 m. (39 to 78 in.) length. Most replies hold a minimum of 1.3 m. (51 in.) is required. The authors observe that the removal of the bulkhead is of advantage in enabling the operator to announce the stops more readily and to be more watchful.

Out of 34 replies to the question, "If you were buying new cars would you favor the American idea of full automatic equipment?" eight favor safety car standards, 17 do not and nine would recommend only a portion of the devices. The authors in commenting on the replies feel that a plan which brings such great economies but which demands so much more from the platform man ought to enjoy at least some protection against overcrowding so that the time for stops could be kept within limits. Furthermore, the greater maintenance expense will absorb but a fraction of the savings with improved one-man cars.

The answers to three questions regarding type and size of one-man cars favored were very diverse. Some believed that one-man operation should be confined to cars up to 30 passengers, but others held that it was possible with cars of 50 to 60-passenger capacity. Separate exit and entrance would be favored even on the small cars, while the larger type might consider entrance at the front and exit at the rear. If all interchange is at the front, the dividing line might be carried into the carbody for a length of 1.5 m. (59 in.). The authors suggest that one-man cars up to 50 seats are feasible on systems operating with unit fares, while other systems must be guided by the character of their fare tariffs.

Four out of 36 say "No" to the question, "Would you continue to give fare receipts, especially if you added fare boxes?" three are in doubt and the remainder say "Yes." The last consider such control absolutely necessary, or at least for transfer passengers. The replies developed that some undertakings are operating one-man cars payleave. Only a few managements had any experience with fare boxes.

Of 38 replies, 12 have a flat-fare system, 23 have not and three say they use flat fares only in part. It is admitted that the flat fare is undoubtedly the most advantageous for one-man operation, but that the difficulties with zone fares are not so great as might be supposed because it is just in the rush hours that many passengers ride on passes or season tickets which, of course, lightens the operator's work quite materially.

Of 35 managements, 14 consider one man operation practicable with zone fares and transfer privileges, nine do not, and 12 believe that it is limited to lines with light traffic. The authors comment that the extent to which such operation is possible depends upon local conditions and the co-operation of the platform men and the public. It is suggested that punching or other marking of receipts, transfers, etc., should be avoided in the course of a trip and that every effort should be made to do this at the terminals. It should also be made easier for the operator to issue receipts as passengers board.

Reduced-rate prepaid tokens or tickets are considered desirable by 18 of 35 managements; eight do not and nine are in doubt. It is observed that if no fare box is used, the fare receipts for cut-rate tickets would have to be special.

Retention of the passenger's bell signal was favored by 24 out of 35 replies, partly because it is so widely used now and partly because an acoustic indication is considered better than a light indication. Three favor light with the bell in reserve and three either have no choice or consider a verbal demand good enough.

Trail cars with one-man motor cars was felt to be practicable by 21 out of 33 managements, while 12 are of the contrary opinion. There seems to be no choice between bell and light signals, but the authors believe the latter will probably become more common.

Out of 36 replies, 17 would pay a premium to one-man operators and 17 would not. The increase varies from 1 to 15 per cent, but the majority think 10 per cent right. The authors judge that an increase is justified in those cases where one-man operation has to be introduced gradually with some provision toward giving a share of the benefits to the personnel to secure their interest.

The replies varied greatly as to prohibition of smoking, but some permitted smoking on the rear platform at any rate. The authors state that special roof ventilators are expected to help in the question of better ventilation.

The advantages of one-man cars in the opinions of the operators are summarized as platform saving, better schedules at the same cost and fewer accidents.

The disadvantages are delays in heavy service, slower schedule speeds, more stolen rides and draftier cars. Some replies suggested that delays in standing time could be made up by faster running time.

ONE-MAN CARS AT AMSTERDAM

Following the questionnaire and replies thereto, the authors presented details of the modernized one-man cars which have been installed under Mr. Van Putten at Amsterdam and Mr. Hultman at Malmö. The latter was fully described in ELECTRIC RAILWAY JOURNAL, for Feb. 9, 1924.

As only a brief description of the Amsterdam car appeared in ELECTRIC RAILWAY JOURNAL for April 12, 1924, it may be well to mention its outstanding features. Mr. Van Putten, after visiting the United States was convinced that anything but real safety car operation was unthinkable for Amsterdam. He was unable, however, to use the then standard Birney type because the cars were too light, there was only one door for entrance and exit and the automatic equipment was air-operated. He therefore prepared specifications for a larger and heavier design with double-door platforms. Five such cars were built by the Linke-Hofmann Works, Breslau, and fitted with the Bergmann Electric Company's one-man devices. These cars operate on a one-fare route with the comparatively high traffic density of 15 passengers per car-kilometer (a kilometer = 0.62 mile).

The special features of these cars include the following:

The "in" and "out" doors are controlled electro-mechanically by the operator, separately or in tandem.

The doors and folding steps work in unison.

The draft rigging with trailer operation has shock absorbers to avoid injury to riders when starting.

The car cannot start before the doors are closed.

The emergency opening of a door opens the power circuit.

Short-circuiting brakes are used, but part of the energy is shunted to two magnetic track brakes which show red signal lights on the bulkhead while in circuit.

Release of the deadman's control handle cuts off the motor circuit but sends current to the track brakes. The deadman's device can be made inoperative by a pedal when the seated operator is using both hands for fare collection and the like.

One ½-hp. 220-volt roof-mounted motor per platform cares for door operation. These motors have functioned successfully for two years in a daily service exceeding 200 opening and closing movements.

Another feature is the use of an illuminated fare box with coin-tilting table.

Because of the success with new cars, 15 old ones have been fitted with some of the same devices. As space limitations did not permit separate entrance and exit via the front platform, these cars are operated front-entrance and rear exit. Unauthorized rear entrance hitherto has been prevented by a three-arm turnstile. The older cars have no deadman's handle or track brakes.

Mirrors give the operator a view of the rear platform.

To reduce car noises, the passengers' push button does not actuate a bell or buzzer but closes a line-voltage circuit which causes a red lamp to light alongside the operator.

In general, these cars eliminate step accidents and do not delay passenger interchange owing to separate aisles for entrance and exit.

The standard 10-cent fare is dropped into a box. No receipts were issued during the turnstile period.

Smoking is permitted on the rear platform.

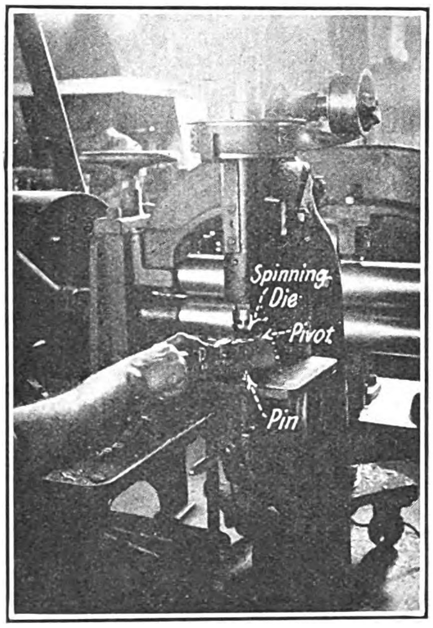
The reconstruction cost of the cars did not exceed 5,000 guilders ($2,010) per car while the platform labor saving alone is 7,000 guilders ($2,814) a year. The service was increased about one-sixth to permit an equal number of riders to be carried during the rush hours. The net annual saving on twelve cars is 50,000 guilders ($20,100) a year.

Because of an accident in which a two-man car was derailed with its front end hanging over a canal, agitation was begun against one-man cars with rear platform turnstiles. As a result, the City Council ordered the removal of the stiles. This will necessitate a return to fare receipts which are to be issued by machine.

Maintenance of Equipment

Spinning Rivets on Controller Fingers

WHEN a rivet is driven by ordinary methods through a number of thin laminated pieces of material, it is difficult to make sure the several pieces are pulled down tightly against each other when the rivet head is formed. This condition is encountered in riveting together the laminations of controller cylinder fingers.



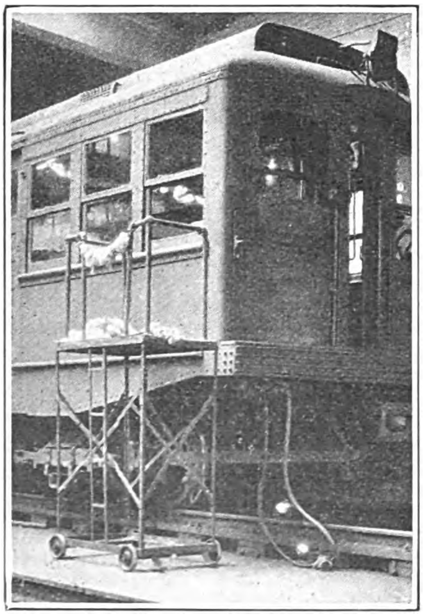
A Rivet Spinning Machine in the Twin City Rapid Transit Company's Shop Has Been Found to Do Very Good Work in Riveting Controller Fingers

The mechanical department of the Twin City Rapid Transit Company has found a rivet spinning machine to be very useful for doing such work. Not only is the production equal to or greater than can be obtained by driving the rivets, but the spinning method has been found to give a much better job. There is no tendency for the shank of the rivet to swell between the laminations, as is the case with a driven rivet.

The die shown in the head of the machine in the illustration is a common commercial type of rivet spinning die. The various parts of the controller fingers are assembled in the jig shown, which is fastened to the bed of the machine. This jig pivots about a point at the back end. The operator grasps the handle on the jig, holding the parts in place with his finger, as shown. He then swings the jig over so that the rivet comes into position under the spinning head. A pin in the bed of the machine, shown in the illustration, can be depressed so as to allow the jig to swing under the spinning head, and upon being released this pin engages a hole in the bottom of the jig, so as to hold it in exactly the right position. The head of the machine is depressed by means of a foot lever manipulated by the operator. The rivet head is formed very quickly, giving an unusually smooth, well-formed job.

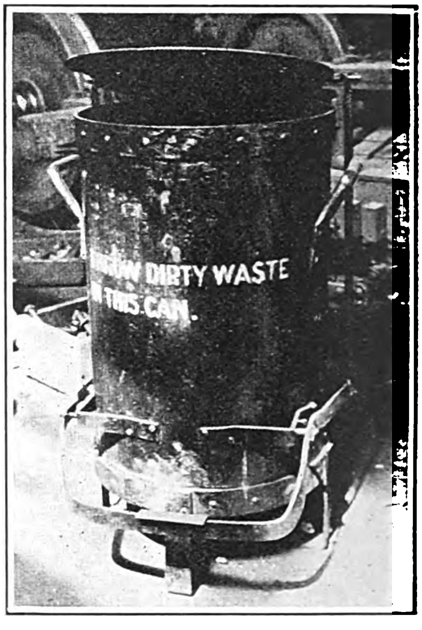
Car Cleaners Use Self-Propelled Carriage

TO AVOID the necessity of the car cleaner climbing up and down a ladder and moving it from place to place when wiping the outside of a car and washing the windows, an easily movable carriage has been developed by the Boston Elevated Railway. This is a simple framework made of iron piping and placed on four small iron wheels. The car cleaner stands on the platform, which is so arranged as to height that he can wipe the entire side of the car from top to bottom for as wide an area as his arms can reach. After he has done this he grasps the car body firmly and rolls the carriage to a new position. It is thought by the company that this device has more than doubled the efficiency of the men cleaning car exteriors. It is being used in all the shops and carhouses of the company where there is a concrete floor on which to operate the carriage.



Easily Movable Carriage Which Has Doubled the Efficiency of the Exterior Car Cleaners

Self-Closing Waste Can



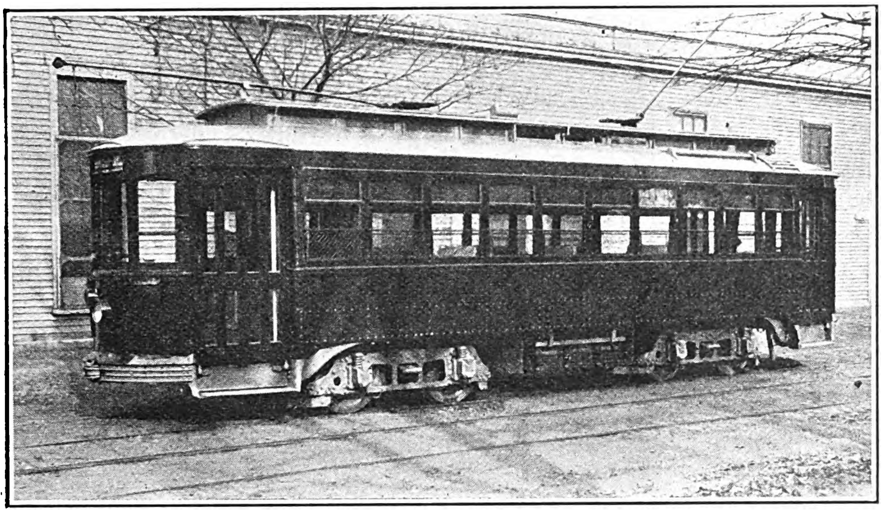
This Type of Waste Can Has Foot Control of Hinged Cover

REALIZING that good housekeeping is one of the most important elements of fire prevention, cleanliness has been promoted in the Wheaton shops of the Chicago, Aurora & Elgin Railroad by the use of improved waste cans. By the device installed there the problem of keeping the waste in the can and the lid shut was solved successfully. The can, of the usual 30-gal. sheet-iron variety, was provided with legs, and a heavy lid hinged at one point so arranged that it can be opened by means of a foot treadle. The four legs are made up of 1½-in. x ¼-in. steel bars bent to the proper form and riveted to the side and bottom of the can. About 6 in. from the bottom of the can, two pieces of 1-in. x ¼-in. steel bar, bent to form a right angle, were riveted to the side of the can. These form a support for the fulcrum of the simple lever which extends from the foot treadle in front to the connecting rods located on each side of the can. These rods connect with projections fastened on the lid and serve as a means of transmitting the motion of the lower lever to the can top. With this arrangement it is possible to step on the treadle at the front and cause the lid to rise. The foot lever is made up of ¼-in. x 1-in. material, the connecting rods of ½-in. round steel and the projections on the lid are of ½-in. round iron forged out flat on one end in order that it may be riveted to the lid. The lid is held shut by its own weight. On each side of the can is a handle located in a convenient position for carrying.

The outfit is painted black, and the instruction "Throw Dirty Waste In This Can" is stenciled on it in yellow paint. Several of these cans are located about the shop and have proved a means of keeping the shop clean.

Simplified Color Scheme Aids Spray Painting

IN ORDER to reduce the expense of car painting, in so far as it is possible to do so without seriously detracting from the appearance of its vehicles, the Eastern Massachusetts Street Railway has reduced the number of exterior colors to two. The entire body is painted yellow, while gray is used for the roof, trucks and the other equipment under the car. No striping or lettering is done except the placing of a number in the center of the side.



The Cost of Car Painting Has Been Reduced by the Use of a Simplified Color Scheme Without Striping or Lettering

Two exterior colors are applied by means of a De Vilbis spray painting machine. The window guards, which are black, are painted by a dipping process. Windows are left in place during the painting process and are protected by a coating of Preservit. After the painting has been completed, this coating is removed and takes with it all paint which may have spattered onto the glass.

Spray painting is used also inside the cars for the floors and sides. The headlining and the ceiling on the platform, which are white, are painted by hand. Such small equipment as may be located inside the car is also hand painted.

In order to encourage riding by keeping the rolling stock clean and fresh looking, each car is painted once every 14 months. It is said that the use of the color scheme here described and the spray painting process has cut in half the cost of car painting.

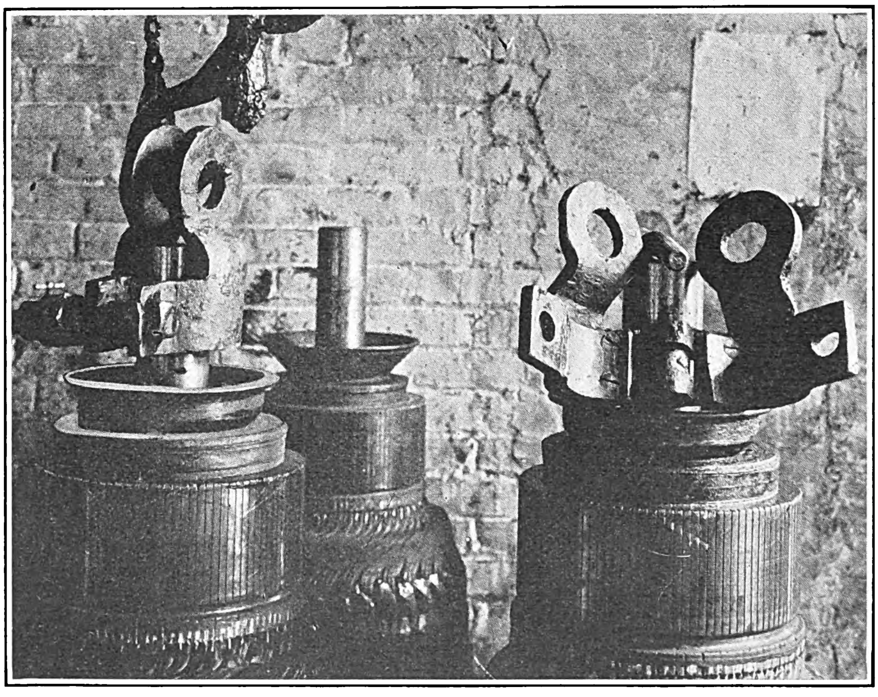
Clamp Holds Armatures in Vertical Position

By R. S. Neal

Assistant Superintendent of Equipment, Kansas City Railways

IN THE shops of the Kansas City Railways it has been found advantageous to handle armatures in a vertical position during the operation of dipping and baking. They are dipped with the pinion end down, and are baked in the same position, to avoid excess flow of varnish to one side, as would be the case if they were drained or baked horizontally.

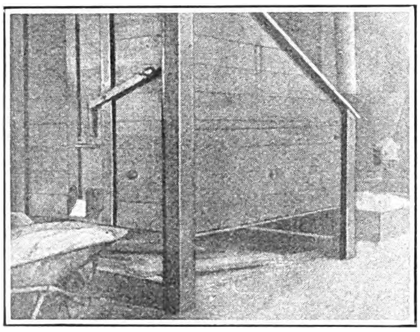
The type of clamp shown in the accompanying illustration, while of simple construction, has proved handy and safe for lifting and moving armatures about by the commutator end of the shaft. This clamp is shown in both the closed and open positions. It consists of two forgings hinged together at one side, while the other side is held together with a bolt which pulls the clamp tight on the shaft and holds it securely. The inside faces of the clamp that come in contact with the shaft are lined with soft copper to prevent any possibility of scoring it.



This Clamp Is Used at Kansas City to Handle Armatures in a Vertical Position for Dipping and Baking

Sand Storage Simply Arranged at Decatur

SAND for use on the interurban cars of the Illinois Traction System is stored in a simple wooden sand bin in the Decatur shops. The bin is 6 ft. high by 6 ft. long by 5 ft. wide and has a capacity of approximately 6 cu.yd. The sloping top contains a six-mesh, No. 14 wire screen, 5 ft. long by 4 ft. wide. A sliding metal door at the forward end, operated by means of a lever and link, closes a chute opening by means of which sand may be poured into a wheelbarrow. To the rear of the bin is located a No. 2 Viloco sand dryer of 1 cu.yd. capacity, manufactured by the Vissering Company. After the sand has gone through the dryer it is shoveled onto the screen of the bin. The sloping top is thus of great convenience. This removes any foreign matter or large particles of sand which would be undesirable for use in the sand box on the cars. Sand is drawn off into a wheelbarrow as needed. The simplicity in the construction of the bin and the lineup of the various parts of the apparauts are the outstanding features of the arrangement.


Sand Storage Bin of 6 Cu.Yd. Capacity Has Screen Sloping Top Through Which Sand Is Screened After Removal from Stove Type Sand Dryer

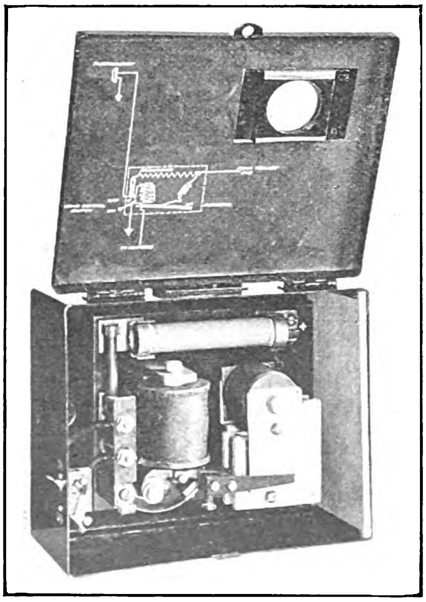
New Equipment Available

Developments in Thermostatic Control

By LEE P. HYNES

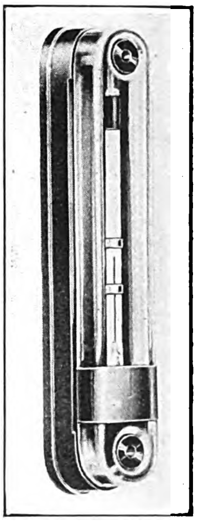
Consulting Engineer Consolidated Car Heating Company, Albany, N. Y.

IN THE first thermostatic control equipments much of the sensitiveness of the thermometer was lost through the metal casing and also through the retarding effect of the car walls. Crews found that without fear of detection they could break the thermometer and keep the heat on continuously, by pressing on the metal case sufficiently to crush the glass tube.


Improved Main Switch for Thermostat Control

A molded glass cover instead of a metal cover has provided a satisfactory solution of the trouble and is used in the Consolidated Car Heating Company's thermostat of the latest type as shown in an accompanying illustration. A back plate of molded insulation keeps the car wall from affecting the operation and provides insulation for the electrical connections. The molded glass cover is mounted on this base with a yielding cushion, covering the mercury tube, which is also mounted in yielding supports to take up any shocks or jars. The glass cover has no openings, as temperature changes are more readily carried to the mercury by direct conduction through a thin strip of copper. This is folded around the outside of the glass case, looped under its edges and clamped around the mercury bulb. This strip is insulated from actual contact with the cover. The glass cover must be smashed before anyone can tamper with the thermostat and the mercury tube is clearly visible.

Improvements have also been made in the main magnetic switch controlled by the thermostat. . Early mercury thermostats were unable to handle much current. Sparking on the contact points oxidized the mercury and ruined the tube. The new equipment includes simply a main switch having an operating magnet, a blowout coil, a series resistance and a fuse for the thermometer circuit. It has no relays, no auxiliary circuits nor contacts, no shunt resistances such as were used with previous equipments. The mercury simply shunts the magnet coil and by a correct design and balance of current values, there is no overloading of the mercury contacts. Three new convenient features have been added to the equipment: (1) An indicator visible through a glass window in the switch box shows whether the switch is open or closed; (2) A small control switch on the side of the box permits the conductor to throw the heat control off or on at will; (3) An opening in the side of the box allows easy inspection and cleaning of contacts.


Visible Mercury Thermostat With Molded Glass Cover

When the small switch in the "off" position, the main switch opens and keeps the heat off until the switch is reset to "on." When the control switch is thrown to the "on" position, it throws the thermostat into control. If heat is needed, it will be turned on, but the thermostat cannot be prevented from shutting off the heat when the car attains the desired temperature.

In the new design an inspector can see at a glance the position of the mercury column, owing to the glass thermostat cover, and also the position of the main switch through the glass window in the switch box. The switch box cover can be locked if desired and need only be unlocked for replacement of a fuse or inspection of contactor tips. The opening in the side of the box for inspection of the contacts is closed by a transite liner.

When the box cover is open, the transite wall shown at the right in the illustration can be pulled out and the contacts inspected or cleaned through the end opening in the box without removing the arc chute.

The News of the Industry

Springfield Franchise Passed

Voters of Illinois City Pass Ordinance Giving Rights to Railway for Twenty Years

An extension of its street railway franchise was obtained by the Illinois Power Company in Springfield at the election on Nov. 4. The majority in favor of the proposal was 2,500. More than 26,000 votes were cast. The extension is for 20 years, the time limit in Illinois. The existing grant of the company does not expire until 1928, but the approach of the expiration date made it difficult for the company to plan ahead satisfactorily and to arrange the best terms for future financing.

Proposal Rejected in the Spring

Early in the spring a franchise proposal was submitted to the City Council and approved by the members of that body, but when the matter went before the voters in April it was defeated by a small majority. At the spring election, just as at the later one, the principal dissenting voice to the company's proposal was raised by Commissioner Willis J. Spaulding. Mr. Spaulding operates a municipal electric light and power plant at Springfield and is president of the Municipal Ownership League of America. If the matter were left to him he would municipalize the entire transportation system of Springfield. He is also a motor bus enthusiast and professes to see the day ahead when street railways in cities of the size of Springfield, some 60,000, will disappear. In order to bolster up this profession he told only parts of the story with respect to the use of the bus in Bay City, Saginaw, Decatur, St. Louis and other cities. He dangled in the faces of the voters of Springfield the prophecy that a complete, new, modern bus system could be installed and operated successfully on a 5-cent fare either by the city or a private concern for $500,000 and provide "much better and cheaper service" than that supplied by the railway.

One Dissenting City Commissioner

The Mayor and the three other commissioners answered Mr. Spaulding's strictures effectively. It is impossible here to recite all the points that they made. Their principal reasons for favoring the franchise were summarized by the commissioners and kept constantly before the public. As they saw it the ordinance does these things:

Protects all the rights of the people, including the right of purchase by the city, at fair value when the city is ready to buy.

Compels adequate transportation service to be furnished.

Requires the company to pay approximately a half million dollars into the city treasury for use of streets during the life of the franchise.

Requires the company to pay the expense of paving between its tracks and 1 ft. outside of rails, thereby insuring no interruption of the city's great improvement program.

Does not in any way interfere with the use of streets for buses and other means of public travel. The franchise is confined to street car travel only. The city is free at any time to decide as to future plans relating to other means of transportation.

The Springfield company has not been slow to take up the bus. It is now operating five vehicles in service coordinated with its railway lines. The company also conducts the electric, gas and steam heating services in the city and supplies electric service to DeKalb and Sycamore. The present fare is 7 cents cash with four tickets for 25 cents and 40, 50 and 60-ride monthly tickets to be sold for $2, $2.50 and $3 respectively.

Extension of Time Likely for Improvement of Yonkers Lines

Admission has been made by Assemblyman Alexander H. Garnjost of Yonkers, representative of the Fourth Assembly District, Westchester County, that the New York Central Railroad Company cannot be expected to fulfill the requirements of his electrification bill. This bill was adopted at the last session of the State Legislature and provided for the electrification of the Getty Square branch and main line of the Putnam Division within the Yonkers city limits by Jan. 1, 1926.

Assemblyman Garnjost says he will offer an amendment to his bill at the next Legislature granting the New York Central Railroad a time extension for the improvement of its Putnam lines in Yonkers.

The railroad has been working out the plans and specifications necessary for the improvement, but there are several reasons why the road could not be electrified by Jan. 1, 1926. Principal among these is the fact that all grade crossings must first be eliminated, in accordance with a recent state law. Another reason is the unavoidable delay which the railroad must face in securing steel for the various bridges which must be reconditioned.

Assemblyman Garnjost, after explaining these reasons, said the railroad must show "good faith" in its plans for the electrification of the Yonkers sections of the Putnam Division, i.e., must either make known its plans or commence the work, before he will offer an amendment to his bill granting the New York Central the necessary time extension.

George W. Kittredge, chief engineer of the New York Central, has estimated the cost of improving the Getty Square branch at $2,000,000 and of the main line at $4,000,000. The plans have not yet been approved by the Public Service Commission.

Buses for Detroit

Emergency Bus Lines Being Run There by Department of Street Railways as Municipal Enterprise

The Detroit Department of Street Railways does not own any buses, but one bus line is being operated by the city and another is to be put into operation. As soon as the buses are delivered that the city intends to purchase three lines will be established. The equipment in use on the Belle Isle line is owned by the Department of Parks and Boulevards. Bus service is being started on the Eight Mile Road, west of Woodward Avenue. The buses will run from the Eight Mile Road and Livernois Avenue district to the Highland Park plant of the Ford Motor Company. The route will cover approximately 5 miles in territory not now served by any kind of transportation. The seven buses to be used will be rented from the Detroit Motorbus Company.

As indicated by the desire of the commission to purchase additional bus equipment the new services just mentioned are only a beginning. The Street Railway Department has made extensive plans for bus service, including the conversion of the Kercheval-Concord carhouse into a modern bus terminal. It is proposed to use the terminal to house the buses on the Belle Isle line and the buses for the proposed Mack-Warren bus line. It is planned to care for the street cars now housed in the carhouse at the yards at St. Jean and Kercheval Avenue.

The rate of fare to be charged on the Eight Mile Road bus line has not been announced. The department will guarantee the bus company the cost of operation, but the line will be operated without profit to the department. It has been announced by the D. S. R. management that the fare will not exceed 10 cents, a charge which will be reduced as patronage of the line increases.

Three buses were supplied by the Detroit Motorbus Company when the D. S. R. was constructing the new Mount Elliott line, which has just been put into service. The new railway serves as a feeder to the Gratiot Avenue line and comprises 2 miles of new track beginning at Gratiot and McDougall Avenue. At Mount Elliot Avenue a spur track runs to the rear of the Dodge plant. Cars enter through a subway into a prepayment station similar to the one in use at the Ford plant at River Rouge.

The Street Railway Department recently placed posters in the cars stating that operation of the bus service depended upon the action taken by the Council. The posters show pictures of the double-deck buses which the commission has recommended for use.

Retail Merchants Want Cars

Discussion Between Mayor Hylan and President Huff of the Third Avenue Railway, New York, Broadcasted

Retail merchants on Forty-second Street and 125th Street, New York, bitterly oppose any plan to remove the crosstown tracks in those streets, as suggested by Mayor Hylan. They declare that such action would prove a great loss to their business, and they are decidedly against any suggestion for the substitution of buses for cars. The Third Avenue Railway has a pile of letters to this effect. They are the result of a brief canvass made by the company following a letter it received on Nov. 13 from Mayor Hylan. This letter, which was addressed to President S. W. Huff, said, in part:

> Why do you send your people about getting petitions signed to continue a public nuisance? You realize that cars running in the middle of the street, as they do on Forty-second Street and 125th Street, as well as other streets in the city, are a menace to the lives of the people in boarding and leaving these cars.
>
> You do not seem to realize that buses will replace these surface lines. At least you should be alive to the situation and make some progressive move yourself.
>
> Some of the people who have signed these petitions and written letters I understand have expressed themselves in favor of buses.
>
> The New York Railways realizes that buses will take the place of their surface lines and has made a request to the Board of Estimate and Apportionment to this end, and no doubt the board will give serious consideration to same.

On the day the letter was received a quick canvass was taken of the opinions of the retail merchants affected, and these testimonials, with a letter from President Huff, were transmitted to the Mayor on Nov. 14. The correspondence, with quotations from some of the letters from the merchants, was then made the subject of a radio talk Nov. 14 from the Third Avenue broadcasting station at Third Avenue and 130th St. A portion of Mr. Huff's letter to the Mayor follows:

> Some of the more than 200 people who wrote personal letters opposing the removal of tracks on Forty-second Street and on 125th Street may have expressed themselves in favor of buses at other locations, but their letters undoubtedly expressed their wishes with regard to the street upon which their business is located, and they are emphatic against the removal of track from these streets.
>
> Passengers in boarding cars away from the sidewalk expose themselves to no more risk, if as much, than they do in crossing streets. The records show that there have been comparatively few accidents from this source, and when once on the cars passengers are practically immune from accident by reason of the stability of the car and its freedom from danger to which buses are exposed.
>
> You are correct in your statement that I do not seem to realize that buses will replace these surface lines. It is hard to realize a mere theory when you are confronted with facts that contradict it. The fact is that buses have not supplanted trolley cars to any substantial extent where the travel is sufficient to justify trolley car operation, and that where attempts have been made so to supplant car operation the business interests have suffered to such an extent that street car service had to be resumed. There may be developments in the future which may justify the substitution of buses for trolley cars. If so, it is purely an economic question and will solve itself, but there is nothing at the present time that would indicate such substitution will take place.
>
> With regard to the proposal of the New York Railways to remove its tracks and substitute buses, I think you will be able to judge better just what this means if you were to ascertain which tracks they are proposing to remove. The companies of the Third Avenue Railway System have, by regular proceedings, abandoned and for the most part removed during the last 5 or 6 years in the territory occupied by the New York Railways, approximately 27 miles of trackage for the reason that the operation over this trackage no longer served any large public purpose or was justified financially. During this period the New York Railways, although it had discontinued operation of a substantial amount of trackage, has not legally abandoned this trackage by reason of being in the hands of a receiver. When you have finally ascertained just what trackage that company is proposing to abandon, I doubt very much whether you will find that the New York Railways proposes to abandon any substantial portion of its trackage that is now being operated.
>
> I wonder, Mr. Mayor, whether you couldn't find the time in the near future to talk this thing through with me. We are both trying to serve the same people, to ascertain their wishes and to do that which is best for them. Something might be gained by a free discussion of this matter. Will you see me?

Studies made by the Third Avenue Railway of the passengers and vehicles passing certain points in congested districts indicate the disproportionately large amount of street space per passenger carried taken by motor vehicles as compared with that taken by trolley cars. Below will be found a table of studies in congestion made during the early part of this year. Studies of this kind are being continued by the company.

STUDIES IN CONGESTION

		Total Passengers	Total Vehicles	Passenger per Vehicle	Square Feet Street Space per Passenger Carried
Count 1—	Cars	3,373	84	40	8
	Autos	829	437	1.9	43
Count 2—	Cars	14,031	500	28	13
	Autos	4,948	2,546	1.9	42
Count 3—	Cars	9,875	264	37.4	8.95
	Autos	10,559	5,287	2	40.5
Count 4—	Cars	2,487	39	64	5.6
	Autos	2,438	877	2.75	28.7
Count 5—	Cars	993	20	50	7.1
	Autos	314	218	1.4	55.2
Count 6—	Cars	5,590	138	41	8.7
	Autos	2,598	1,779	1.5	35.4
Count 7—	Cars	1,500	77	19.5	20
	Autos	4,615	2,436	1.9	43

Count 1 was made at Forty-second street and Broadway Jan. 17, 1924, 5 to 6 p.m., westbound.

Count 2 was made at Forty-second Street and Broadway, Jan. 17, 1924, 12 to 8 p.m., westbound.

Count 3 was made at Broadway and Fiftieth Street, Jan. 23, 1924, 12 to 8 p.m., northbound.

Count 4 was made at Broadway and Fiftieth Street, Jan. 23, 1924, 5 to 6 p.m., northbound.

Count 5 was made at Broadway and Hudson Street, Yonkers, Jan. 7, 1924, 5 to 6 p.m., northbound.

Count 6 was made at Broadway and Hudson Street, Yonkers, Jan. 7, 1924, 12 to 8 p.m., northbound.

Count 7 was made at North Avenue and Burling Lane, New Rochelle, Jan. 19, 1924, 12 to 8 p.m., northbound.

New York City Must Answer $30,000,000 Charge

Under a decision rendered by the United States Circuit Court of Appeals on Nov. 20 the city of New York must answer a charge made by Lindley M. Garrison, former receiver of the New York Municipal Railroad Corporation and allied companies, now included in the B.-M. T., that the city caused damages approximating $30,000,000 to the railway corporations. The suit begun by Mr. Garrison charged that under an agreement made in 1913 the municipal authorities failed to carry out certain plans for the extension of the transit system to which they were committed.

Judge John C. Knox recently granted an order requiring the city to answer this complaint and corporation Counsel George T. Nicholson took an appeal to the Circuit Court of Appeals.

Report Delays Settlement

Citizens' Committee Insists on 7½-Cent Fare in Cincinnati—Directors Call Negotiations Off

Insistence upon an absolute and unconditional guarantee of a 7½-cent rate of fare for the first three years of the traction franchise by the citizens' committee in a report to Mayor Carrel threatens to undo at the eleventh hour the work of the conferees in the electric railway negotiations with the city of Cincinnati, the Cincinnati Street Railway, the Cincinnati Traction Company and the public. The result may be a continuance of a 10-cent rate of fare, if not a further increase, after Jan. 1. The directors of the Cincinnati Street Railway in a formal statement issued on Nov. 22 absolutely decline to accept the recommendations of the citizens' committee and insist that they will go no further with the present negotiations.

In its report to the Mayor, the citizens' committee says in substance that "the ordinance as drafted is much superior to the present ordinance, that there was an agreement as to fundamentals and that the ordinance should be sent to the City Council for passage after it is modified to provide for an absolute guarantee of a 7½-cent rate of fare for the initial three-year period of the grant." It is this provision to which the directors of the Cincinnati Street Railway take exception.

Under the terms of the ordinance as drafted the new operating company, the Cincinnati Street Railway, proposes to rehabilitate the entire system and to improve the service. It will immediately create a fare control fund of $400,000 to insure stabilization of the rate of fare. If the operating expenses of the company exceed the income from fares, the company will be permitted to draw upon the fare control fund until it is down to $200,000 if necessary before any increase of fares will be permitted. There is an additional guarantee for the first three years of a low rate of fare, since the proposed ordinance provides that during that period the company must feed into the fare control fund one-sixth of the return allowed upon capital as soon as the fund goes below $400,000. So that under the terms of the grant, even before the fund is reduced to $200,000 the company is compelled to give up a part of its earnings in the interest of a low rate of fare. After that has been done and the fund is reduced to $200,000 an increase is then permitted. During the negotiations the company sought to modify that clause so that in the event of the granting of a higher wage to the platform men it would not be compelled to devote any of the return on capital to keep down fares. Upon the insistance of City Solicitor Saul Zielonka and Street Railroad Director W. J. Kuertz, however, that modification was not included in the grant.

The company's representatives, however, during all of the negotiations have refused to accept a clause that would guarantee unconditionally a 7½-cent rate of fare for the first three-year period.

Boston Mayor for Municipal Ownership

Mayor James M. Curley of Boston advocated before the special legislative committee on the finances and control of the Boston Elevated Railway that the Elevated should be taken over by the cities and towns in which it operates and the fares reduced to 5 cents. He would tax the communities for the deficit from operation. The committee heard the Mayor on Nov. 25.

Under the Mayor's plan the communities, constituting essentially the Metropolitan area, would take the Elevated by condemnation, after the property had been valued, and then manage the road by a board of public trustees, as at present. Mr. Curley says two of the trustees should be appointed by the Mayor of Boston and three by the Governor of Massachusetts. The Mayor contended that in regard to its importance to the public the railway should be considered a civic problem on a par with the schools, the water system or the sewerage system. High real estate values and proper conduct of business could be assured only if the railway received proper civic consideration. There are 500,000 private autos in Massachusetts and many bus lines, and it is the Mayor's idea that the car riders should no longer be required to support the electric railways. The Mayor figures that it would increase the taxes about $9,000,000 to make the railway a direct charge on the community, but Representative Henry L. Shattuck of the committee estimated that the tax increase would be nearer $14,000,000.

The committee is charged with the responsibility of recommending a policy with respect to the future operation of the Boston Elevated. It is expected to file its report by Dec. 15.

Bus Legislation Likely in Indiana

Utilities and bus operators are wondering what will happen at the session of the Indiana Legislature next January. It is significant to note that in the recent political campaign the successful candidate for Governor, while he stated that all unnecessary commissions should be abolished, did not specify just what commission he meant. This is considered by utility operators to mean that the administration will not look with favor on the abolition of the Public Service Commission.

On the other hand, the State Chamber of Commerce has launched a movement for a bus and truck regulatory law. It is planned to make a survey of the traffic needs of the entire state and present reports to the individual chambers of commerce and civic bodies in each city. They will be asked to study the reports and present suggestions to be condensed into a bill which will be introduced in the Legislature.

The question of bus regulation first came up two years ago at a meeting of the Assembly, but a movement to provide regulation was defeated. The development of bus transportation in the state has reached such huge proportions during the last two years that this question is most certain to come up again at the next session. In fact, officials of city and interurban railways are insistent that some sort of regulation be imposed on bus lines. The main contention at the last session on the part of bus men was against the form of the bill rather than on the principle of regulation. It would appear to be natural to seek to put the bus lines under the jurisdiction of the Public Service Commission, but members of the commission say they are overworked now and cannot assume additional responsibilities.

Objections to Pittsburgh Looping Will Be Heard

The City Council of Pittsburgh, Pa., recently voted to conduct hearings on request of objectors to the plan of the Pittsburgh Railways for rerouting downtown cars. The action was taken after the Council had been advised that a decision on the plan was a matter for the Traction Conference Board, and that the Council was not to be regarded as a factor in a rerouting plan. Much discussion has taken place since the company formulated its plan for short-looping in the business district. The main points in the plan were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 22. In talking to the Real Estate Board recently about traffic problems, Arthur W. Thompson, president of the Pittsburgh Railways, discussed the proposed changes in routing and the reduction in the size of the loop in the downtown district. He said that at the present time there was a crisis in congestion caused by the increased number of vehicles entering the area during the day—80,000 vehicles at the present time, not including the street cars. Mr. Thompson said that it was because of the lack of transportation facilities that people had been forced to a greater use of automobiles and that this was one of the very things which was bringing about a greater congestion and which the company was trying to remedy or temporarily relieve.

He referred to the routes which would be shortened and the few streets to be converted into one-way thoroughfares. It was proposed, he said, that the loops be extended on Sundays, holidays and in off-peak hours at night.

Passes Popular the First Week in Oklahoma City

Whether the weekly passes now sold by the Oklahoma Railway, Oklahoma City, Okla., giving unlimited riding on the street cars for $1.25 a week, will prove to be a sufficient booster for traffic to work the company's salvation in the crisis that has been growing more acute for several months, the pass is proving popular with some car riders. About 500 passes were sold during the first week. The records show that the average cost of each ride by holders of the weekly passes was 5.4 cents. The passes are transferable and are good on any street car at any time during the week for which they are sold for as long a ride as the holder cares to take. The company has an application pending with the Corporation Commission for a 10-cent fare, on which a hearing has been set for Dec. 5.

Fare Increase Imperative, Says Twin Cities Head

An oral hearing has been set for Dec. 1 before the Minnesota Railroad Commission, on the petition of the Twin City Rapid Transit Company for an increase from its 6-cent fare.

Horace Lowry, president of the company, recently stated that the present fare means confiscation of property, and that a 7-cent fare is absolutely necessary. The traffic decline on the line has been steady. In the first 10 calendar months of 1920, the peak year for Minneapolis and St. Paul, car passengers carried numbered 198,500,000, against 172,711,000 in the corresponding period for 1924. Mr. Lowry pointed out that in the summer of 1921 both the Minneapolis Street Railway and the St. Paul City Railway applied to the commission for valuation of property and fixing of a reasonable rate of fare. The commission granted a 7-cent fare, but both cities appealed and the courts reduced the fare to 6 cents on the ground that the state commission, not having yet valued the properties, could not reasonably fix a fare. Mr. Lowry said that expecting a value would soon be arrived at, the company continued to operate at the 6-cent fare for three years. He said the evidence of the company's financial condition has been filed with the commission.

Rights of Community Bus Line in Court

Although two court injunctions have been granted in Los Angeles, one on the application of the Pacific Electric Railway against the Community Donational Bus Line operating between the city of Los Angeles and the city of Venice, the operators of the free bus system have defied orders and continued operations. It was recently brought out that two days prior to the date of the issuance of the injunction the bus line was leased by the original owners to a Mr. Prole of Oakland, and under the name of the Merchants' Bus Service began operating under the Prole system. Mr. Prole, inventor of the Prole Transfer Coupon System, is running the buses by having the passengers buy coupons which are redeemable at stores in towns through which the buses operate.

After issuance of the first injunction, the Community Donational Bus Line appealed to the California Supreme Court to have the order of the Los Angeles Superior Court set aside, but the Supreme Court denied the defendants a writ of prohibition which would have prohibited the Los Angeles judge from enforcing the injunction, on the ground that the Superior Court had jurisdiction. After the buses were changed to the Merchants' Transfer Bus Line under the Prole system the operators were cited for contempt of court, being charged by the court with having violated the terms of the second injunction.

The bus line has also made application to the Railroad Commission for a permit to operate as a common carrier. The Prole or coupon system of buses is now operating while the matter is still in the higher courts for a decision.

Forfeiture Clause in Draft for Rockford Company

Mayor Herman Hallstrom of Rockford, Ill., has completed his draft of a franchise ordinance for the Rockford City Traction Company. This is in accordance with instructions in a resolution recently adopted by the City Council. The Mayor has sent copies of the draft to the railway officials and the Aldermen for their consideration. The Mayor said that the ordinance could be introduced as a substitute for the one now before the Aldermen.

It provides for a 20-year grant indorsed by referendum. The ordinance leaves the matter of the operation of motor buses subject to permits from the Council. The draft provides for assessing full cost of track paving against the street railway company, with permission for payments on the installment plan and for practically doubling the street improvement program for thoroughfares containing car tracks. The Mayor would abandon the plan for requiring a $750,000 cash bond to guarantee completion of promised improvements and would substitute a forfeiture clause that the franchise shall end if promised improvements are not made within the time specified in the ordinance. Opinions on the Mayor's draft differed widely.

Transit Talks Tell Tale of B.-M.T.

With the desire on its part to inform the patrons of its difficulties and problems, and at the same time to express its intention of doing everything it possibly can to help its patrons, the Brooklyn-Manhattan Transit Corporation, through its chairman, G. M. Dahl, has been carrying on a series of advertisements in the daily papers. These advertisements are called "Transit Letters." In the first one Mr. Dahl gives some facts about the Brooklyn-Manhattan Transit Corporation as to its passenger traffic, its wages expenses, its miles of "L" and subway lines, and the number of cars which serve its patrons. In subsequent letters the ownership and directorship of the B.-M. T. are discussed, and in a later letter Mr. Dahl tells what the stockholders and directors have done for the patrons of the company during the past year and a half since they have been responsible for the policies of the B.-M. T. He says that from the very start the public interest has been the chief interest which has controlled the company.

Fare Request Refused in Malden

The Malden City Council has refused the request of the trustees of the Boston Elevated Railway for the right to raise the fares in that city from 5 to 6 cents without a tranfer and to 10 cents with transfer. These rates were asked in accordance with a new fare schedule established by the elevated on other parts of the system.

The railway has been unable to put the increase in fares into effect in Malden owing to a clause in the franchise granted by the City Council permitting the company to run buses in that city, in which it stipulated that local fares shall not exceed 5 cents. The ruling has caused some confusion. The fare from Malden to Medford, for example, is 5 cents, while from Medford, which is under the new rate schedule, to Malden, the fare is 6 cents on strip tickets.

The Malden City Council has also adopted an order requiring the Boston Elevated in the future to advertise two weeks in advance any proposed substitution of buses for electric cars in Malden.

The City Council has empowered the Mayor to call a meeting of citizens to discuss the traffic system of the city and the petition of the Eastern Massachusetts Street Railway for permission to run buses from Malden Square to the Revere Line, and so complete the system to Revere Beach.

One-Man Car Operation Planned in Cleveland

The Cleveland Railway has announced its intention of using one-man cars during non-rush hours on a number of lines in Cleveland, Ohio, that have not been meeting operating expenses. The announcement has met with opposition from Councilmen. John J. Stanley, president of the company, insists, however, that only the courts can stop his company from using the one-man cars.

The company plans to start the use of one-man cars on Dec. 1. They will be run on the Clifton Boulevard line, and possibly on the Fairmont Boulevard line, between the hours of 9:20 a.m. and 3:50 p.m. and from 6:20 p.m. to 12:30 a.m.

Paul Wilson, secretary of the railway, says the company's plan to use one-man cars is an economy measure. He points out that the company asked for an increase of 2 cents a car-mile in its operating allowance to bring this allowance up to 28 cents a car-mile, but that so far the City Council has not acted on this request.

Immediately after the announcement by the company of its intention to run one-man cars, the Lakewood City Council, at a special meeting, passed an ordinance making it a misdemeanor to operate a car with a one-man crew. The Cleveland City Council also adopted a resolution instructing the City Street Railway Commissioner to refuse to authorize operation of one-man cars.

It is the general opinion in Cleveland that the right of the company to operate one-man cars will be threshed out in the courts.

The City Council on Nov. 24 also received resolutions authorizing the Cleveland Railway to operate bus lines on four main arteries leading to the westerly limits of the city from the Public Square. The bus fare would be 10 cents, with a 1-cent transfer charge to street cars and a 4-cent transfer charge from cars to buses.

Actual operation of buses by the railway will not be undertaken, however, until the Ohio State Supreme Court has decided whether the City Council or the State Public Utilities Commission has the right to grant bus franchises within the city limits.

Railway Sustained in Revocation Action

Controversy has developed over the Eastern Massachusetts Street Railway's track location in Mason Street in Salem, Mass. In 1909 the Aldermen there awarded the railway a location in the street so as to supply the power house with coal. The company now purposes to convert the power plant into a carhouse and to have the approach through Mason Street; but the City Council of Salem last July voted to revoke the track rights in Mason Street and ordered that the tracks be torn up. The Council took the position that here was no "public convenience and necessity" for the use which the present Board of Public Trustees intended to make of the location. The Mayor of Salem approved the Aldermen's order. The trustees of the Easttern Massachusetts disagreed with this decision. As a result the Salem city government appealed to the Department of Public Utilities, but the department, on Nov. 24, filed a decision adverse to the city. The commission points out, however, that the Salem city government has the right to appeal to the courts. Two members of the Public Utilities Department dissented from the majority decision, partly on the ground that the decision of he city authorities should be undisturbed unless it was shown to be "unreasonable or ill considered."

Buffalo Conductors Put on Their Honor

Fare boxes on all cars of the International Railway, Buffalo, were abolished on Sunday, Nov. 16, as a result of the honor system to be put into operation by Mitten Management, Inc. Herbert G. Tulley, president of the International, said to the platform employees:

> Mitten Management, Inc., has never considered the fare box in accord with the co-operative spirit. It has been awaiting an opportunity to make employees responsible for fares collected rather than depend upon a mechanical device to protect the company against employee dishonesty and to reduce the conductor to a mere changemaker, hopelessly trying to watch myriads of coins dropping into a small glass case.
>
> In the old days of low wages it was not considered an injustice to deprive the company of a few fares now and then. Those days are gone and most companies have replaced the old haphazard method with the drop coin fare box.
>
> Where fare boxes are used the conductor is required to ring up on his register for every person passing the box. The conductor ordinarily protects himself from loss by actually keeping his register lower than that of the fare box and tallies the two at the end of the run by ringing up a sufficient number of fares to make the two agree. This procedure, while protecting the conductor against personal loss, provides him with neither the means nor the incentive to see to it that every passenger is obliged to pay a fare.
>
> I. R. C. prefers to trust to the honesty of its men. This it has taken occasion to further encourage in that their higher wage will largely depend upon the collection of a fare from every passenger. I. R. C. trainmen have proved themselves worthy of this trust.
>
> I. R. C. will protect its earnings, first, by making payment of fare a personal transaction between the passenger and the conductor, thus preventing the passing of passengers without payment of fare; second, by giving its men such an interest in its earnings that robbing the company means robbing themselves.

Some time ago the company stopped the registration of transfers and passes.

High School Points Moral in Atlanta

The opening of the Girls' High School, in Atlanta, Ga., the first of next year may bring to a head the right of the public to demand new accommodations while denying sustenance to its railway. When the school board asked for more trackage and more cars to carry girls to and from the new school building, the Georgia Railway & Power Company responded by stating it had no money to lay new track or to buy and operate any extra cars. Preston S. Arkwright, president of the company, recently reviewed the situation. He said it would be difficult in any event to provide transportation for the students of the high school as the building was located in a most inaccessible place. Further, he said that the company was financially unable to make any extensions. On this point he said:

> You've got a right to depend upon the railway as the agency for reliable service. But that agency must be kept in condition to furnish the service on which you depend. You can't levy taxes, paving burdens and the like and on top of it all turn jitneys loose and expect the railway always to be in the position to meet the demands of the public. I guess it will be either the steel cars or the jitneys.

H. M. Atkinson, chairman of the company's board of directors, corroborated Mr. Arkwright's statements. The chairman said that the railway receipts were decreasing from the corresponding periods of last year at the rate of almost $50,000 a month, and that even last year they were far below normal. He said that under the contract with the city the company was paying in 1924 in bridge rentals, paving service and taxes more than $800,000, which is about one-sixth of the entire railway revenue.

It is expected that the John A. Beeler organization will soon report on the valuation of the Georgia property to the special councilmanic committee conducting an investigation into the petition for relief filed by the company with the City Council in December, 1923. The company sought relief necessary to place the railway on a "living basis." Among other things it asked for elimination of jitney competition on streets where cars operate, 10-cent cash fare, a continuation of the ticket rate for 6⅔ cents and the elimination of all gross profits taxes and street paving assessments.

New England Motor Transport Conference

A conference to discuss the highway transportation problems of New England will be held at Boston on Dec. 8 and 9, under the guidance of the National Automobile Chamber of Commerce, and with the co-operation of many New England organizations representing motor vehicle users. Electric and steam railroad men will be among the speakers, and special sessions will be devoted entirely to discussion of how electric railways are using the motor bus, and how railroads are solving, with the motor truck, the problem of handling local less-than-carload freight.

Other topics will be intercity motor coach operation, what the commercial use of New England's new highway system means, and how the automobile is helping to reclaim New England's deserted farms, the federal government's research program into the economics of road use and a discussion of safety and highway congestion.

Home Rule Law Ambiguous

Representative of Railways Wants the Measure Amended so There Can Be No Doubt About Its Meaning

The Home Rule Commission held a public hearing at Albany on Nov. 20. Since the enactment of the city home rule law, the Home Rule Commission has extended its study of municipal self-government in New York and other states and, as asked by municipal officials, has examined certain questions which have confronted several of the cities of the state in applying the provisions of the home rule law and in operating thereunder. The commission has attempted a solution of some of these difficulties and has endeavored to aid the cities with its advice in all cases in which application has been made therefor. The hearing was regarded as most important because of the possibility that some provision allowing cities further jurisdiction over public utility corporations might be allowed to get into the home rule for cities law.

James L. Quackenbush, on behalf of the Interborough Rapid Transit Company and other street railways, submitted to the commission a memorandum urging an amendment to the law. Very briefly the purpose of Mr. Quackenbush's proposal is to remove the doubt and uncertainty that prevails with respect to the power of the Municipal Assembly of New York City and the legislative bodies of other cities of the state to annul or supersede various provisions of the public service commission law, the railroad law, the transportation law and the rapid transit act.

SAYS LAWS SHOULD LESSEN LITIGATION

Mr. Quackenbush said that it could be urged that judicial interpretation of the act would probably exclude the right of local legislative bodies to supersede any provision of the laws mentioned, but that so long as the home rule law remained in its present form and until the courts had construed its provisions in cases arising from time to time the uncertainty would remain and give rise, as it already had done, to many contentions, embarrassments and delays that could be obviated by the amendment proposed.

The attorney said that the limitations that the courts, by judicial construction, will ultimately place upon the right to supersede state statutes by local legislation should so far as possible be explicitly stated in the act itself. Mr. Quackenbush holds that otherwise the Legislature is placing an unnecessary burden upon the courts, and is chargeable with responsibility for the delays and uncertainties incidental to litigation. He says that laws should tend to lessen litigation rather than to encourage it. He then cited as a specific instance the difference of opinion between the Corporation Counsel and the Comptroller of the city of New York with respect to the scope of the city home rule law that largely involves a determination of what are "matters other than the property, affairs or government of cities. This controversy involves in part the right of the municipal Assembly to amend a portion of the transportation corporation law in its application to the city of New York." In this controversy the comptroller clings tenaciously to the opinion that with the sanction of the municipal Assembly the city can proceed with the Mayor's municipal bus plan without the need for further enabling legislation, while the Corporation Counsel holds to a contrary view.

Other subjects discussed at the hearing were:

1. Necessary and desirable amendments to the home rule constitutional amendment.
2. Scope of term, "property, affairs and government." Does it include all matters usually embraced in city charters?
3. Right of the Legislature to enact general laws relating to property, affairs and government of cities.
4. What general laws apply "in terms and effect alike" to all cities?
5. Necessary or desirable amendment to the home rule law.
6. What difficulties or doubts have been experienced by municipal authorities in construing and operating under the home rule law?
7. Is the duty of the Legislature to limit the power of cities to borrow money, etc., under Sec. 1 of Article XII of the Constitution, to be performed by the enactment of general laws or emergency laws, or may the Legislature so act by a special law.
8. What disposition should be made of Article II of the general city law. (General provisions.)
9. What disposition should be made of the optional city law?
10. Should there be a statutory classification of cities for convenience in enacting city laws and relating to their property, affairs and government?

Advisory Council on Accident Prevention in Chicago

To co-ordinate activities in the important work of preventing accidents on the Chicago Surface Lines, a general advisory council on accident prevention has been established with the following members: V. T. Noonan, chairman; H. H. Adams, C. H. Evenson, H. B. Fleming, F. M. Hamilton, F. L. Kriete and J. Z. Murphy.

The direction of accident prevention work in each department will be delegated to departmental councils which will supervise and direct protective and preventive measures within their respective jurisdictions and carry into effect plans that will insure full co-operation on the part of all employees.

It will be the duty of the general advisory council to investigate reports of unsafe conditions or dangerous practices, to provide appropriate remedies therefor and to formulate policies for the most effective promotion of accident prevention.

New Cars Allocated in New York

The New York Transit Commission issued an order on Nov. 17 to the Interborough Rapid Transit Company allocating to service on various subway lines, where the commission believes there is the greatest need, the 100 new cars recently delivered of the 350 ordered by the railway under the commission's instructions. Improvement of rush-hour conditions at the Times Square station was an important item in the order.

Railroad and Ferry Traffic in 1923—325,920,315 Passengers

The need of future provision for the handling of suburban passengers into New York City was recently made plain by figures made public by the New York Transit Commission giving the steam railroad and local ferry traffic into and out of New York in 1923. The great growth of local commutation traffic within the past few years has been studied by the engineers of the Commission who are preparing to arrive at a definite policy of handling the situation.

The trunk railroads entering New York or approaching from the Jersey side carried in 1923 a both-way passenger traffic of 234,867,481 people. This figure represents an increase of nearly 5 per cent over the traffic in 1922. This traffic includes the following: Baltimore & Ohio 620,000; Central Railroad of New Jersey 15,752,834; Delaware, Lackawanna & Western 22,201,447; Erie 30,889,917; Lehigh Valley 743,502; Long Island 69,766,867; New Haven 17,666,194; New York Central 30,025,529; New York, Ontario & Western 551,753; New York, Westchester & Boston 5,796,093 and the Pennsylvania Railroad 40,853,345.

In addition to the figures of steam railroads there were 42,014,142 local or rapid transit passengers carried in and out of the city by the Hudson & Manhattan Railroad which when added to the steam railroad traffic gives a grand total railroad traffic entering and leaving the city of 276,881,623. Even this total does not include the passengers entering and leaving the city on several ferry lines. Total traffic by ferry in and out of New York amounted to 49,038,692. With the steam railroad traffic there was a grand total of railroad and ferry traffic in and out of New York during 1923 of 325,920,315 passengers.

The number of railroad commuters entering and leaving the city on the various railroad lines was 147,172,484. The grand total of railroad and ferry commuters was 238,225,318.

Eliminating Sundays and holidays, and using a traffic year of 340 days, the basic figure generally employed by the Transit Commission—as a divisor—there are shown to be an average of 700,662 daily commuters in and out of the city. The total daily traffic in and out of New York City is 958,589. These figures represent two-way traffic passengers. The difference between the two, divided by 2, or 129,000 passengers, probably represents an approximate figure of the daily visitors to New York City, the great majority of whom arrive from outside the commuting zone.

State Control Urged for Missouri Bus Lines

The Missouri Legislature, which will convene next January, will be asked to enact a law placing all bus lines in Missouri under the control of the Missouri Public Service Commission. The measure that will be presented to the state lawmakers will probably require all bus companies and service car organizations to report regularly to the state body concerning their profits, etc., and also to provide indemnity bonds for the protection of their patrons.

In St. Louis the present regulatory body is the Board of Public Service, working under a city ordinance passed several years ago by the Board of Aldermen. Under the city ordinance the bus company pays the city 3 per cent of its gross earnings, but is not required to submit a statement of profits.

Richard W. Meade, president and general manager of the Peoples Motorbus Company, has stated that his company would welcome a law placing it under control of the Missouri Public Service Commission. Mr. Meade is quoted as follows:

> Such control already exists in New York and other States. We would also favor a provision requiring monthly statements of earnings such as are submitted by other public utilities. The Peoples Motorbus Company already carries ample indemnity bonds and sets aside a certain percentage of its earnings for an accident reserve fund in addition.

Advertising to Help Company and Patrons

In an effort to picture some of the difficulties that are encountered in railway operation to the end that the public will give its co-operation in solving problems the Worcester Consolidated Street Railway, Worcester, Mass., has been using space liberally in the advertising columns of the Worcester newspapers. General Manager Henry C. Page says the results have been satisfactory and that he hopes advertising, never before done in Worcester by his company, will become a permanent policy. "We have a commodity to sell," Mr. Page explains, "which is as important to every householder in Worcester as the merchandise sold by the department stores, and the fact that we have a monopoly is no reason why we should not advertise it." He said he was particularly well pleased with the slogan in the recent advertising, "Help us to help you to better service."

British Expert Praises Detroit System

The Department of Street Railways, Detroit, Mich., has come in for a lot of praise from Lord Ashfield, one of the foremost authorities on transportation. The chairman and managing director of the railway, tramway and omnibus companies of the "Underground" group of London recently visited Detroit and predicted that the municipally owned lines would be a great success so long as the people continued to keep politics out of the system. He said that he had traveled on the lines and had been impressed with the smoothness of operation and the remarkable ability displayed in handling the crowds of workmen. He says it is an efficient system, splendidly managed. Lord Ashfield, formerly Albert Henry Stanley of Detroit, came with his family to Detroit when he was a small boy. He was general manager of the Detroit United Railway for twelve years.

Canadian Railway a Public Benefactor

Capilano Canyon, a famous beauty spot near Vancouver, B.C., has been presented outright by the British Columbia Electric Railway to the Vancouver Board of Trade, to be retained by it in trust for the public as a park. Approximately 145 acres is comprised in the gift. "We feel that this property should belong to the public in deed as well as in name," said George Kidd, president of the British Columbia Electric Railway in making the presentation.

The property was acquired by a predecessor company, evidently for a hydro-electric power site. Ever since it has been the Mecca for thousands of tourists. Recently the company was offered a considerable sum for a portion of the canyon by an individual who intended to promote it as a pleasure resort. Turning down this offer, the company decided to present it to the Board of Trade.

The gift has resulted in a great many expressions of appreciation by press and public. The following statement by J. K. Macrae, president of the Board of Trade, was only one of many: "The present offer was entirely unsolicited on our part, and the greatest credit is due to the company and to Mr. Kidd for the splendid public spirit which has prompted them to make this gift."

Wildcat Buses in New York a Menace

Condemning the "municipal buses" operated under the jurisdiction of the Department of Plant and Structures of the city of New York as "wildcat firetraps," the New York Transit Commission, in a statement issued by Commissioner LeRoy T. Harkness attacked the "emergency bus system" maintained by the present city administration. The attack came after a municipal bus, operated in Queens County, caught fire with serious injury to several passengers. An investigation of the matter by the grand jury is now under way. As no one was killed probably only civil indictments will result.

Commissioner Harkness disclosed the sensational conditions discovered by Transit Commission inspectors on several municipal bus lines in Manhattan, the Bronx and Queens. Not only was overloading revealed, but in many instances, it was charged, the vehicles were either not equipped with "emergency doors" in the rear, or these doors were fastened in such a way as to be useless in emergencies.

"The burning of passengers in these wildcat firetraps," said Mr. Harkness, "is not the only danger to the traveling public. Most of these buses are simply bodies mounted on truck chassis, and were never intended to carry human beings."

"The dangerous and deplorable conditions revealed by the Queens accident," the statement declares, "merely dramatized the menace to passengers through the operation of wildcat buses which do not have the safeguards provided by adequate franchise restrictions and general utility regulation."

Plea for Restoration of Service on Wisconsin Line Dismissed

The Railroad Commission of Wisconsin has dismissed the petition of residents of Omro who asked it to order the Wisconsin Power & Light Company to re-establish railway service between Oshkosh and Omro despite the fact that it has been operating at a loss due to improved highway conditions and the increased use of the private automobile. Bus service has been established on a schedule comparable with that of the discontinued interurban line, but fear was expressed that during the winter months bus service would not be as reliable as rail service. A statement of earnings and expenses introduced before the commission by the company for the year 1923 showed a deficit of $4,215. The resumption of service would necessitate a complete rehabilitation in all departments of the system. To do this to conform with the present standards of the company would cost $146,716.

Grand Rapids Company Submits Interesting Data on Car Capacity

A recent survey of daily traffic on Monroe Avenue in Grand Rapids, Mich., over which cars of practically all routes of the Grand Rapids Railway pass showed that from 4 to 6 p.m. on an average day 102 cars passed capable of carrying 4,032 passengers and actually carrying 3,628. In the same period 1,052 automobiles passed with a total capacity of 4,532 passengers and actually carrying 1,918. The street cars carried 98.8 capacity loads, while the autos carried 42.5 per cent.

The railway made a diagram of these figures and submitted it to its patrons. The diagram pictures one street car which would carry 48 passengers and under it and on the same scale were pictured 27 automobiles, the number needed to carry 48 passengers at 1.8 passengers per automobile, as was the case on the test day. The 27 automobiles easily took up six times as much space on the rush hour street as the single street car.

On the particular day in question the street space occupied by the street cars figured 4,692 ft. and that by the autos 14,728 ft. or 75.8 per cent of the street space or more than three times the space occupied by the street cars. These 102 street cars were only 8.83 per cent of the traffic, but they carried 63.8 per cent of the passengers.

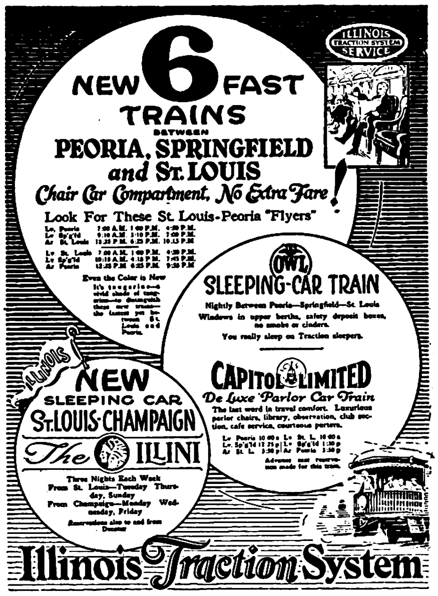
Newly Organized Company Promises Good Service

The newly organized Erie Railways, Erie, Pa., will put into effect any reasonable measures which will improve service in Erie. These promises were made recently by R. A. Meyers, general manager of the property, at a conference held in the office of the city solicitor. Mr. Meyers said that some time ago a campaign was started to have service speeded up for the benefit of patrons, and it was in connection with this plan that the cars were made pay as you leave on outbound trips to facilitate service downtown. At the same time the pay-as-you-enter plan was put into effect on inbound trips to prevent delays in the business district and to aid in discharging passengers. He said that the plan was to increase the capacity in accordance with the demands for service and that every suggestion that had been brought to the company's attention for the betterment of service was receiving serious consideration.

Interurban Advertises Improvements in Service

Many improvements and innovations in service mark the general change of schedules put into effect by the Illinois Traction System, Peoria, on Sunday, Nov. 9. Without exception on the main divisions the changes include the addition of trains and shortening of schedules.

The principal innovation is the inauguration of three "fliers" each way daily connecting Peoria. Springfield and St. Louis. These trains make the trip from the heart of Peoria to the heart of St. Louis in less than 5½ hours. They are in addition to a de luxe parlor car train each way daily which leaves each terminal at 10 a.m. The three new trains are distinctive in design. The coaches are painted a vivid tangerine color and contain a chair car compartment. No extra seat charge is made on these trains. They are to be known as the Peoria-St. Louis Fliers.



ILLINOIS TRACTION SYSTEM SERVICE

NEW 6 FAST TRAINS BETWEEN PEORIA, SPRINGFIELD and ST. LOUIS

Chair Car Compartment, No Extra Fare!

Look For These St. Louis-Peoria "Flyers"

Lv. Peoria 7:00 A.M. 1:00 P.M. 4:30 P.M.
Lv. Sp'g'fd 9:10 A.M. 3:10 P.M. 7:00 P.M.
Ar St. Louis 12:25 P.M. 6:25 P.M. 10:15 P.M.

Lv. St. Louis 7:00 A.M. 1:00 P.M. 4:30 P.M.
Lv. Sp'g'fd 10:10 A.M. 4:10 P.M. 7:45 P.M.
Ar Peoria 12:25 P.M. 6:25 P.M. 9:30 P.M.

Even the Color is New

It's tangerine—a vivid shade of tangerine—to distinguish these new trains—the fastest yet between St. Louis and Peoria.

OWL SLEEPING-CAR TRAIN

Nightly Between Peoria—Springfield—St. Louis

Windows in upper berths, safety deposit boxes, no smoke or cinders.

You really sleep on Traction sleepers.

CAPITOL LIMITED

De Luxe Parlor Car Train

The last word in travel comfort. Luxurious parlor chairs, library, observation, club section, cafe service, courteous porters.

Lv Peoria 10:00 a | Lv St. L. 10:00 a
Lv. Sp'g'fd 12:25 p | Lv Sp'g'fd 1:30 p
Ar St. L. 3:30 p | Ar Peoria 3:30 p

Advance seat reservations made for this train.

ILLINOIS NEW SLEEPING CAR ST. LOUIS-CHAMPAIGN

The ILLINI

Three Nights Each Week
From St. Louis—Tuesday Thursday, Sunday
From Champaign—Monday Wednesday, Friday

Reservations also to and from Decatur

Illinois Traction System

Ad Typical of Recent I. T. S. Campaign

The de luxe parlor car train is known as the Capitol Limited. It continues to serve meals à la carte and has such refinements as library and club sections, observation platform and reserved parlor chairs.

On the Springfield-Decatur-Champaign-Danville division four fast trains have been placed in service each way daily instead of two. These trains make the trip from Springfield to Danville in 4 hours and 15 minutes.

Three fast limited trains have been placed in service each way daily connecting Peoria, Bloomington and Decatur, whereas two have been on the schedule.

Another step forward is marked in the sleeping car service started on the route connecting Champaign, Decatur and St. Louis. The sleeping car leaves Champaign on Monday, Wednesday and Friday nights, and returning leaves St. Louis on Tuesday, Thursday and Sunday nights. It is named the "Illini," in deference to the famous university at Champaign-Urbana.

Service between suburban points and their nearest terminal cities has been augmented with the addition of "turn-around" trains, notably between Morton and Peoria; Danvers, Heyworth and Bloomington, and Riverton and Springfield.

No changes are made on the Ridgefarm or Catlin divisions, but train time has been altered on trains on the Homer, Mechanicsburg and Hillsboro divisions.

The improvements in service were advertised widely in the newspapers in the territory in which the company operates.

Another Paper Sees the Injustice of the Paving Charge

"As a matter of equity it does not seem fair that the International Railway should still be compelled to maintain the pavement and make repairs to the street between its rails," says the Buffalo *Evening Sun* in commenting on the franchise of the railway which provides that the company maintain the pavement between its tracks in the city. The newspaper says, "It is a heritage of horse-car days," and adds:

> At the time when this system of street paving was adopted there was one or more perfectly good reasons for the practice: First, because the street car horses had to have a non-slippery surface on which to travel while drawing the cars with their heavy loads; second, because much of the heavy trucking in the city was hauled by horses that also required such a surface in bad weather.
>
> Today this strip of rough stone pavement is an anachronism. The street cars are not drawn by horses and most of the heavy trucking is done by auto trucks. It is time that this historical rough strip was abandoned and that asphalt should replace stone as fast as new tracks are laid or important repairs are necessary. Those stone-paved surfaces are no more needed on the street with car lines than they are on any other comparatively level streets.
>
> It may not be popular to say it, but it also is true that with the passing of the horse-drawn cars and the substitution of trolley-driven cars, all real reason has passed for saddling on the street car company the keeping up of the pavement between the tracks and along their outer rails.
>
> It is true that the International Railway's franchise imposes this requirement on it—and the company has not been considerate enough of the Buffalo public to make a proposal to relieve it of part of its burden generally acceptable.

New Safety Laws Urged.—Amendment of the traffic law to provide for the full stop of all street cars before crossing arterial highways will be urged by City Commissioner Pier at an early meeting of the City Council of Portland, Ore. At present cars are not obliged to stop at the "full stop streets" and this is said to be confusing to motor drivers. Commissioner Pier has been investigating the matter and reports that in his belief many of the accidents in which street cars and motor cars figure are due to failure of street cars to come to a full stop at the busy arterial highway crossings.

News Notes

Tramway Wants Increased Fare.—The Denver & Crown Hill Railway, a branch line of the Denver Tramway, operating from a junction of the city lines to the Crown Hill Cemetery, a distance of about 1 mile, has petitioned the State Public Utilities Commission for permission to raise the fare from 5 cents to 8 cents, effective on Dec. 1. It is claimed that the road has operated at an annual deficit of between $5,000 and $8,000. Only one car operates on the line.

Must Continue Bus Service.—The Pennsylvania Public Service Commission recently disposed of an application to discontinue bus service. The York Railways, York, Pa., organized the York Transit Company to supplement railway service with buses. After eleven months operation an application to discontinue the bus service was filed. It had yielded $3,011, which was $5,717 less than it had cost. The commission held that the service was necessary and denied the application for permission to quit, giving the company the right to renew its application, however, if, after three or four months trial of rates considered by the company to be sufficient to yield operating expense and fair return, it should be found that the service could not be operated profitably. The old rates averaged 4 cents a mile.

Agitation Over One-Man Cars.—Formal notice has been served upon the International Railway, Buffalo, N. Y., by the municipal authorities demanding immediate withdrawal of one-man cars. The city also has asked the Public Service Commission to take action. Herbert G. Tulley, president of the International, says one-man cars have come to stay.

Petitions to Run Supplementary Buses.—The Roanoke Railway & Electric Company, Roanoke, Va., has petitioned the State Corporation Commission for permission to establish a supplementary bus line. The company states that its appeal is based on an understanding of the public's "demand . . . for interurban bus transportation."

Seeks to Enjoin Bus Operation.—Parlor car service of the Iroquoise Trails Motor Coach Lines, Inc., between Rochester and Buffalo, N. Y., was halted on Nov. 21 when the Rochester, Lockport & Buffalo Railroad obtained a temporary restraining order, pending trial of an action in Supreme Court. The railway will sue for a permanent injunction on the ground that the bus company is operating in competition without permission from the towns and villages it serves and without a certificate from the State Public Service Commission.

Railway Favored for Football Jaunts.—The Michigan Electric Railway, Jackson, Mich., has called the attention of parents to the desirability of having their children travel to the high school and college football games by the company's interurban system rather than in automobiles. It draws attention to the fact that two serious mishaps have recently occurred near Jackson in such automobile jaunts. Athletic Director Mason of the Jackson public schools has taken a stand against boys traveling in automobiles to and from schools or to out-of-town events. He has arranged for special cars on the Michigan Electric Railway from Jackson to Grand Rapids for his team and any rooters who wish to accompany it. Special rates are granted, in such instances. The railway believes that at such times the excitement and natural exuberance over the coming events cause mishaps, and in that emergency the electric railway is the way of sureness and safety.

Granted Bus Franchise.—The Portland Electric Power Company, Portland, Ore., has been granted a franchise to operate a bus line on East Thirty-ninth Street, to connect with the railway lines. The bus line will be operated as a crosstown line. The franchise will run for six months.

City Officials Sued.—Claiming that her husband was killed by a trackless trolley on Victory Boulevard, Staten Island, March 10, 1923, Mrs. Eva Chrampanis has filed suit for $75,000 in the county clerk's office in St. George, Staten Island, against Mayor Hylan, the five Borough Presidents, Murray Hulbert, President of the Board of Aldermen, and Grover Whalen. This is the second time that Mrs. Chrampanis has brought suit in the matter. Following the accident she sued the city of New York and the case was argued before Justice Selah B. Strong in the March term of this year. Counsel for the city asked for a dismissal on the ground that since the trackless trolley on Staten Island was being operated without a franchise from the city of New York, the city could not be held responsible for the death of her husband. Justice Strong granted the request for dismissal. Arthur M. Simonson, attorney for Mrs. Chrampanis, then sought permission to lodge a complaint against individuals.

New Railway in Prospect.—Plans are under way for connecting Mariemont, east of Madisonville, with downtown Cincinnati, Ohio, by electric railway. Negotiations have been in progress for some time through which, if completed, the cars of the Cincinnati, Milford & Blanchester Traction Company will be brought over the tracks of the Cincinnati Traction Company to Cincinnati. B. H. Kroger, president of the Cincinnati, Milford & Blanchester Traction Company, said that the matter had been taken up with officials of the traction company and that plans had been discussed. Mr. Kroger said that plans are being held in abeyance until the new electric railway charter has been agreed upon. Recently the Cincinnati, Milford & Blanchester Traction Company purchased a strip of property in downtown Cincinnati which is being considered as a possible site for the new downtown terminal of the interurban.

Wages Advanced Two Cents.—Platform employees of the Rochester, Lockport & Buffalo Railway operating an interurban line between Rochester and Lockport, connecting at the latter city with the International Railway for Buffalo, have been granted a wage increase of 2 cents an hour after a conference between the management and James Largay, Utica, vice-president of the Amalgamated. The agreement ends a two-year dispute over wages which threatened a strike two weeks ago. The new scale became effective on Nov. 1.

Eighty Buses in Service.—During the past month the Pennsylvania Power & Light Company started bus service between New Castle and Sharon, Pa. This addition brings the total number of buses operated by the Republic Railway & Light Company, the controlling company, up to 23 in interurban service and 57 buses in city service.

Seeks Advanced Rates. — The Virginia Railway & Power Company has petitioned the States Corporation Commission for permission to increase its present fare from Richmond to Petersburg from 47 cents to 60 cents and to advance the ticket rate from 42 cents to 55 cents. Commutation rates under this petition would be raised from $3 to $3.50 for a minimum distance and from $13.75 to $16.50 for the full trip. The petition was signed by President Wheelright. It said that the commission had found the value of the interurban division $1,210,000, and that earnings for the nine months ended Sept. 30, 1924, were $40,646 and for a similar period last year $36,869. The actual return on this valuation for the year 1923 was only 3 43 per cent, deducting the sum of $15,000 which the commission said was a proper charge to be made against the Richmond-Petersburg divisions for transfers to and from the interurban line.

Will Repeal Bus Tax Ordinance.—Acting on what it alleged was a refusal by the Duluth-Superior Traction Company to furnish bus service to residents in and between Allouez and Itasca, suburbs of Superior, the City Commissioners have voted unanimously to repeal the city's bus tax ordinance, which provided a tax of $500 on each jitney placed in city service. The City Commissioners contend that when this ordinance was adopted it was the understanding of the City Commission that the railway would place a bus in service between these points.

Complaint Dismissed. — The California Railroad Commission has dismissed the complaint of the city of Piedmont against the Key System Transit Company, charging discrimination against the city of Piedmont in the matter of interurban fares. The defendant company has complied with the order of the commission to remove the discrimination. It is now operating interurban trains over an extension of the Piedmont line from Fortieth and Piedmont Avenue in Oakland to Oakland and Jerome, in Piedmont.

Seeks Increased Fares.—The Athens Railway & Power Company, Athens, Ga., has petitioned the Georgia Public Service Commission for permission to issue weekly passes for $1 and to increase cash fares from 7 cents to 10 cents. The company also wishes to sell books of tickets at the rate of two for 15 cents if the 10-cent cash fare is granted. Fares in Athens have been 7 cents since September, 1921.

Financial and Corporate

I. R. T. Reports $359,025 Deficit

Net Corporate Income Increased by $1,202,972—Traffic Up on Subway and Manhattan Divisions

The net corporate income of the Interborough Rapid Transit Company, New York, N. Y., for the year ended June 30, 1924, was $1,071,177, against a net corporate deficit of $131,795 in 1923, or an increase of $1,202,972. The surplus at the end of the year was $391,534, compared with a deficit for the year ended June, 1923, of $524,783.

The number of passengers carried was 1,074,343,243, compared with 1,025,175,131 last year, an increase of 49,168,112. This was due to a gain of 38,282,756 on the subway division and a gain of 10,885,356 on the Manhattan Railway division.

COMPARATIVE STATEMENT OF INCOME ACCOUNT, YEAR ENDED JUNE 30

	1924	1923
Gross operating revenue..	$57,773,775	$55,559,435
Operating expenses......	33,841,415	34,392,508
Net operating revenue.	$23,932,359	$21,166,927
Taxes..................	2,763,529	2,662,310
Income from operation.	$21,168,830	$18,504,616
Non-operating income....	402,762	573,850
Gross income.........	$21,571,592	$19,078,466
Income deductions.......	20,500,416	19,210,261
Net corporate income for the year.........	†$1,071,176	*$131,794*
Add:		
Surplus at beginning of year...............	*524,783*	*524,866*
Profit and loss account —net change during the year............	*154,859*	131,878
Surplus or deficit at end of year*................	†$391,534	*$524,783*

* Stated exclusive of accruals under contract No. 3 and related certificates payable from future earnings but with full deduction for sinking fund on first and refunding mortgage bonds, the payment of which is under the "Plan of Readjustment," postponed for five years from July 1, 1921, provided an amount equal to such postponed sinking fund be expended for additions or improvements to the property.

† Stated exclusive of expenditures for maintenance in excess of contractual provisions aggregating $1,430,202, leaving a balance (deficit) after actual maintenance of $359,025 for the year.

Figures in italics show deficit.

An expenditure of $5,909,509 was made during the year for additions, betterments and replacements. This amount included the company's contribution toward construction and equipment under contract No. 3 and the related certificates, completion of the multiple-unit car door control device on 1,378 subway cars and a considerable portion of the cost of installing multiple-unit car door control devices on 465 Manhattan division cars, also the cost of completing 100 subway steel trail cars put into use during the summer of 1923.

The increase in revenues from transportation for the year was $2,446,446. While the greater part of this gain was on the subway division, the Manhattan Railway division showed an increase of more than 3 per cent, most of which, according to the report, may be attributed to increased service and improvements in the condition of the cars and stations, together with increased patronage resulting from advertising. There was a decrease in the other operating revenue of $232,107, leaving a net increase in gross operating revenue of $2,214,339. This falling off in other operating revenue resulted from a decrease in the sale of power of $322,000, partially offset by an increase in advertising and rentals.

The cost of conducting transportation during the year was $959,588 less than the previous year, although the car-miles operated increased 7,310,000 and wage rates were 5 per cent higher.

It was necessary to expend for maintenance $1,364,464 more than in the previous year, to keep the property in a safe operating condition. Considering the actual maintenance expenditures the total expenses for operating and maintaining the property for the year were $35,271,618, compared with $34,829,706 in 1923. The increase in general expenses was $36,720 over the previous year, although the amount expended in the settlement of accident and damage claims showed an increase of $75,123, due largely to the necessary postponement of the settlement of such cases during the past few years.

STATEMENT OF INCOME DEDUCTIONS, YEAR ENDED JUNE 30, 1924

Gross income...........			$21,571,592
Rentals:			
City of New York:			
Interest on city bonds		$2,049,182	
Sinking fund........		561,817	$2,610,999
Manhattan Railway:			
Interest:			
Consolidated mortgage 4 per cent bonds..........		$1,627,320	
Second mortgage 4 per cent bonds..		180,920	
Fixed rental—organization............		50,000	
Dividend rental on capital stock......		2,723,877	4,582,117
Total......................			$7,193,116
Interest and sinking fund charges—On securities issued by Interborough Rapid Transit Company:			
First and refunding mortgage 5 per cent gold bonds:			
Interest..	$8,066,992		
Sinking fund...	2,170,556	$10,237,548	
Ten-year 7 per cent notes—interest......		2,246,419	
Ten-year 6 per cent notes—interest......		260,908	
Equipment trust certificates, Series "A" —interest..........		70,420	12,815,297
Other deductions:			
Sundry rents........		$264,659	
Interest on unfunded debt...............		178,543	
Interest on investment of depreciation reserve		48,800	492,002
Total income deductions.........			$20,500,416
Net corporate income............			$1,071,176
Maintenance expenditures in excess of contractual provisions..............			1,430,202
Balance (deficit) after actual maintenance.......................			$359,025
Per cent expenses to earnings..........			58.57
Passengers carried..................			1,074,343,243

The net result of the operation of the Interborough system, after deducting the actual maintenance expenditures, shows an improvement over the previous year of $209,966. This figure is arrived at after deducting the Manhattan dividend rental of $1,013,877 in excess of the previous year, including a reserve of $233,877 to cover the amount of additional dividend rental from July, 1, 1922, to June 30, 1924, which might become payable to owners of Manhattan stock not agreeing to the plan of readjustment.

Following an order from the Transit Commission, under date of Aug. 22, 1923, directing the purchase of 100 additional steel motor cars for use in the subway division, arrangements were made for the purchase of these cars through an equipment trust, whereby 25 per cent of the cost, estimated at $3,000,000, was paid in cash and the balance through the issuance and sale of $2,250,000 of equipment trust certificates, bearing interest at the rate of 6½ per cent.

BUSES AS ADJUNCT TO RAILWAY

In his report to the stockholders Frank Hedley, president and general manager of the Interborough property, states that since the report was prepared several applications for franchises to operate comprehensive bus systems have been filed with the public authorities. He said that the Interborough's position was that there should be no extensions of existing bus lines, except as feeders for the rapid transit lines. He said the operation of buses over the routes contemplated in the franchise applications recently submitted would seriously affect the net revenues of the company and its ability to pay interest on the city's bonds issued for construction purposes. It was his idea that bus operation should be rendered as an adjunct to the rapid transit lines, in which the city is financially interested under the provisions of the existing contracts. He concluded by stating that 30 years ago the city adopted a policy of underground transportation, with ultimate municipal ownership, and that it should not now revert to a policy of 70 years ago of coach transportation with private ownership.

The accompanying tables show the income account of the company for the fiscal year ended June 30, 1924, compared with the year before, also the income deductions for the year ended June 30, 1924.

Line to Be Reorganized.—The Portsmouth, Dover & York Electric Road, Portsmouth, N. H., will be reorganized under the name of the Portsmouth, Kittery & Eliot Railway. The company will operate its cars from Kennard's Corner, Eliot, to Sea Point, Kittery. It is expected that service will start early in the new year. The incorporators include W. W. Sargent, president of the Fitchburg & Leominster Railway; Zelig Van Loan, E. A. Pierce, general superintendent of the Bellows Falls & Saxon River Railway, and Dr. Samuel Nason.

St. Louis Plan Approved

Terms Announced Under Which the Reorganization of United Railways Will Be Carried Out

Holders of the securities of the United Railways, St. Louis, Mo., and its subsidiary companies, were notified on Nov. 26 of the perfection of the plans for the reorganization of the company. With the exception of the first general mortgage 4s holders are instructed to deposit their securities with the respective depositories on or before Dec. 24. The general 4s are undisturbed by the reorganization plan. Under the terms of the plan a total of $41,296,000 of stock is eliminated, the amounts being $16,383,000 of preferred and $24,913,000 of common.

The reorganization is intended to terminate the receivership, bring about a fair adjustment of the respective interests of the various security holders, reduce the fixed charges to an amount safely within the earning capacity of the property, settle the litigation and controversies which have prevented reorganization of the properties, provide adequately for present and future capital requirements and place the property in a position to render the highest standard of public service. In particular, the reorganization is intended to prevent separation of the properties and to continue under one management all of the roads now comprising the United Railways system.

The new financial arrangement and agreement is dated Oct. 1, 1924. Under it the fixed charges of the company, including the sinking fund on the Suburban bonds, will be $1,927,000 as against $2,613,980 under the present organization.

The capitalization and annual charges after reorganization are estimated as shown in the accompanying table.

The proposed new capitalization is compared in the accompanying table with the obligations on the present outstanding securities of the company.

Holders of the bonds and stock of the company and its subsidiaries who have not already deposited their securities with their respective protective committees may become parties of the reorganization plan and agreement by depositing their securities with the depositories under their respective depository agreements.

Newman, Saunders & Company, Inc., New York, of which J. K. Newman, a member of the reorganization committee, is head, have agreed to form a syndicate of which it will be manager, to underwrite the 245,745 shares of new common stock to be offered the preferred and common stockholders of the present company.

PRESENT CAPITALIZATION AND CHARGES OF UNITED RAILWAYS

Amounts outstanding	Bonds	Annual charges
$30,300,000	United Railways Company first general 4s	$1,212;000
2,000,000	St. Louis & Suburban first mortgage 5 (8) per cent	160,000
4,500,000	St. Louis & Suburban general 5s	225,000
1,640,000	Cass Avenue & Fairgrounds Railway first mortgage 5 (6) per cent bonds	98,400
986,000	Compton Heights, Union Depot & Merchants Terminal Railway first mortgage bonds	59,160
1,474,000	Lindell Railway Company first mortgage 5 (8) per cent bonds	117,920
9,790,000	St. Louis Transit Company improvement 5 per cent gold bonds	489,500
	Receiver's certificates	
4,200,000	Receiver's certificates Series B 6 per cent	252,000
	Total fixed charges	$2,613,980
	Stocks	
16,383,000	United Railways preferred stock	819,150
24,913,000	United Railways common stock	....
$96,186,000		$3,433,130

ESTIMATED CAPITALIZATION AND ANNUAL CHARGES AFTER REORGANIZATION

		Annual charges
$30,300,000	first general mortgage 4s, undisturbed	$1,212,000
6,000,000	first and refunding mortgage bonds or collateral gold notes of new company	390,000
4,500,000	first mortgage bonds of new Suburban	225,000
	Total interest charges	$1,827,000
	Sinking fund of $100,000 annual for retirement of Suburban bonds	100,000
	53,845 shares of new preferred 7 per cent stock	376,915
	343,645 shares of new common stock of no par value	....
	Total obligations on securities	$2,303,915

Chicago's Loop Has 1,200,000 People Daily

More than 1,200,000 persons pour into the loop district of Chicago every twenty-four hours, according to a traffic count made by the city's department of public service. Of the number more than 700,000 are carried by surface and elevated lines, buses and suburban steam lines. The figures were gathered by the department so that actual data might be had on a city's traffic problems for use in considering questions arising affecting pedestrians, motorists and street-car and elevated passengers might be settled on a definite basis with a regard for the greatest number.

The count showed that pedestrians numbering 182,011 came into the loop every day; 34,184 entered by commercial vehicles and 233,309 by passenger vehicles. The surface lines carried 475,237 persons and the elevated lines 189,905. Buses transported 74,000.

The figures for the loop-bound traffic of the surface and elevated lines are based on the average number of passengers carried a day during the first six months of the current year. The Chicago Traction and Subway Commission of 1916 had established, on the basis of an actual count, of all passengers carried by these lines, that of the 24-hour total surface lines traffic, 23 per cent was carried in or out of the loop, while of the total passengers carried by the elevated lines in 24 hours, 63 per cent are hauled to and from the loop district.

Conspectus of Indexes for November, 1924

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Nov. 1924 **7 17**	Oct. 1924 **7.15**	Nov. 1923 **6.95**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Oct. 1924 **148.5**	Sept. 1924 **151.4**	Oct. 1923 **160.9**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Street Railway Wages*† 1913 = 100	Nov. 1924 **220.7**	Oct. 1924 **220.6**	Nov. 1923 **216 4**	Sept. 1 20 **232**	Mar 1923 **206 8**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Oct. 31 1924 **3.53**	Sept. 30 1924 **3.47**	Oct. 31 1923 **4 67**	July 31 1920 **11.12**	July 31 1924 **3.19**
U. S. Bank Clearings Outside N. Y. City (Billions)	Oct. 1924 **18.02**	Sept. 1924 **15.90**	Oct. 1923 **17.04**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures	Oct. 1924	Sept. 1924	Oct. 1923	Jan. 1924	Sept. 1924
Number	**1,574**	**1,276**	**1,608**	**2,231**	**1,276**
Liabilities (millions	**45.89**	**26.95**	**75.17**	**122 95**	**26 95**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Nov. 1924 **205.7**	Oct. 1924 **207.6**	Nov. 1923 **220.9**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Oct. 1924 **151.9**	Sept. 1924 **148 8**	Oct. 1923 **153.1**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Nov. 1 1924 **13.35**	Oct. 1 1924 **13.00**	Nov. 1 1923 **13.14**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	Nov. 1 1924 **193.7**	Oct. 1 1924 **190.9**	Nov. 1 1923 **191.8**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Oct. 1924 **148.7**	Sept. 1924 **146.8**	Oct. 1923 **150**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Oct. 1924 **165.0**	Sept. 1924 **163.7**	Oct. 1923 **164.1**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

†Beginning with this issue a slight change is made in the weighting employed in the electric railway wage index. This index represents on the base of 1923 = 100, the trend of maximum hourly wages of street and interurban railway platform men of about 100 of the largest companies in the United States. The weighting heretofore given to this index has been the number of passenger cars operated by the various companies. The weighting has now been changed to be in accordance with the number of trainmen (conductors, motormen and one-man car operators) employed by the various companies. Although the change is slight, it is thought the revised index is a more accurate measure of the trend in wages. Monthly index figures since January, 1923, on the old and new bases were published on page 787 of the issue of the paper for Nov. 1, 1924.

Canadians Oppose Stopping Service on Toronto Radial

Engineers of the Hydro-Electric Commission of Ontario have been authorized to prepare a report for submission to the city of Toronto setting forth the earnings, value and other statistics of the Schomberg division of the Metropolitan Radial Railway in explanation of the commission's decision to suspend service over the road. It was also decided to notify the municipalities which are affected that under the radial agreement they have the right to acquire the line if they so choose. Apparently the Schomberg division must go unless the municipalities which it serves choose to take over its operation.

King Township residents declare that the proposal of the commission to scrap the Schomberg division would bring economic destruction to the several villages which it serves. In consequence township officials are preparing a campaign of vigorous resistance to the project. York County Council will be asked by the township to join with it in a protest to the Hydro commission. In the event of this failing to bring results an appeal may be made to the Dominion Railway Commission to have the Schomberg line taken into the national system.

Employees Handle Stock Sale in Birmingham

Approximately 4,000 shares of preferred stock of the Birmingham Electric Company, paying 7⅕ per cent interest, were sold to Birmingham, Ala., people during the first week of a drive to sell an issue of 20,000 shares of the stock locally. The sale started formally on Nov. 10 and is being handled by employees of the company. Employees bought 2,400 shares of the stock before the formal offering to the public and more than 70 per cent of the employees subscribed, it is stated. The stock, which is no par value stock, is being sold at $97 per share and is callable at $110 per share. The proceeds of the sale are to be used in gas and electric extensions.

As an advertising feature in connection with the stock sale four cars of the company were painted white with advertisements of the stock sale in large black letters on them. The ads read "Invest in Our Preferred Stock. It Pays 7⅕ per Cent. It's Safe. Our Employees Sell It."

In addition to the white painted street cars, newspaper and billboard advertising as well as posters in all street cars are being used.

New Third Avenue Director.—At a meeting of the Third Avenue Railway, New York, on Nov. 12, William Carnegie Ewen was elected a director of the company. He succeeds Harry Bronner of Blair & Company, New York, resigned. Mr. Ewen is an investment banker with offices in New York. He has in the past specialized in New York city traction securities and is regarded as being unusually well informed with respect to the history of the various companies in New York City and on the possibilities of the territory in which they operate.

City Wants Payments on Time.—At a conference with Mayor Kendrick, his cabinet, the Council and the Transit Commission, T. E. Mitten of the Philadelphia Rapid Transit Company announced that his company stood ready to carry the interest and sinking fund charges, but he asked that during the early operation of the new subway the amounts to be paid by the company be less than during the later years of the arrangement. He added that the company eventually would pay the equivalent of all interest and sinking fund charges of the entire 50 years. Both the Mayor and president of the Council declared that such procedure would impair the city's improvement program by tying up some of its borrowing capacity. A member of the Council's finance committee named by the Mayor as one of the four city representatives to confer with the company's officials on details of the Chestnut Street subway agreement said that the city must insist that the company be not permitted to interfere with the city's development program by slowness in taking over the full yearly burden.

Deficit in September.—For the month ended Sept. 30, 1924, the Municipal Railway of San Francisco, Cal., reports total receipts of $270,881 and total operating expenditures of $203,722. The excess of receipts over expenses for the month was $67,160. After the consideration of reserves, amounts for depreciation and interest charges, the net deficit from operations for September was $454.

Return Less than 1 per Cent in Mobile.—The financial statement of the operations of the Mobile Light & Railroad Company, Mobile, Ala., for the year beginning Oct. 1, 1923, and ending Sept. 30, 1924, made in connection with a recent abandonment petition shows railway revenue of $747,801. Operating expenses and taxes were $715,770; net $32,031; bond interest, $67,595; other interest, $900; total interest, $68,495; deficit after interest, $36,463; paving assessment, $2,216; deficit after paving assessment, $38,680; sinking fund, $25,000; deficit after sinking fund, $63,680. Including operation of the Chickasaw line, which was not valued by the Public Service Commission, the net income was 0.85 per cent on the valuation of $3,765,369, it was stated in the company's recent plea for abandonment of some lines.

Buses Meet With Losses.—Bus service maintained by the Seattle Municipal Railway in connection with the car lines is a financial loss to the railway system, Superintendent D. W. Henderson reported to the City Council recently. During the first nine months of 1924 the loss amounted to $20,125. The Council has before it an ordinance appropriating $17,000 to purchase two buses for operation on Empire Way, and Superintendent Henderson recommends against such a move, stating that at least three buses would be required, involving an initial investment of $25,000.

Prior Preference Stocks Offered.—A syndicate including Otis & Company is offering at $92 per share and accrued dividend to yield 7.61 per cent, $4,000,000 of the 7 per cent prior preference stock of the Continental Gas & Electric Corporation. This company is presently to be a subsidiary of the United Light & Power Company of Grand Rapids, Mich. The United Light & Power Company, through a subsidiary, has recently contracted to purchase more than 75 per cent of the common shares of the Continental Gas & Electric Corporation. The Continental Gas & Electric Corporation is a large utility holding company which controls among other companies the Columbus Railway, Power & Light Company and the Kansas City Power & Light Company.

Third Quarter Better Than a Year Ago.—For the quarter ended Sept. 30, 1924, the United Traction Company, Albany, N. Y., received in transportation revenue $687,125, against $696,940 for a similar period a year ago. Revenue from other railway operations for the same quarters was $20,435 and $22,434 respectively. The total operating expense for the third quarter of this year was $631,987. The net surplus was $75,574. After the consideration of taxes the operating loss was $10,256. The operating loss for a similar period last year was $61,960. The net corporate loss for the third period of 1924 was $130,975. The net loss for the year, up to the close of the September quarter was $205,986. This is $12,452 less than the net loss for the first three quarters of 1923. For the nine months of 1924 the company collected 110,091 fewer passenger fares than for a similar period in 1923. For the first nine months in this year the company operated 3,945,745 car-seat-miles more than for the first nine months one year ago. The number of car-seat-miles operated for the quarter this year was 64,218,392.

Railway Appurtenances Sold—The Southeastern Ohio Railway, operating between Crooksville and Zanesville, Ohio, was sold recently to Henry Goodman. He will dismantle the property. Officials say that bus lines depleted the railway income. Cars have not been running since last May. The likelihood of the abandonment of this 16-mile line has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Income Increases.—For the quarter ended Sept. 30, 1924, the New York State Railways, Rochester, N. Y., reports to the New York Public Service Commission a net income of $217,774, compared with $205,842 for the similar quarter in 1923.

$7,900,000 Bond Issue on Account of Purchase.—Although the final railway purchase award at Toronto, Ont., calls for $11,448,500, the issue of bonds by the city on account of the railway purchase is for $7,900 000, as the city has already paid $2,500,000 on account, and more than $800,000 is still owing the city by the company in percentages. The terms of the award and the plans looking toward the liquidation of the Toronto Railway have been referred to several times in recent issues of the ELECTRIC RAILWAY JOURNAL. A meeting has already been called having for its object the winding up of the affairs of the company.

Personal Items

Assignments Made in Westinghouse Railway Department

Important changes, involving four division sales managers, have been made in the railway department of the Westinghouse Electric & Manufacturing Company. W. R. Stinemetz, manager of the heavy traction division, and K. A. Simmon, manager of the light traction division, have been appointed assistants to the manager of the railway department. To fill their places, A. J. Manson, manager of the transportation division at New York, has been elevated to the managership of the heavy traction division, as noted in the ELECTRIC RAILWAY JOURNAL for Nov. 22, and E. A. Palmer, manager transportation division, San Francisco office, has been advanced to the managership of the light traction division.

Mr. Stinemetz was graduated from Lehigh University in 1893. He was first employed by the Chicago Telephone Company and the Brooklyn Edison Company. He entered the employ of the Westinghouse Electric Company in 1897, was electrical engineer for power houses of the Third Avenue Railroad, New York, in 1899 and in 1900 was employed by the Westinghouse agents in Mexico. In 1901 he worked on the electrification of the Boston Elevated Railway and later launched the single-phase road of the Atlanta Northern Railroad. He then spent two years supervising the installation of single-phase railroads in France for the French Westinghouse Company and still later was engaged in installing the electrical equipment in the power house which supplied light, heat and power to the United States Capitol. In 1913 he was employed as a commercial engineer in the railway department of the Westinghouse company and several years ago was made manager of the heavy traction division of the railway department.

Mr. Simmon entered the employ of the Westinghouse company upon his graduation from the University of Minnesota in 1905. He attracted attention through the development of train-heating boilers for the New Haven locomotives. Railway control was his special work for some time and he became head of the railway control section of the railway engineering department in 1914. Four years later he became section engineer in charge of light traction motors and control in the railway engineering department. In 1921 he was appointed manager of the light traction division.

Mr. Manson's career was reviewed in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 22.

Mr. Palmer served with the Public Service Railway, New Jersey, upon his graduation from Cornell University in 1909 and was appointed assistant superintendent of the Plank road shops in 1911. Three years later he was made division master mechanic of the Central Division in Elizabeth, N. J. He held this position until 1916, when he entered the employ of the American Brake Shoe & Foundry Company as mechanical expert. He was engaged by the Westinghouse company in 1917 and was assigned to the railway department of the San Francisco office.

T. R. Langan, manager of the transportation division at the Buffalo office, has been appointed manager of the transportation division at the New York office, to succeed Mr. Manson.

Mr. Ainey Heads Commissioners

Chairman of Pennsylvania Body Elected President of National Body at Phoenix Meeting

W. D. B. Ainey was elected president of the National Association of Railway & Utility Commissioners at the recent annual convention in Phoenix, Ariz.

W. D. B. Ainey

Mr. Ainey is chairman of the Public Service Commission of Pennsylvania. He was appointed to that body by Governor Brumbaugh in 1915 and three months later he was made chairman. Mr. Ainey performed the duties of this office so capably that in 1917 he was reappointed for a 10-year term.

Mr. Ainey is very well known among utility men operating outside of his own state. He has been a frequent attendant at the conventions of the utility managers and was one of the speakers at the Midyear Meeting of the American Electric Railway Association in Indianapolis in 1922. His subject at that time was "A Commissioner's Viewpoint on Some Electric Railway Problems." According to Mr. Ainey, it is in the management and in the management alone that there is to be found the solution of the utility problems of the country. He has said publicly that in so far as the public utilities are concerned it should be the policy of the law not to permit managerial responsibility to be avoided, but that responsibility without authority to make itself effective is vain.

Mr. Ainey's principal interest lies, of course, in Pennsylvania, but he has long been a national figure. He was elected to Congress in 1911 and was there four years as a member of the Sixty-second and Sixty-third Congress. His election to this office was a tribute of his constituents toward the man. That his legal attainments have been given wide recognition is evidenced by the numerous occasions on which he has served as a delegate to international gatherings, including the Inter-Parliamentary Conference in Geneva, Switzerland, in 1912 and the Hague Conference in 1913, where he was made secretary of the Japanese-American groups of parliamentarians. In 1914, on the invitation of the Imperial Parliament, he visited Japan as a delegate from the United States.

Mr Ainey is a native of New Milford, Pa. He was graduated from the law school of Lehigh University and was admitted to the bar in 1887.

Duties Reassigned in Schenectady

Changes in the personnel of the Schenectady Railway, Schenectady, N. Y., include the names of Messrs. Witherwax, Nellis and Palmatier.

C. J. Witherwax, for some years past connected with the company as general passenger and freight agent, has resigned his position, effective Nov. 24, to engage in other business. When he took over the management of all special car movements, excursions and the investigation of irregularities in service about ten years ago his office was a new one with the company. Later he was appointed claim agent. Prior to his connection with the railway he was associated with the Schenectady Illuminating Company and the Mohawk Gas Company.

J. G. Nellis, who was appointed superintendent of the Schenectady Railway on Oct. 15, 1924, takes charge of the traffic department in addition to his other duties, vice C. J. Witherwax, resigned. Before going to Schenectady Mr. Nellis had been superintendent of the Auburn & Syracuse Electric Railroad and prior to that a division superintendent with the Fonda, Johnstown & Gloversville Railroad at Amsterdam, N. Y. The activities of both Mr. Witherwax and Mr. Nellis have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Frank Palmatier, who for many years past has been superintendent of power for the Schenectady Railway, has had his duties enlarged so as to have charge of both power and overhead lines.

Douglass Ford, superintendent of the North Branch Transit Company, Bloomsburg, Pa., has resigned, effective Dec. 1, to become general manager of the Trenton, Bristol & Philadelphia Street Railway, which is in process of merger with the Frankford, Tacony & Holmesburg Street Railway and the Pennsylvania & New Jersey Railway. The headquarters will be located at Bristol, but may be moved when the merger is completed.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Hoover Reviews Economic Progress

Outstanding features of the fiscal year ended June 30, 1924, were, according to Herbert Hoover, Secretary of Commerce, first, the advance in agricultural prices, which have lagged behind industrial prices for the last four years; second, the beginning of sound economic policies in German reparations, leading to a hopeful measure of economic recovery in Europe, and, third, the recovery of our own industry and commerce, great stability of prices, high production, full employment, expanding foreign trade and prosperity throughout the business world.

A slight slackening in production at the end of the year is indicated by the fact that the index for manufacturing output for June was 15 points below the average for the fiscal year, that for railway ton-mileage was 13 points below, for building contracts 6 points and for employment in factories 7 points below. Subsequent recovery is shown by the September indexes, which for manufacturing production stood thirteen points higher than in June, for mineral production nine points and for forest production one point higher.

Financing Machinery Purchases

A new method of financing the purchase of machinery has been developed by the Industrial Equipment Corporation of America, New York City. The proposed plan resembles in many ways railway equipment trust financing. Certain kinds of machinery are standard with certain industries and possess a substantial resale value. Figures obtained from dealers in second-hand machinery indicate that the cost of removing such machinery does not average more than 5 per cent of the original cash value. Moreover, the rate of depreciation on such machinery is not particularly high. These factors have made possible the new financing arrangement.

Under the usual railway equipment plan the equipment is purchased from a manufacturer and either leased under the Philadelphia plan or sold under the conditional sale plan. The user pays a sufficient rental to meet the face value and dividends in the first case, or the maturing principal and interest in the second case, as they become due. Title to the equipment is vested in a suitable trustee during the life of the trust and each unit of equipment bears evidence of the ownership of the trustee in the form of a metal plate or some other conspicuous designation.

In financing the purchase of machinery the lease plan will be the procedure employed. Through the application of this method there is no possibility of the borrower obtaining title to any of the equipment pledged. Depreciation can readily be taken care of through an arrangement of serial maturities during the life of the trust.

This idea is not entirely new as purchases of other than railway equipment have been financed in the past in a similar manner. In fact, the beginning of the so-called railway equipment financing was not accomplished by a railway company at all, but is said to have taken place about 1845 when the Schuylkill Navigation Company desired to purchase some barges. Other instances of the application of this principal to the purchase of other material than locomotives and cars have occurred at various times. Machinery has been sold on the conditional sale plan to manufacturers and other types of industrial improvements have been financed through the recording of chattel mortgages and the issuance of serial installment payments against them. These transactions, however, have been more or less individual in nature and no successful effort has heretofore been made to develop the broad possibilities of the project as conceived by the organizers of the present corporation.

Lumber Prices Have Doubled in 50 Years

An interesting fact in connection with average lumber prices during the past 50 years is that between 1874 and 1904 there was comparatively little variation. Beginning in 1905, however, there was a steady rise, interrupted only by one marked recession, until 1920, which was the peak year. Then followed a slight decline, but the average so far for 1924 is almost as high as for 1920.

The lumber prices shown in the accompanying table from 1874 to 1909, inclusive, are for long-leaf yellow pine boards, 1x12 in.; from 1910 to date for long-leaf yellow pine timbers, 3x12 in.; all per thousand feet, board measure, in approximately 20-ft. lengths at New York, N. Y.

In 1912 pine lumber prices had reached a point not touched again until 1918. The slump, which occurred meantime, reached the lowest point between 1914 and 1915. It was caused by the opening of the Panama Canal, when Douglas fir shippers on the West Coast could send the lower priced lumber through to the Atlantic seaboard in competition with Southern pine.

Year	Price	Year	Price
1874	$26.00	1900	$24.50
1875	21.00	1901	17.50
1876	21.00	1902	21.00
1877	20.00	1903	23.50
1878	20.00	1904	21.50
1879	20.96	1905	24.92
1880	19.00	1906	29.33
1881	19.00	1907	30.50
1882	19.00	1908	30.50
1883	19.00	1909	33.04
1884	19.00	1910	36.00
1885	18.66	1911	36.00
1886	19.00	1912	40.00
1887	19.00	1913	35.25
1888	16.75	1914	29.50
1889	20.31	1915	27.75
1890	21.75	1916	32.62
1891	18.00	1917	37.33
1892	18.50	1918	42.66
1893	8.50	1919	50.87
1894	18.50	1920	63.73
1895	16.92	1921	48.16
1896	16.42	1922	47.05
1897	16.44	1923	55.22
1898	15.75	1924	58.00
1899	16.25		

Metal, Coal and Material Prices

Metals—New York	Nov. 25, 1924
Copper, electrolytic, cents per lb.	14.00
Copper wire base, cents per lb.	16.25
Lead, cents per lb.	8.80
Zinc, cents per lb.	7.25
Tin, Straits, cents per lb.	54.50
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.275
Somerset mine run, Boston, net tons	2.075
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	1.475
Central, Ill., screenings, Chicago, net tons	1.30
Kansas screenings, Kansas City, net tons.	2.30
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N. Y., cents per lb.	17.25
Cement, Chicago net prices, without bags.	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.10
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.152
Turpentine (bbl. lots), N. Y., per gal.	0.84

Growing Machine Tool Market

Machine tool makers are beginning to visualize the market ahead for them among the electric railways now operating buses. A good market exists for machine tool equipment of a type not now needed in the strictly railway shop. Some 2,000 buses are now being operated by the railways, and the number is growing rapidly. Garage installations of sizes varying from that needed for taking care of repairs on a few buses to that for several hundred are of almost daily occurrence.

In these shops in varying degree there will be installed lathes, drill presses, brake relining machines, chain hoists, cylinder boring and honing tools, portable drills and grinders, ball bearing jacks, gear type jacks, heavy duty dolly jacks, universal bench saws, wheel pullers for light duty and wheel pullers for heavy duty. This list includes some things that are not machine tools in the strictest sense, but all come under the general head of labor-saving machinery.

Each extension of the use of the bus means a direct need for the installation of machine tools by the railways. The electric railways are not equipped with the types of machine tools needed for garage work, even if they were inclined to attempt to turn their present equipment to such use. They must buy new equipment of one kind or another.

Moreover, the present is a most propitious time for just such buying. For a long time now the machine tool market has been more or less flat. True, it is improving, but when a large company like Niles-Bement-Pond feels called upon for the first time since 1899 to pass the payment of the dividend on its preferred stock a pretty good criterion is furnished of the extent of the period of readjustment through which the machine tool industry has been passing since the war. The management very frankly stated publicly that the business had not been profitable for the last three years.

Burned Carhouse to Be Rebuilt

On Nov. 21 fire destroyed the carhouse and 10 cars of the Schuylkill Railway, located at Girardville, near Mahonoy City, Pa., with a loss of $150,000. The fire for a time threatened the entire plant of the company and interrupted trolley service throughout the northern end of the county for 5 hours. It has been announced that the buildings will be rebuilt. The company is considering the question of replacing the rolling stock which was destroyed.

Rolling Stock

Illinois Central Railroad has decided on certain details of the 215 new cars which it has ordered, as mentioned in ELECTRIC RAILWAY JOURNAL for Nov. 22, page 905. Of this order 130 will be motor cars built by the Pullman Car & Manufacturing Company and 85 will be trailers built by the Standard Steel Car Company. General features of the motor cars are given in the accompanying table.

Builder of car body	Pullman Company
Type of car	Passenger motor
Seating capacity	81
Estimated weight:	
Car body	57,000 lb.
Trucks	33,000 lb.
Equipment	35,000 lb.
Total	125,000 lb.
Bolster centers, length	47 ft. 9 in.
Length over buffers	72 ft. 7½ in.
Truck wheelbase	8 ft. 0 in.
Width over all	9 ft. 9¾ in.
Height, rail to roof	13 ft. 0 in.
Body	Steel and aluminum
Interior trim	Aluminum
Headlining	Agasote
Roof	Monitor
Air brakes	Westinghouse type PS
Control	General Electric type PC
Destination signs	Hunter
Gears and pinions	With motors by manufacturer
Journal bearings	Plain
Lightning arresters	General Electric
Motors	Westinghouse and General Electric specials*
Seating material	Rattan
Slack adjuster	American
Trolley	Pantograph
Wheels	Rolled steel 38-in.

*Motors—inside hung 4 per car—250 hp. two motors in series on 750 volts.

The trail cars will differ from the motor cars in weight and in size of wheels. Estimated weights for these cars are as follows: Car body, 57,000 lb.; trucks, 26,000 lb.; equipment, 1,000 lb.; total, 84,000 lb. Trucks will be built by the Commonwealth Steel Company and will be equipped with 33-in. rolled steel wheels. Additional details concerning these cars and the motor cars will be published as soon as the company has decided upon them.

Connecticut Company, New Haven, Conn., has just received four White buses.

Pittsburgh Railways, Pittsburgh, Pa., last spring let a contract to the Standard Steel Car Company for the construction of 125 cars, as mentioned in the ELECTRIC RAILWAY JOURNAL, issue of May 10, 1924. These are now being built at the plant of the Osgood-Bradley Car Company, Worcester, Mass., for the account of the Standard Steel Car Company.

Grays Harbor Railway & Light Company, Aberdeen, Wash., recently purchased two double-truck light-weight safety cars, representing an investment of $25,000, and completing the $60,000 improvement which the company has made in 1924. The cars were built by the American Car Company of St. Louis, and each has a seating capacity of 52. They will be used to meet the traffic demands on the line between Aberdeen and Hoquiam.

Tennessee Electric Power Company, Chattanooga, Tenn., includes in its budget for 1925 $100,000 to be expended on track improvements in Chattanooga and the reconstruction of rolling stock. A large part of this amount will be used to rebuild 30 of the most modern cars now in service. These will be equipped with complete safety car service.

Illinois Power & Light Corporation, Chicago, Ill., has placed an order with the Yellow Coach Manufacturing Company for six type Z, 29-passenger, single-deck buses. These buses will have 6-cylinder engines and will be used in the city service at Peoria, Ill.

San Antonio Public Service Company, San Antonio, Tex., has purchased one type Z, 4-cylinder, 29-passenger, single-deck bus from the Yellow Coach Manufacturing Company.

Department of Street Railways, City of Detroit, has received offers from three bus manufacturers who are willing to supply buses on the rental plan proposed by the city. These are Dodge Brothers, Yellow Coach Company and Mason Motor Truck Company.

Power Houses, Shops and Buildings

Grand Rapids Railway, Grand Rapids, Mich., has awarded the contract to F. W. Burgstahler & Sons, Grand Rapids, to rebuild its Hall Street carhouse, which was recently destroyed by fire. The general contract price is given at $33,450.

Track and Line

Los Angeles Railways, Los Angeles, Cal., has reconstructed Central Avenue track from Fourteenth Street to Slauson Avenue.

Chicago Surface Lines, Chicago, Ill., has opened up its 1½-mile extension to the Hegewisch, Ill., plant of Henry Ford. The South Chicago Chamber of Commerce took over the sale of bonds covering the cost of the extension. The new line runs through Prairie on Torrence Avenue from 112th Street to 124th Street.

Boston Transit Department on Nov. 25 opened bids for the building of the first section of the work of making the Shawmut Avenue branch of the New York, New Haven & Hartford Railroad into a branch of the Boston Elevated Railway. This section includes the extension of the Dorchester subway at Andrew Square and the building of an incline to the New Haven tracks. The contract has not yet been awarded, but the bids are as follows:

Reynolds Brothers, Inc.	$1,074,295
Simpson Brothers Corporation	1,033,520
C. & R. Construction Company	1,019,930
Martin F. Gaddis	1,013,610
A. G. Tomasello & Son	991,160
Coleman Brothers, Inc.	969,530

Trade Notes

Lindsley Brothers Company, New York City, N. Y., pioneer operators in the Northwest since 1896 in Western red cedar poles, has recently established a New York office at 150 Nassau Street, in charge of Walter E. Mitchell as Eastern representative. Mr. Mitchell has been engaged in the pole business in the East since 1904.

Gibb Instrument Company, Bay City, Mich., has changed its name to Gibb Welding Machines Company. This is a change in name only and denotes no change in organization. As the company no longer makes instruments, but is engaged exclusively in the manufacture of electric welding and heating machines, the new name was adopted as more exactly descriptive of the product.

New Advertising Literature

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued a new edition of its publication "Cars and Car Equipment." This is a 20-page book, 8½ in. x 11 in., resembling in a general way the book published under the same title in 1920 by this company. Service performance, general data, weights, dimensions and information on electrical equipment and mechanical equipment, together with photographs and floor plans, are included for fifteen different cars. These include the light-weight cars of the Boston Elevated, Eastern Massachusetts, Lewiston & Reedsville railways, the Cincinnati and Wheeling traction companies and the North Shore Line. Moderate-weight cars of the Brooklyn City Railroad, Los Angeles Railway, and New Orleans Public Service, Inc., are shown. Suburban and interurban cars pictured are those of the Monongahela-West Penn system, Ohio Valley Electric Railway, the Indianapolis & Cincinnati Traction Company. A multiple-unit car of the Chicago elevated is also included.

American Rust Proof Company, New York, N. Y., has issued a 15-page pamphlet called "Rust and Rust Prevention." It describes the preservation of steel from rust by Vatu.

Barber-Greene Company, Aurora, Ill., has issued an attractively illustrated 25-page pamphlet called "Snow Insurance." Detailed specifications of the Barber-Greene snow loader are included and stories of its successful operation in many cities in the country. In addition, the pamphlet explains the practical solution of snow removal, stressing the great cost to the merchant, the community and the street railways where snow is allowed to remain unremoved. It states that the record of the New York car lines shows that $1,000,000 was lost in fares in the winter storms of 1919.

Ohio Brass Company, Mansfield, Ohio, has issued an illustrated 30-page booklet called "Trackless Trolley." It contains descriptions of overhead materials, current collection equipment and bus equipment.

New York, Saturday, December 6, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 23

A Background of Forty Years for Future Building

By HARRY L. BROWN
Editor Electric Railway Journal

FORTY years ago last month—in November, 1884—the first issue of the magazine that has since become the ELECTRIC RAILWAY JOURNAL made its way to the youthful but vigorous street railway industry. Then, as ever since, the paper was presenting information on those subjects and problems in which there was most interest on the part of the men responsible for what was destined to become a great public service. Those were the days when the street railway was not a necessity but a convenience, and the managements had to offer inducements to get the people to ride. Selling transportation was then as live a topic as it has come to be once more in recent years. Aside from the more general aspects of the street railway business, the early issues of the JOURNAL treated its technical aspects, and these at the time had largely to do with horses, harness, colic cures, feed cutters, grooming machines and the like.

Even at this early date, however, improved methods of operation had a prominent place in the paper. The cable drive was then rapidly coming to the front to give a faster and more economical service. Electricity as a motive power was frequently touched upon. While at the beginning of the paper electricity was looked on merely as an experiment, it was soon visualized by the editors as the future means of propulsion for all street railways, and the paper became its active champion. General opinion at the time, however, was in favor of the cable.

Thus the whole story of the industry, its struggles and successes, its mechanical development, its financial and accounting difficulties, its relations with public authorities, its progress in solving these many problems, little and big—all have been recorded for the benefit of the field in the pages of this paper. It has not mattered that hay motors gave way to electric motors, that rope traces gave way to gears, feed cutters to rotary converters and colic cures to shop equipment; the JOURNAL has kept pace. Indeed it has been a significant factor in leading the way. Through these 40 years of transition and of enormous growth in the business of urban and interurban transportation, it has labored continuously in the interests of the industry. Through most discouraging days it has stuck by the industry and steadfastly maintained that a utility so essential could not perish. It has suffered financially with the reverses in the industry, for it prospers or declines with the industry. Which is to say that the JOURNAL is part and parcel of the industry, its champion, its critic when criticism is helpful, and above all, its informant—the "bible of the industry," as is often said.

With this number, the JOURNAL commemorates its fortieth anniversary. Its history, in bare outline, is published in the following pages. Interesting as this is, it does poor justice to the history that is disclosed by going back through the 64 volumes that compose its record. To one who is intensely interested in the industry today, here is a pastime of genuine pleasure.

Going back to the very first issue, whose front cover masthead is reproduced on the second succeeding page, it is interesting to note that six pages of the total of 24, including advertisements, were devoted to news of the American Street Railway Association which had recently been organized. Thus the JOURNAL has always been an enthusiastic supporter of association activities.

From the start, the paper has featured progress and new methods—modernization. For progress is essential in an industry that not only is a direct impetus to great growth in the population of cities, but which must itself keep pace with the increasing demands upon it due to this very growth.

Think what it would mean, for example, if present-day traffic had to be handled by horse cars. The industry would have to possess more than 1,000,000 horses and mules. The Chicago Surface Lines alone would have to have some 40,000 animals. Picture the stables for housing such a herd, the small army of hostlers to take care of them, and the scores of "white wings" required on the streets. Then you take a keener interest in the discussions of the "Refined Habits of the Louisville Street Railway Mule" that found space in some of the early issues.

It is also interesting to find that the JOURNAL has treated the street railway as an essential part of a city from the very first. We find this comment in an editorial in the issue of May, 1885:

> Without this cheap and convenient system of internal transportation, working within and in co-operation with the other greater or lesser divisions of labor, the modern city could not exist. Cities of a million population now are few in number and those several cities in the near future with *five million population* would never exist except in the imagination of sanguine and false prophets,

but which by the aid of street transportation will be facts to be learned from the geography of our children.

The JOURNAL was even then building for the future. It started out with a clear vision of the great function of transportation. That vision has been realized over and over, but it has constantly expanded. Now, with the new, flexible, mobile bus as an added tool, the vision of the transportation industry of the future is again as much beyond its present scope as is the present industry beyond the horse car stage of 40 years ago.

More than of any other individual, this vision of the JOURNAL has been the reflection of the vision and genius of its publisher, James H. McGraw—a great builder of industry. The JOURNAL was his "baby"—his first publication and the beginning of the group which now are produced by the largest industrial and business paper publishing house in the world, of which he is the head. To him, clearly, is industry indebted for having set a new and substantially higher standard of editorial service in such papers. He has never spared expense nor effort to make the JOURNAL, nor any of the other McGraw-Hill publications, of the utmost possible usefulness to their industries. He sees them as among the tools of industry and as such they must be sharp and true and made of the right metal. As he said to the writer, "My whole book of instructions for you is this: 'You cannot make the paper too good to suit me.'"

It is that opportunity without limit to serve the electric railway industry to which the JOURNAL is now, even more than ever before, striving to measure up. It has a background and experience of 40 years to guide its future building. Its purpose will always be to merit the high place it holds in the estimation of the industry.

Prosperity and the Electric Railway

FOUR weeks of a bull market in Wall Street indicate the general impression of prosperous times ahead. President Coolidge in his speech in Chicago on Thursday of this week expressed the same thought, though with a word of caution that prosperity will come only if we work for it. Secretary Mellon makes the same prediction in his annual report, published yesterday, in which he said: "The situation in America looks more favorable for sound and orderly economic development than at any time since the war."

Undoubtedly the electric railway industry should prosper in times of general good business. With general industry active, employees must be carried back and forth to their places of work, and they will have more money to spend for other travel for themselves and their families. Their purchases will be greater, and those railways hauling freight should enjoy more business. As a necessary utility for all classes of people, the gross revenue of the electric railways of the country should increase with prosperous times. At the same time railways may expect an increase in their unit costs, though the inflation of the post-war period is not to be expected, as business conditions, both in this country and abroad, are on a much sounder basis than in 1920.

Of course, the railway industry is very much better fitted to meet any increase in costs than it was in 1914 and 1915. The essential nature of the service which it renders is generally recognized, its equipment for rendering this service is of better design and in much better condition than 10 years ago, and the need for higher fares with increased expenses is generally recognized. A slight increase in the cost of operation, if it comes, need not be a cause, by and large, for worry. But during the period now coming electric railways should watch carefully their expenses as well as their receipts, and if the former with careful management rise unduly they should lose no time in devising some system of fares which will increase the margin of profit.

Modernization Builds Morale

MATERIAL improvement in the morale of the operating and maintenance employees is a certain by-product of real modernization work on an electric railway. Its importance is perhaps as great as the direct results for which modernization is undertaken, namely, economies, better patronage and better public relations. This is just beginning to be realized by the properties which now have their modernization programs well along.

The modernization work on the Eastern Massachusetts Street Railway system, resulting in far better operation at lower maintenance costs, was told about in this paper, page 808, Nov. 8, and discussed editorially on page 830 in the issue for Nov. 15. On this property the management has noticed a most desirable change in the attitude of the employees. Because new equipment has replaced a large part of the old and all equipment put in good condition, the maintenance men think now, when a car comes in, that it is *worth* repairing. They have some respect for it. Also, when a motorman takes a car out, he does so with the feeling that it is a good piece of equipment, not a despicable "pile of junk." He has assurance that it is going to run all day and not have to be pulled in after a few hours.

It is easy to comprehend what such a feeling of confidence in and respect for the equipment, spread over a property, means in the way of improved service, better public relations, more revenue and less expense.

An interesting reflection of the poor morale which results from the opposite situation on a railway was observed the other day. This was on a property where one is almost afraid to ride on the cars for fear they will fall down on his head and where there has not been a new car or a new piece of equipment since the time whereof the memory of the present generation of employees runneth not to the contrary.

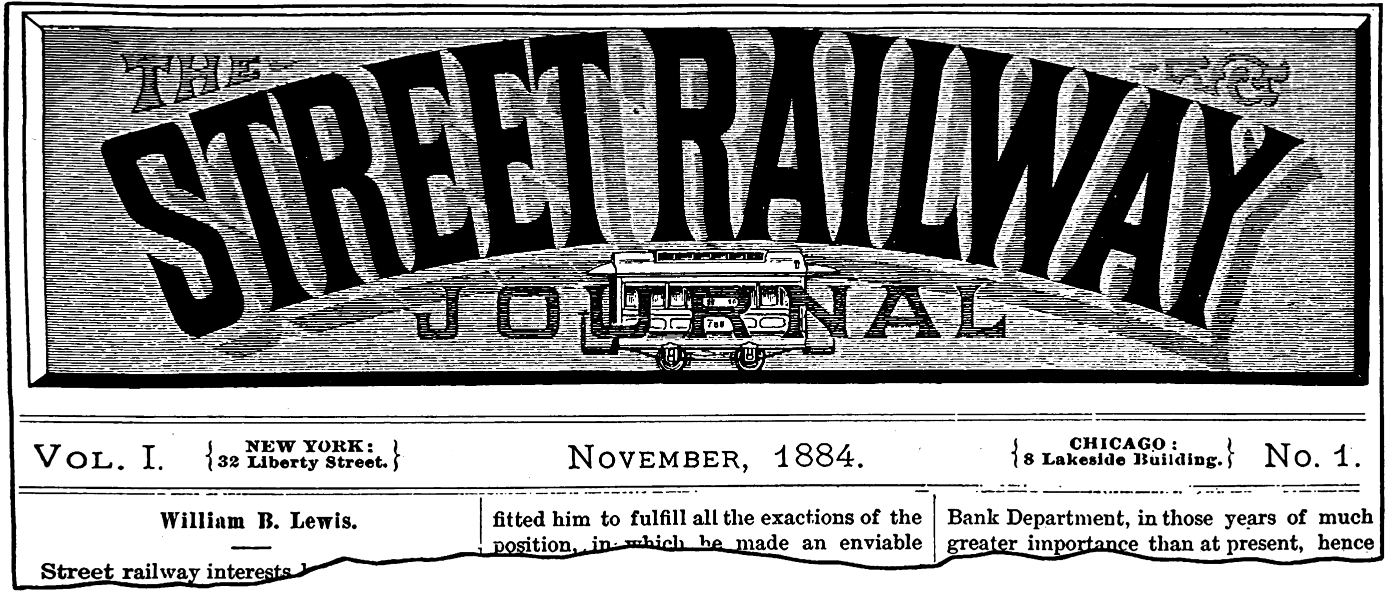
A conductor came up to the front end for a word with the motorman while the car awaited the traffic signal. He said to his teammate:

"How's she acting now?" The car had evidently been pulled in that morning and was now on its first trip out of the carhouse again. The motorman replied:

"She's pretty good now. They put a new tip in the controller."

"I'm glad to see *something* new around here," said the conductor.

That remark told volumes about the condition of the property and the indifferent morale of the men. It is virtually impossible to have good morale, a matter of profound importance, on a system that has for many years not had a new car nor any evidence of keeping up to date.



THE STREET RAILWAY JOURNAL

VOL. I. NEW YORK: 32 Liberty Street. NOVEMBER, 1884. CHICAGO: 8 Lakeside Building. No. 1.

William B. Lewis.

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Street railway interests

fitted him to fulfill all the exactions of the position, in which he made an enviable

Bank Department, in those years of much greater importance than at present, hence

Forty Years of "Electric Railway Journal"

Historical Sketch of the Beginning, Development Policies and Service Rendered by a Publication Which for Forty Years Has Been the Principal Medium for Disseminating News and Technical Information of the Street and Interurban Railways—It Has Striven to Be of Major Service to the Industry Through the Transition from Horse Car and Cable to Electric Car and Recently to Include the Bus

WITH the issues of November this paper, formerly the STREET RAILWAY JOURNAL, completed 40 years of publication service to the street railway industry. It was the first paper in this field. The industry then was already of sufficient magnitude that the need was felt by the men in the field for a medium in which to exchange information and keep them up to date on the inventions and experiments which were the forerunners of important developments soon to come in the street railway industry. There were then some 525 horse railway companies in 300 cities in the United States. Their equipment comprised 16,000 four-wheel cars and 100,000 horses and mules.

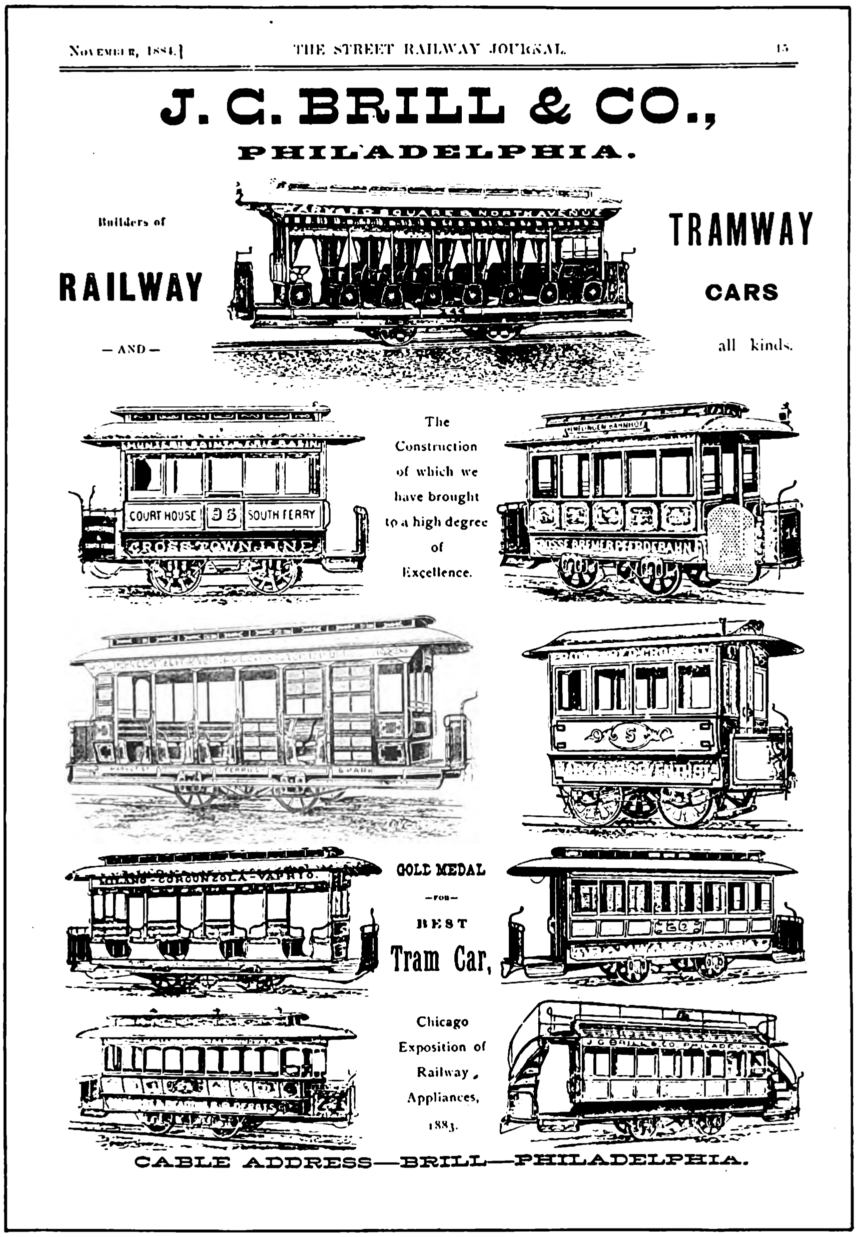
In addition there were cable railways in six cities—San Francisco, Chicago, Cincinnati, Kansas City, New York and Philadelphia. Although the cable had been introduced in 1873 in San Francisco, primarily to provide service on the steep hills, its further use had made slow headway. This was principally on account of the excessive cost of installation as compared with the simple track required for a horse railway.

Electric propulsion of cars at this time was hardly more than a dream. The idea had been conceived several years before. A number of purely experimental and exhibition lines had been built in the period dating from 1879. The electric propulsion of cars necessarily awaited, however, on the development of electric generating machinery and of railway motors and control. In fact, looking back now, it seems fair to say that in large measure it was the electrical manufacturers who made possible the great local transportation industry of today.

The first electric street car line to be operated in regular service, that installed in Cleveland by Bentley and Knight, was 2 miles long and had three cars operating on a crude underground conduit. It made its appearance about the time of the STREET RAILWAY JOURNAL, going into service in July, 1884. Thus the JOURNAL may be said to have been born with the electric railway. The installation at Richmond, Va., by Sprague, which is usually referred to as the first practical electric road, did not come along until four years afterward. It, of course, was by far the largest installation up to that time, and more than any other proved the practicability of electricity for car propulsion. The discussions of electric operation in the early issues of the JOURNAL were thus based on the experimental installations.

The founding of the paper was also nearly contemporaneous with that of the American Street Railway Association, and in one of the early issues gave a report of the second annual convention of that association.

This, in a few words, was the extent and nature of the industry when the JOURNAL was started in November, 1884. The first conception of the paper had been the idea of Emerson P. Harris of Chautauqua County, N. Y. He had lifted a street railway department out of the *Journal of Railway Appliances*, a steam railway paper, to create the STREET RAILWAY JOURNAL as a separate monthly publication. This new paper during the first 4½ years was edited by Robert Grimshaw, George L. Fowler and Mr. Harris. It dealt mostly with horses and allied topics and the early transportation prob-



November, 1884.] THE STREET RAILWAY JOURNAL. 15

J. C. BRILL & CO.,

PHILADELPHIA.

Builders of

RAILWAY

— AND —

TRAMWAY

CARS

all kinds.

The Construction of which we have brought to a high degree of Excellence.

GOLD MEDAL

— FOR —

BEST

Tram Car,

Chicago Exposition of Railway Appliances, 1883.

CABLE ADDRESS—BRILL—PHILADELPHIA.

COURT HOUSE
33
SOUTH FERRY
CROSS TOWN LINE

An Advertisement Which Appeared in the First Issue of the "Street Railway Journal" in November, 1884. The Brill Company Is the Only Advertiser of that First Issue that Remains in the Field Today and It Has Been Represented in Practically Every Issue Since that Time.

lems, with some articles and discussion on cable installations and electrical experiments.

James H. McGraw, another young man from Chautauqua County, had come with the American Railway Publishing Company, which was the publisher of the *Journal of Railway Appliances, Power* and the STREET RAILWAY JOURNAL, early in 1885. In 1889 he purchased the STREET RAILWAY JOURNAL and started his own company. Mr. McGraw then became editor and manager as well as publisher. This was about the time of the real beginning of electric operation of street railways. While with the American Railway Publishing Company Mr. McGraw had been everywhere that anything new of importance was going on in the industry. He had seen the great value of this intimate first hand contact and observation. So with the STREET RAILWAY JOURNAL as his own, he began editing the paper from the field. This has been the fixed policy of Mr. McGraw ever since all of his present great group of industrial publications.

Besides his personal editorial work Mr. McGraw developed an organization and got enough business in the paper to carry the expense and make possible this extensive traveling and field editing. C. B. Fairchild, Edward E. Higgins and Henry W. Blake were the editors whose labors contributed early toward giving the paper a standing in the field.

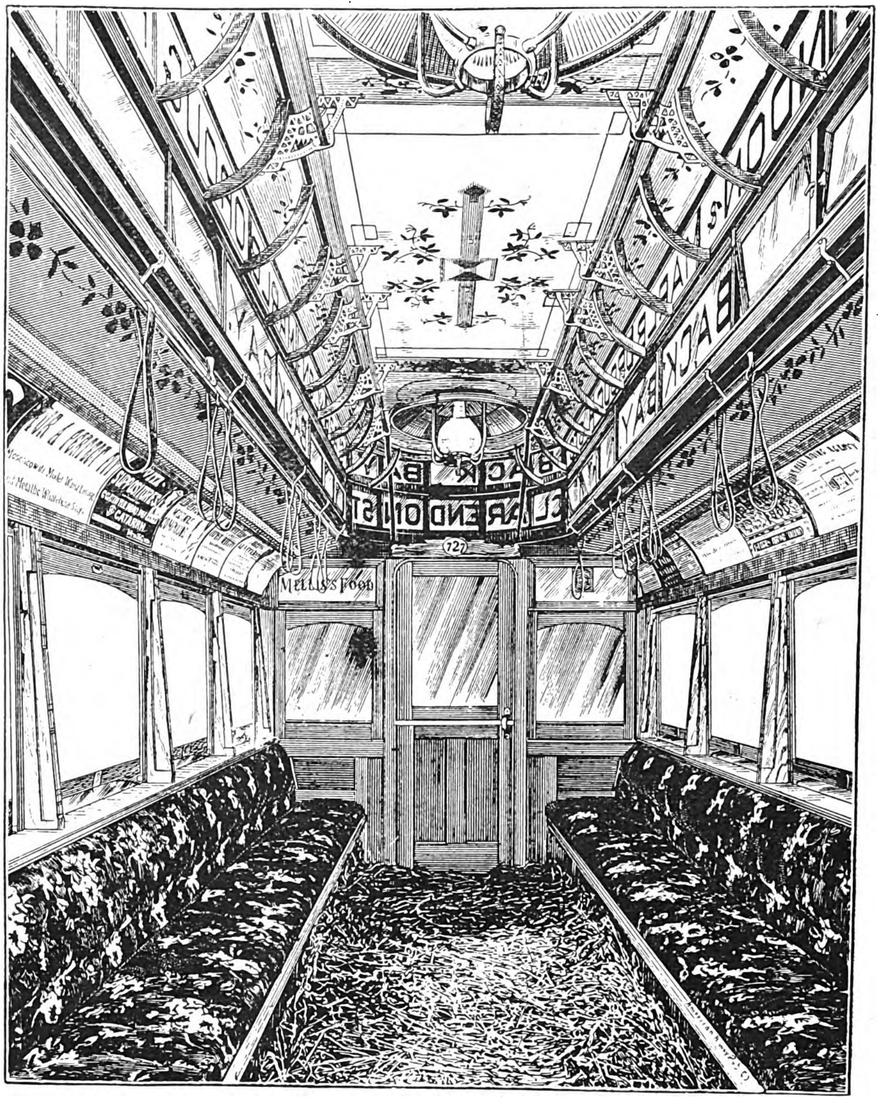
The JOURNAL was newsy and readable and in great demand. It was edited with self-assurance. There was a captivating spontaneity about it and an atmosphere of intimacy with the reader. The service rendered to the American Street Railway Association was invaluable. This consisted in printing notices and full and prompt reports of meetings. The names of association officers appeared in a masthead in every issue.

The first issue contained more than six pages of convention reports. Of its 24 pages, four were occupied with editorials, personals, letters, and fillers. Nearly 13 pages of advertising completed the contents. The first page was occupied with an obituary notice, illustrated with a wood cut of William B. Lewis, who had been president of the Brooklyn City Railroad, which incidentally has the same corporate identity today as then.

In these early issues the name of C. J. Van Depoele was much in evidence, as his company was very active at the time in making installations of electric railways. John Stephenson, the veteran car builder, wrote on the evolution of the street car, in which he had played an important part. Bentley and Knight, whose names are linked with pioneer electric railway work, figured prominently. The opportunity to reach the street railway field through the widely circulated paper was appreciated by Sidney H. Short, Frank J. Sprague, Elihu Thomson, E. J. Houston, J. C. Henry and many others. These men were prolific of ideas regarding the electric motor and its application. Their comments and the articles regarding their inventions made reading of intense interest to street railway men.

Mr. Fairchild, upon becoming editor of the paper, began visiting street railway properties, spending enough time on each really to become acquainted with its problems and its equipment. His researches were promptly reflected in the paper, which showed clearly that it was being edited from the field.

One of his first ventures was a series of talks with electric railway men, in which he used the dialogue form of reporting. He began in July, 1889, with C. D. Wyman, vice-president Central Park, North & East River Railroad. The "talks" made a big hit and were continued for some time. Mr. Fairchild wrote



An Elaborate Wood Cut from the Cover of the Street Railway Journal of June, 1886. It Shows the Interior of a New Car of the Metropolitan Railroad, Boston. The Cut Was Used in Subsequent Issues in an Advertisement of the United States Steam and Street Railway Advertising Company, Ltd.

from the field fully illustrated descriptions of electric railway conditions in many important cities. These studies were unique and their thoroughness commended them. They were voluminous but easy to read and were of great service to the industry. During 1893 and 1894 all but four states in the country were visited and their railways studied in detail.

Mr. Fairchild had not been traveling long among street railway properties before he discovered a need for some kind of a systematic textbook in this field. The scattered railways needed a foundation of information as to best practice if they were to progress without making costly mistakes. He undertook to furnish it. He began in the JOURNAL in 1890 a series of copyrighted articles on street railway practice, later published in book form with the title: "Street Railways; Their Construction, Operation and Maintenance." As one of the earliest books on practical electric railway construction and operation, this proved to be a splendid piece of work which was widely read and highly appreciated by the industry.

Mr. Fairchild's principal contribution to the paper during his 6-year connection with it was that he brought it into personal contact with the leaders of the industry. These 6 years comprised the period of most rapid electrification of the horse, steam and cable street railways. He watched this process not at long range from the office, but on the ground. Although not a railway man by training he was able to sense the problems that confronted the men who were doing pioneer work in transportation.

It was in 1891 that the first "Souvenir" issue of the JOURNAL appeared. This was a supplement to the paper, issued in advance of the A.S.R.A. convention. Its purpose was to prepare the way for the convention.

As to editorial contents, the main feature of the "Souvenir" was a group of articles regarding the convention locality, each of the many railways in Pittsburgh and Allegheny being covered. This practice has since been followed in what later were designated as "Convention Issues" rather than "Souvenirs," whenever the convention has been held elsewhere than at a pleasure resort. There was also a history covering the 9 years of the association, articles regarding leading manufacturers, a list of exhibitors containing 117 names, and a membership list of the association.

MR. BLAKE JOINS THE STAFF

When Henry W. Blake came with the JOURNAL in January, 1891, as assistant to Mr. Fairchild, he added an element to the organization that it had not had before. He had had unusual educational advantages. He had graduated from the Sheffield Scientific School of Yale University in 1886, in civil engineering, and had followed his Yale course with one in electrical engineering at the Massachusetts Institute of Technology, finishing it in 1888.

After graduation, Mr. Blake had been connected with the Sprague Electric Railway & Motor Company, for which he handled advertising and publicity. This work naturally brought him into contact with the trade press of that day, and he became acquainted with Mr. McGraw.

Mr. Blake co-operated heartily with Mr. Fairchild in the endeavor to make the paper practical. He was the natural successor of Mr. Fairchild when the latter left the paper in 1894.

Studies in Electric Railway Economics

BY 1893 the STREET RAILWAY JOURNAL was so firmly established and had made so creditable a record for itself that it was ambitious to render even greater service to the industry than it had done theretofore. The opportunity developed through the appearance on the scene of Edward E. Higgins, who after some 7 years experience with several manufacturing companies traveled extensively abroad. On returning home he opened a consulting engineering office, but soon after, in 1893, joined the staff of the Journal as co-editor.

He had already begun the preparation of a series of articles on street railway investments. These were published in the Journal, beginning in the January, 1894, issue. They were a notable contribution to a new subject and attracted wide attention. Later, these articles were published in book form.

While the articles were coming out, the preparation of a financial manual was also under way. It first appeared in June, 1894, as a supplement to the Journal. At first it carried the title "American Street Railway Investments," but it later became the "McGraw Electric Railway Manual." The supplement was bound in cloth of a brilliant red color, from which it soon became known as the "Red Book," a nickname which continued through its 21 years of existence.

The "Red Book" contained much financial information that was not available elsewhere, even including subdivided operating data when such were available. In the first issue there were reports of more than 1,000 railways operating in about 600 cities and towns.

The consolidations that were going on as horse car lines were bought up extended their range and made the financing less and less a matter of local concern. Large sums of money were needed and it became necessary to go to outside investors for funds. This naturally made a field for the "Red Book," which stepped in to help sell the idea of the electric railway as a desirable investment field.

Mr. Higgins continued as co-editor of the Journal until 1900, when he retired to enter the general publishing field. He was with the paper during the period when his expert knowledge was most needed, that is, during the constructive, speculative period of the business.

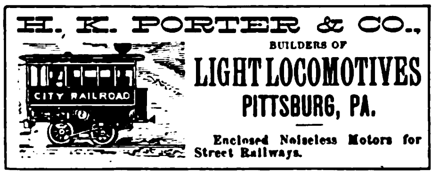
The "Red Book" which he started was continued after he left the Journal, as long as there appeared to be a field for it. It was discontinued with the volume for 1914.

Real Newspaper Service Started

As far as the style of the contents went the Street Railway Journal was newsy from the start. It went as far as a monthly publication could go in furnishing news, but in its first decade there was not the pressure upon it for prompt news service that came about in the middle '90s. By this period the street railway business was booming. The incorporation of new companies was of frequent occurrence, and enormous quantities of supplies were being purchased. So the Journal publishers felt it incumbent upon them to provide news service of a more comprehensive nature.

The first step was the issuing of a daily business news bulletin for the benefit of advertisers and prospective advertisers. This put the facts promptly before those who could most immediately benefit from knowing them. Information for the news bulletin was secured from local correspondents, by the editors, etc. The more permanent items of news used in the bulletin were salvaged for insertion in the regular issues of the Journal.

Experience with the news bulletin, and the desire of the publishers to improve the news service furnished to all subscribers, led, in June, 1899, to the issuing of a weekly supplement, devoted entirely to news. This was continued to the end of the year, when it was incorporated with the paper as a regular feature. With the issue of Jan. 6, 1900, the Street Railway Journal became a regular weekly.


H. K. PORTER & CO.,
BUILDERS OF
LIGHT LOCOMOTIVES
PITTSBURG, PA.
Enclosed Noiseless Motors for Street Railways.

CITY RAILROAD

Another Type of Motive Power Advertised in the Issue of January, 1886

During the first month the first issue of the paper contained 66 text pages and the others 12 each, but gradually the news issues increased in size and finally all issues became uniform. The news section, however, was printed in a definite place in the paper, thus continuing in a way the identity of the news issue.

Special Attention Given to Foreign Practice

While during its first decade the Street Railway Journal was growing in influence among the street railways of the United States and Canada, it also increased in prestige abroad. The practical application of electricity as a propelling power for street railways in Europe lagged somewhat behind that in this country. Although Siemens & Halske had demonstrated that electric cars were practical as early as 1879, it was not until 1894 and 1895 that really active European tramway development took place. In the meantime the phenomenal success of the electric railway in this country was creating abroad a demand for American apparatus, and large quantities were exported.

The Journal had a considerable share in keeping Europe informed as to what America was doing along this line. It was natural, therefore, that the office of the paper was frequently visited by representatives or delegations from Great Britain and the Continent who had been sent here to study American practice. This brought the editors into close touch with foreign developments. Furthermore, the paper had competent foreign correspondents and early established a London office in charge of A. W. Shaw, who served as European manager until 1917.

Messrs. McGraw, Higgins and Blake had traveled extensively in Europe. They were quick to see the desirability of publishing a special European edition which would increase the already large foreign subscription list and render the advertising more fruitful. Such an edition, started in 1897, was a modification of the American edition, some parts of the latter being lifted out and a section dealing with foreign practice being inserted.

The body of the paper was all in English, but to assist the foreign subscribers quickly to gain a comprehensive idea of the contents of an issue, digests of the principal articles were printed in French, German and Spanish. The digest facilitated the use of the paper, as a person familiar with one of the foreign languages was able with its aid to determine whether it was necessary for him to dig into the original article. References to figure numbers in the articles were given in the digest, thus virtually illustrating it.

The foreign edition with the digest was continued for several years, until the increasing familiarity of the Journal's foreign readers with English rendered it no longer necessary.

Journal Becomes More Technical

THAT the STREET RAILWAY JOURNAL was keeping in close contact with its rapidly developing industry was indicated by the increasingly technical, although always practical, nature of many of its articles. From 1895 onward, for, say, 15 years, the progress of electric railways was mainly along engineering lines. Power plants and power transmission, track design and construction, scientific application of motors, and heavy electric traction were features of transportation work which had attracted engineers. The JOURNAL became largely an engineering paper for a time.

An excellent illustration of the work of the paper along engineering lines is furnished by the campaign on train-resistance formulas. Obviously it was essential to designers to know what resistance a car or train would have to overcome at various speeds.

The JOURNAL started with a formula determined by John Lundie, a consulting engineer who had had much to do with the elevated railways in Chicago. The Lundie formula soon became famous through the publicity thus given to it. Experts like C. O. Mailloux, W. H. Blood, Jr., and others brought out the results of their work through the JOURNAL almost as a matter of course. Within 10 years its columns became the repository of most of the writings on the subject, and the paper was widely quoted. All of the early literature on train resistance refers to the JOURNAL as the source of much original information.

The height of the train resistance formula campaign came about 1902, when the soundness of some of the conclusions of the paper were attacked. Mr. Blake was abroad that year and was present at the office of the Siemens-Halske Electric Company in Berlin just as the proof sheets of the report on the famous Zossen high-speed railway tests came in. He was permitted to send some summary sheets to New York for publication long in advance of other publicity. The Zossen results vindicated the JOURNAL'S reasoning and the conclusions were driven home by a series of editorials.

When in 1904 the Electric Railway Test Commission was organized in connection with the Louisiana Purchase Exposition, to utilize the facilities of the exposition for scientific investigation, Mr. McGraw was invited to become one of the five members in recognition of the work which his paper had done in encouraging the laying of a sound engineering basis for railway work.*

The Test Commission produced an elaborate and valuable report which many were anxious to have published in book form. As no one else would finance the printing, Mr. McGraw agreed to do so because he said it had to be made available to the industry.

The JOURNAL also did an important work for the industry along power plant lines beginning back in the early '90s. The rapid expansion of the electric railway business created an enormous market for power-plant machinery, because the railways required power on a large scale and required it at once. Power was not available from lighting plants in the necessary quantities, and of the proper variety for railway use, so that each railway, no matter how small, had to have its own plant. Beginning in 1891 or earlier, articles on power plants and power plant practices became conspicuous. In 1897 the paper secured from a well-known engineer, Dr. Charles E. Emery, a notable series of articles on engines for electric railway power plants. This began in the "Souvenir" issue of that year and continued into the following year. The articles formed a veritable treatise on the subject and were of great value to the industry.

As each important power plant was built for an electric railway property, it was described fully in the paper in order to illustrate the technical advances. From time to time articles of a more general nature were published, including many editorials on all phases of power development.

This continued until, in recent years, electric railways have tended more and more to purchase power from central stations. To secure operating economy, large power plants and super-power plants have been developed to generate electric power on a large scale, distributing it to all classes of customers. The electric railway makes an excellent customer for such a plant, and in many cases can buy power cheaper than generate it. This situation has naturally been reflected in the pages of the JOURNAL, which, of late years, have contained proportionately much less material on this subject.

ACTIVE INTEREST TAKEN IN ELECTRIFICATION

About the time that train resistance had become reasonably well understood, it happened that the electrification of steam railroads began to attract attention. The JOURNAL fortunately was in a position to be of great assistance in this development. The task of disseminating information on heavy traction fell naturally upon the paper because most of the pioneer work in this line was done by men trained in electric railway work.

The application of electric motive power in hauling heavy trains began, in this country, with the electrification of the Baltimore & Ohio Railroad tunnel in Baltimore in 1894, but it was nearly 10 years thereafter before railroad managers became seriously interested. Even then the railroads were very slow to recognize the electric locomotive as a coming thing, and made installations only as necessitated by tunnel conditions. In the meantime the JOURNAL kept hammering away, editorially and by the best of technical news service, to convince transportation men that there was a field for electric operation of trains. That this work was thoroughly done was indicated by the extended use of the paper for reference on this subject. A recent French work on electrification in the United States, as well as American bibliographies on the subject, are replete with references to the paper. From the beginning all important installations have been fully covered and their significant features have been pointed out.

CAMPAIGN FOR PUBLICITY

While, with the industry, the JOURNAL was becoming more technical, the publishers and editors of the paper did not confine themselves to engineering. One thing they early recognized was the need for publicity of electric railway affairs if good public relations were to be preserved. The JOURNAL took a leading position in this matter, far ahead of that occupied by railway managers generally. Editorially and in news articles it preached the gospel of frankness in dealing with the public. Progress was slow, but in time results began to come, especially as public service commissions increasingly required full information to be filed. Now, of course, publicity is accepted as the normal thing.

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*James G. White was chairman of this commission; H. H. Vreeland, treasurer; Mr. McGraw, secretary; the other members were George F. McCullough and W. J. Wilgus.

In May, 1908, Mr. McGraw purchased from Hugh M. Wilson the only serious competitor of the STREET RAILWAY JOURNAL, the *Electric Railway Review.* With the first issue of June the two papers were combined as the ELECTRIC RAILWAY JOURNAL.

At the time of the consolidation of the JOURNAL and the *Review* the latter was in its eighteenth year. The paper was started in Chicago in 1891 as the *Street Railway Review* by H. H. Windsor, with whom was associated Fred S. Kenfield, Western advertising manager of the STREET RAILWAY JOURNAL. Ten years after the *Review* was started Mr. Windsor sold his interest in the paper to his partner, who organized the Kenfield Publishing Company. Mr. Kenfield in turn sold the property in 1906 to Mr. Wilson, publisher of the *Railway Age,* and left the publishing business.

The *Review* was improved in every way by Mr. Wilson and became an active competitor of the JOURNAL.

When the JOURNAL absorbed the *Review* its staff experienced a welcome increase. In addition the JOURNAL gained several editorial features, including the daily edition issued in connection with the annual convention of the Electric Railway Association and the annual statistical issue.

The Dictionary and the Directory

A FEW months before the JOURNAL took over the *Review* in 1908, Jan. 1 of that year to be exact, the paper had engaged as associate editor, Rodney Hitt, who for nearly 6 years had been connected with the *Railroad Gazette* and who had had valuable experience in compiling and revising several of the railway dictionaries which the Boardman Publishing Company issued in co-operation with committees of the steam railroad associations. Plans were soon laid to publish a similar dictionary for electric railways in co-operation with the American Street and Interurban Railway Association.

As an advisory committee on the proposed dictionary, the association appointed H. H. Adams, New York City; Paul Winsor, Boston, and Richard McCulloch, St. Louis.

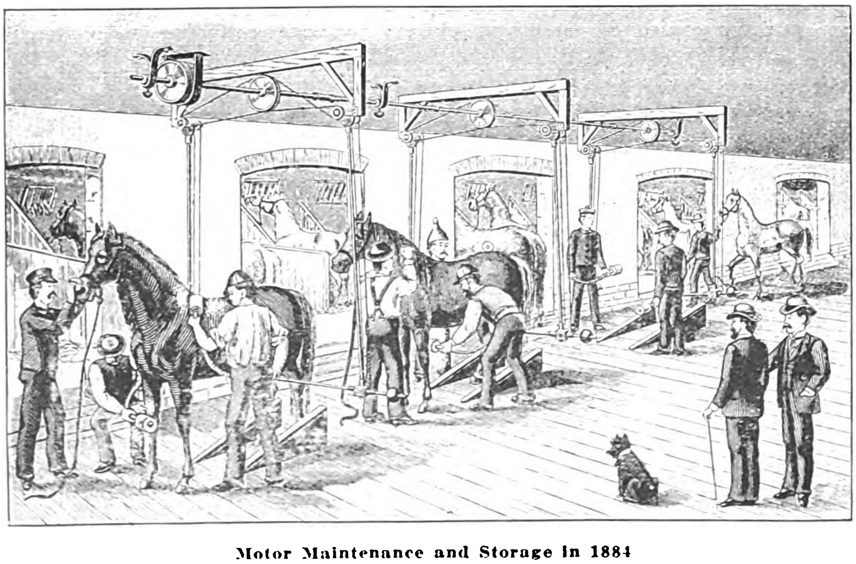
The preparation of the dictionary went along steadily during the ensuing two years, and it was completed during 1911.

The book comprised 355 pages, of which 63 contained definitions to the number of 2,200. The remainder was made up of illustrations—pictures and drawings of cars and parts of cars, with details of equipment. As stated by the committee, the primary purpose of the dictionary was to assist in bringing about standardization of the terms used in electric car building and maintenance. It was an outstanding service of the McGraw Publishing Company to the industry.

The present publication of an electric railway directory was the outgrowth of early work done by the paper. It dates back to June, 1885, for in the issue of the STREET RAILWAY JOURNAL for that month appears an official list of street railways of the United States and Canada. It continued to be printed monthly until June, 1892, after which it appeared only quarterly for a period of 5 years. By 1897 the directory had grown so that it was printed separately in the form of a booklet about 4 in. x 6 in. in size, as a supplement to the paper. This began the second stage of its development. The booklet was not circulated generally, but was printed mainly for advertisers. For each railway it gave the officers, track mileage, and numbers of motor and trail cars. There was no advertising in it. Beginning with the issue for February, 1904, the directory became essentially the McGraw Electric Railway Directory of today, with a page size of 4 in. x 8½ in.

The Journal from 1908 On

SINCE 1908 the most conspicuous single addition to the service rendered by the paper has been the improvement in the field of maintenance. The editors realized that the subject of maintenance had become so important in the eyes of the electric railway operator that they should give it more intense treatment. Consequently, a special maintenance number, the first of the annual series which has continued until the present time, was issued April 4, 1908. In 1913 the number and range of the articles on maintenance were increased and segregated in a special department.



Motor Maintenance and Storage in 1884
Reproduction of a wood cut in one of the early issues of the STREET RAILWAY JOURNAL

This equipment and maintenance section was well received in the field. It resulted in the further development of the maintenance service, by devoting an entire issue each month to mechanical and engineering matters, except for the timely news material which always has the right of way. Such a plan was started with the issue of February 23, 1918. The regular weekly equipment and maintenance department was omitted. Later, the weekly department was restored, supplementing for the weekly subscribers the service furnished by the monthly.

INTEREST IN BUS MATERIALIZES

The JOURNAL early foresaw that electric railway managers should be well informed on motor bus developments. It published articles on the place of the bus and advocated a proper co-ordination of bus and rail service. The paper was in a difficult situation because for the ultimate good of the electric railway industry it had to take an advanced position. The electric railway industry had suffered so keenly from jitney competition that it was in no mood to discuss the subject and in general resented the suggestion that electric railways should operate buses. The paper urged that, as transportation experts, the railways should control a complete co-ordinated system. But not all railway managers believed that buses could be operated at a profit and they hesitated to go into the business. They did not like to see their favorite paper advocating what seemed to them to be a suicidal policy. Yet it was clear to the JOURNAL editors that a great service could be done both the electric railways and the independent bus operators by showing the proper field of the bus and by preaching the principle of helpful co-ordination rather than destructive competition.

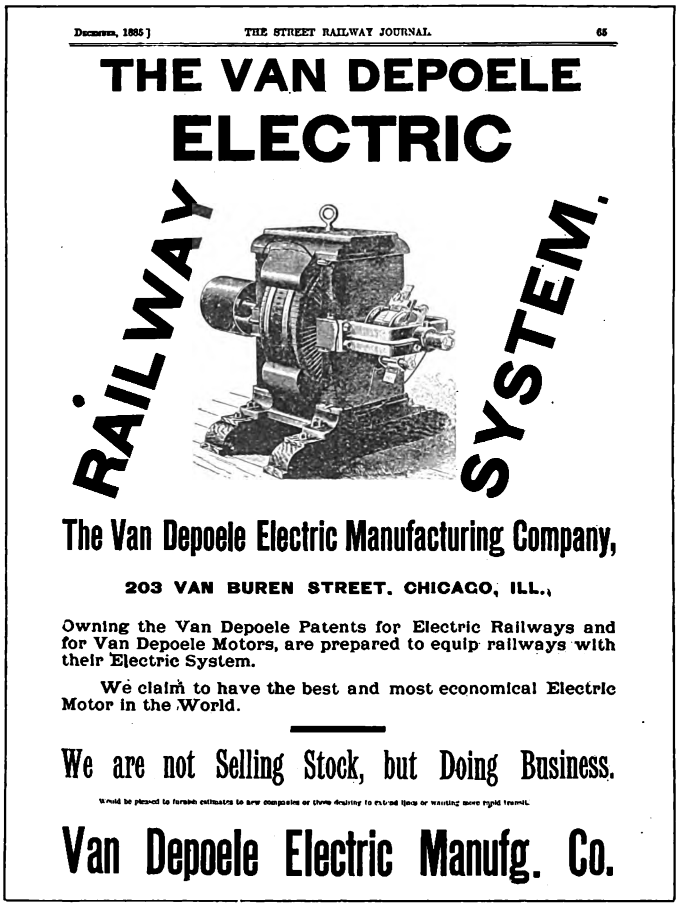
The logical answer could only be a separate paper with a bus appeal, which would reach both the bus operator and the electric railway interested in bus operation. Such a paper, named *Bus Transportation*, was started in January, 1922.

Harold V. Bozell, then co-editor of the JOURNAL was appointed editor of the new paper as well, and Carl W. Stocks, managing editor. Mr. Stocks became its editor on July 1, 1922, when Mr. Bozell was transferred to the *Electrical World.*

The starting of a bus paper by the McGraw-Hill company was considered by electric railway men generally as a wise move. The opinion was not unanimous, however. Without waiting to see how the publishing plan would be worked out, one of the state electric railway associations voiced extreme opposition in a formal resolution.

The JOURNAL continued its plan of treating the bus and opposition to the new venture soon died down. In due course the electric railways began to show a genuine interest in the bus, as was well illustrated at the 1923 and 1924 conventions of the American Electric Railway Association, where bus exhibits were the most conspicuous feature. In fact, several of the railways which objected to the publication of *Bus Transportation* are large users of buses today.

The depression in the industry resulting from the high costs attendant upon the war reacted unfavorably upon the JOURNAL from the business standpoint. Many advertisers stuck by faithfully, even when business was dullest, but the mounting costs of production had the same effect on publishing as on electric railway operation. Retrenchment was necessary, but even though the paper was losing money, the essential editorial service was maintained.



December, 1885.] THE STREET RAILWAY JOURNAL. 65

THE VAN DEPOELE

ELECTRIC

RAILWAY SYSTEM.

The Van Depoele Electric Manufacturing Company,

203 VAN BUREN STREET. CHICAGO, ILL.

Owning the Van Depoele Patents for Electric Railways and for Van Depoele Motors, are prepared to equip railways with their Electric System.

We claim to have the best and most economical Electric Motor in the World.

We are not Selling Stock, but Doing Business.

Would be pleased to furnish estimates to new companies or those desiring to extend lines or wanting more rapid transit.

Van Depoele Electric Manufg. Co.

The First Advertisement of Any Electric Railway Equipment to Appear in the Paper. This Was in the Issue of December, 1885.

SOME CHANGES IN THE STAFF

As Mr. Blake approached the end of a thirty-year period of service, with the JOURNAL, he appreciated the fact that he should have associated with him a younger man of the executive type of mind and trained to relieve him of details. Accordingly, Harold V. Bozell, in February, 1920, became associate editor of the paper. He was promoted to the position of co-editor with Mr. Blake a few months later, but in July, 1922, was transferred to the *Electrical World,* becoming co-editor of that paper with W. H. Onken, Jr.

When Mr. Bozell was transferred to the *Electrical World,* Harry L. Brown, who since 1915 had been first Western editorial representative, then associate editor and later Western editor, with headquarters in Chicago, except for 20 months of military service, was transferred to New York as managing editor. On Jan. 1, 1923, he was appointed co-editor with Mr. Blake and placed in executive charge.

During 1923 the editorial staff was increased with a view to rendering a more practical service to the industry. To permit this, three new men were secured from electric railway properties, Messrs. Charles Gordon, J. A. Miller, Jr., and M. B. Knox, and one from a consulting engineering practice, Morris Buck. G. J. MacMurray and C. W. Squier, in addition to Mr. Blake, also members of the present staff, had been with the paper for a number of years.

As executive editor, Mr. Brown believed that the electric railway industry, with returning prosperity could and would support this more comprehensive editorial service. Mr. McGraw was willing to back him up. The field has responded; the paper has won increased recognition, and the revenue from advertising has grown so that this standard of service can be maintained and improved upon in the future.

"Souvenirs" a Series of Text Books

THE story of the ELECTRIC RAILWAY JOURNAL would not be complete without further reference to the annual which has been published since 1891 just prior to the convention of the American Street Railway Association, later the American Street and Interurban Railway Association, and still later the American Electric Railway Association. The purpose of this publication at the outset was to acquaint the members of the association with the local street railway situation in the convention center, and to give them full information regarding the association officers and their activities.

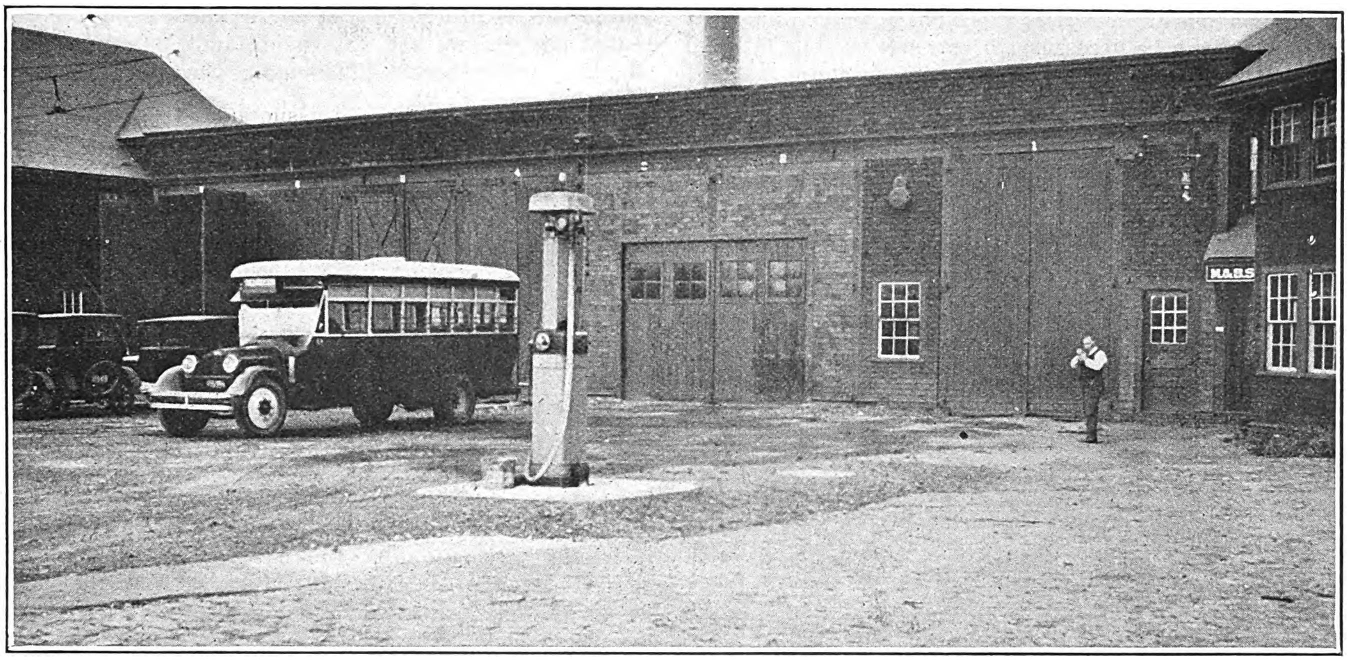
The annual was distributed long enough in advance of the convention to permit those who expected to attend it to receive their copies before starting, and thus prepare them to make the most of their opportunities. Those who remained at home benefited also, through being furnished with unusually complete information regarding railway conditions in a particular section of the country.

The annual was at first known as the "Souvenir," and it was issued as a supplement to the paper. It was printed on stock of finer quality than the regular issues and no expense was spared on illustrations and text preparations. Later, the "Souvenir" became a section of a regular issue, printed and bound separately, but paged so as to bind in its proper place in the volume. Still later, as at present, one of the regular issues was enlarged to accommodate the articles appropriate to the occasion, the enlarged issue being known as the Convention Number.

In 1907 the electric railway association began the practice of holding most of its meetings at Atlantic City, N. J., thus obviating the necessity for the kind of a program which the Convention Issue had provided for 16 years. The plan was changed, therefore, for issues of Atlantic City convention years, at least, to one under which a review was given of the progress made in the art along some lines particularly active at the time. Examples are heavy traction, welfare work, interurban practice, one-man cars, and public relations. The table published herewith gives the full list of subjects.

The Convention Numbers of Electric Railway Journal

Year	Convention City	Contents of Convention Number
1891	Pittsburgh	History of American Street Railway Association—Articles regarding Pittsburgh and Allegheny railways — Articles about manufacturers — List of exhibitors (117) — Membership list of association.
1892	Cleveland	Articles regarding the association and the convention program — Biographies of local committee members— Descriptions of local railways — Manufacturers' section.
1893	Milwaukee	Extended articles on several local railway systems.
1894	Atlanta	Tenth anniversary. Elaborate article on Atlanta — Biographical notes of American Street Railway Association officers and committee members — History of the STREET RAILWAY JOURNAL — Other articles — Totaling 122 pages of text.
1895	Montreal	Electric railway systems of Canada — Long illustrated article on the American Street Railway Association.
1896	St. Louis	Signed articles by experts covering different aspects of local street railways — Statistical study of great street railway properties of America — Progress of the year — Section on new appliances and engineering development.
1897	Niagara Falls	Articles on electric railways of Niagara region — First article of a series by Dr. C. E. Emery on engines for electric railway power stations — Large number of short articles, some signed.
1898	Boston	Articles regarding the local situation and numerous general articles.
1899	Chicago	In addition to articles on local railway situation, electric railway practice in several foreign countries was covered.
1900	Kansas City	International engineering — Besides space given to local situation and to convention, the issue covered railway practices in several foreign countries and included high grade technical articles such as design of large railway generators, by H. F. Parshall; electric railway motors by John Lundie, etc.
1901	New York	More study of local transit situation in all phases, remarkably complete. The leading article was written by Frank R. Ford and contained, so far as is known, the first diagrams ever published, showing the location of cars on a street railway system.
1902	Detroit	Besides featuring the local situation, authoritative articles were given on interurban traction covering many roads. Notable article by Philip Dawson on suburban transportation conditions of London.
1903	Saratoga	While local situation was covered, principal contents were general articles on track, overhead, rolling stock, power equipment, and repair shop methods.
1904	St. Louis	Twentieth anniversary. Besides the local situation, history of the American Street Railway Association was given and the evolution of the industry was covered in a series of articles. Achievements in detail were given year by year and statistics presented in graphical form. There were notable articles on the New York subway, its power plant and distributing system.
1905	Philadelphia	Comprehensive study of Philadelphia street railway systems. New make-up adopted with text and line cuts on rough paper, halftones on coated paper in sections—commercial type face employed. This issue contained the first maps of a street railway published in this country, so far as is known, showing by the width of the lines the normal number of cars passing over that line within a definite period.
1906	Columbus	In addition to articles on the Columbus street railways and neighboring interurban railways, there were excellent articles on rolling stock, generation and distribution of power, carhouses, schedules, freight and express, interurban economics, etc.
1907	Atlantic City	First Atlantic City convention — Railroad electrification issue — All phases of electrification, including maintenance, were taken up — There was a feature article by Philip Dawson on electrical equipment of main line railways in Europe.
1908	Atlantic City	Operating practice — Articles dealt with employment of trainmen, welfare work, train dispatching, tickets and fares, track, overhead, carhouses, repair shops, etc.
1909	Denver	Twenty-fifth anniversary — Tramway situation in Denver covered, as well as interurban railway construction and practice in the West — History of preceding five years covered year by year.
1910	Atlantic City	Development of traffic — Articles took up promotion methods in different parts of the country —.As illustrations had to be scattered through text, coated paper was used throughout — It was lightly tinted in green.
1911	Atlantic City	The Public Service Railway system was exhaustively covered in all departments.
1912	Chicago	An elaborate study of the Chicago properties, going into many phases of their construction and operation.
1913	Atlantic City	Recent progress — The topics thoroughly covered were track construction, power generation, car design, repair shop methods, fare accounting, freight handling, signals and self-propelled cars.
1914	Atlantic City	Public relations — Articles, a number contributed, on three phases of subjects: Meeting the public, operating conditions, and regulation.
1915	San Francisco	Pacific Coast properties — Signed articles relating to various electric railway matters.
1916	Atlantic City	The development of electric railway cars was treated from different points of view.
1917	New York (Conference but no convention this year)	More service at less cost — This issue was devoted to the development of one-man car operation.
1918	New York (Conference but no convention this year)	Issue devoted to four subjects as follows: What war has meant to Canada's lines; How safety cars save fuel and men; British tramways severely affected by war; Disabled soldiers in electric railway service.
1919	Atlantic City	Selling transportation — Means for getting electric railways on a profitable basis, including several articles on the zone system. This was the year of the printers' strike, but the Convention Issue was out just in time to avoid it. The convention report number had to be published in Baltimore.
1920	Atlantic City	Mass transportation — Signed articles by experts on several phases of the problem of handling passengers in large groups.
1921	Atlantic City	Better salesmanship in transportation — The articles show how all departments can help in the sale of transportation, there being articles signed by several experts.
1922	Chicago	Chicago transportation experience—All phases of this subject were discussed by experts in signed articles.
1923	Atlantic City	Trends in car development — An analytical study of the different phases of car design tendencies.
1924	Atlantic City	Modernization — A group of signed articles on the introduction of modern methods into the work of every department of the electric railway, contributed by outstanding men of the industry.

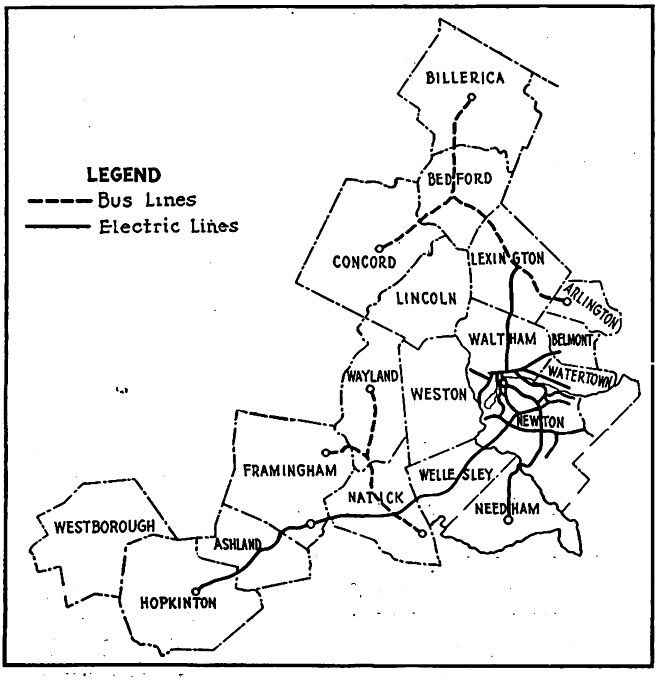


The North Lexington Carhouse Has Been Converted Into a Bus Garage

Buses Run Along Paul Revere's Route

Historic Towns in Eastern Massachusetts Formerly Served by Single-Track Lines of the Middlesex & Boston Street Railway Now Have Bus Service Operated by the Same Company—More Economical Operation Has Been Obtained on Routes Where the Traffic Is Light

LARGE areas in one of the oldest sections of the United States have recently been provided with modern bus service in place of street car service. In spite of its age, however, this district is one which has never been closely built up and the passenger traffic on the railway has always been comparatively light. When it became necessary some time ago to consider the problem of rebuilding several miles of its track, the Middlesex & Boston Street Railway, Newtonville, Mass., determined that under these traffic conditions it would be more economical to undertake bus operation. This has been done with the result that operating costs have been materially reduced without affecting the revenue at all.



Routes on Which Bus Service Has Replaced Car Service in a Historic Section of Massachusetts

The more important of two such routes recently established by the railway begins at Arlington Heights, where connection is made with the Boston Elevated Railway, and runs in a general northerly direction through Lexington and Bedford to Concord and Billerica. These towns are all in Middlesex County and the bus line in part follows the famous route taken by Paul Revere in 1775 when he rode to "spread the alarm through every Middlesex village and farm."

The new bus route follows the old car route from Arlington Heights through Lexington and Bedford. From the latter town one branch goes to Billerica and another to Concord as did the railway. From Billerica to Arlington is 13 miles and from Concord to Bedford is 4 miles, making the total trackage on which car service has been suspended in the last few months about 17 miles.

Formerly, a two-hour street car headway was run from Billerica to Arlington, and a similar two-hour headway from Concord. This gave hourly service between the junction at Bedford and the Arlington terminus. Short trips going only as far as the Bedford town line reduced the headway to a half hour through Lexington. For the most part buses are now operated on the same headway as the cars formerly had, except that on account of the small carrying capacity of the bus as compared with the street car some trips have been "doubleheaded." It is expected, however, that next summer it will be necessary to increase the bus mileage considerably to take care of the heavier riding at that time of year.

The running time is the same as before, except that schedules are better maintained on account of having no turn-out delays. From Arlington to Concord or Billerica the round-trip time is 2 hours, which corresponds with the headway. One bus therefore suffices for each of these services. From the Bedford line to Arlington two more buses are used to supply the half-hour headway required between these points. These four buses are run all day. During rush hours, however, extra trips are run from the center of Lexington, providing a 15-minute headway between there and Arlington. In this area standing loads are permitted.

COLONIAL PHARMACY
LEXINGTON HARDWARE & S

Where Bus and Car Lines of the Middlesex & Boston Street Railway Connect at Lexington

The last car was operated on this route on Sept. 15, 1924, and since that time the traffic has been handled entirely by bus. So far there has been no notable increase or decrease in the number of passengers carried. Fares are the same with the buses as they used to be with the cars. There are three 10-cent zones between Arlington and Billerica and the same number on the branch running to Concord. No fare box is used. Fare is handed directly to the operator when the passenger enters the bus, and its receipt is recorded on an International cash and ticket register. At the end of each fare zone the operator stops the bus and goes through to collect second or third fares. This method of collection is feasible because the second and third fare points are far out in the country and the number of bus passengers is small. Free transfers are issued at Lexington between the railway's cars and buses.

When bus operation was undertaken in this district the North Lexington carhouse of the railway was converted into a garage. The cars which continue to operate in Lexington were transferred to the Waltham division, and are now housed at, and operated from, that carhouse. For greater convenience the swinging doors of the carhouse at Lexington were converted into sliding doors of smaller dimensions, as large entrances were no longer needed. The pits in the carhouse were filled in and the necessary changes made in the tool equipment to permit the repair of the motor vehicles. It is planned in the future to concrete the floor of the carhouse, but this has not yet been done. A gasoline filling station is located in front of this building.

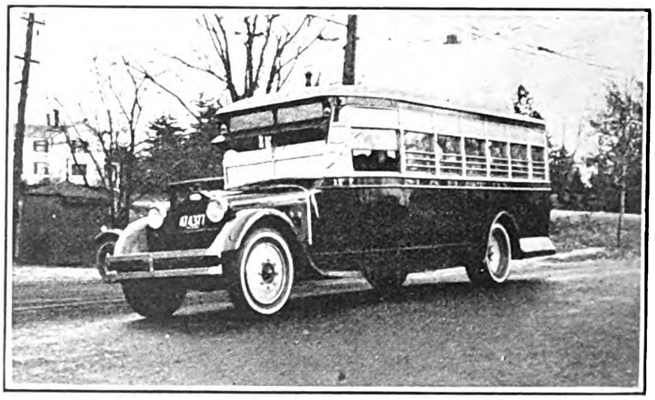
The new automotive equipment of the Middlesex & Boston Street Railway consists of 12 White Model 50-A buses with Bender bodies. Of these seven are at Lexington and five at Natick. Slight modifications have been made in the design of two of the most recently purchased in order to give more knee room for the seated passengers, and to provide additional space for standing passengers. This change has increased the over-all length about 7 in. An interesting feature of the design is a rear bumper which has been put on to prevent damage to the body if the operator backs into a tree, pole or other obstruction.

The four all-day buses operated from the North Lexington garage and three trippers cover altogether about 800 miles per day. Each bus is inspected daily at any convenient time when not needed for service. An experienced auto mechanic who formerly was connected with the White Motor Company in Boston has been engaged to supervise bus maintenance for the railway. The fact that the White company maintains a large and well-equipped service station in Boston has been helpful in reducing the amount of repairs which it is necessary for the railway to take care of in its own shop.

Various kinds of tires have been tried to determine which is best suited to the particular conditions of operation. All tires are bought outright, however, and no tire supply contracts arranged on a mileage basis have been made. The railway expects that each tire will give at least 12,000 miles service.

As October, 1924, was the first full month of bus operation, the management feels that it is too soon to draw definite conclusions regarding the financial success of the experiment. The cost of operation has not yet been accurately determined, but the railway believes that the final figure will be between 25 cents and 30 cents per bus-mile. Even if the cost should reach the maximum believed likely, that is to say about 30 cents per bus-mile, it will be less than the previous cost of railway operation per car-mile. Moreover, it will also be lower than the present revenue per bus-mile, which is, as already mentioned, approximately the same as the old revenue per car-mile.

Among the advantages resulting from the substitution of buses for cars in this instance were the release of track and line maintenance gangs formerly required for the Lexington division and a reduction in the supervisory force at the carhouse. No power need now be purchased from the Edison Electric Company, as the car line which has continued to operate in Lexington can be supplied with power over the railway's own feeders from other stations. Some of the cars which were released when bus operation was inaugurated have been placed in service elsewhere. Others, however, were considered too old and too heavy to be used any longer, and these were scrapped. Accidents have been fewer with the buses than they were previously with the cars.



One of the Extra-Length White Buses on the Road from Lexington to Concord

To protect itself in this respect the railway carries liability insurance.

In so far as possible the trainmen who formerly operated cars in this division have been retained by the company in the capacity of bus operators. Those who were thought to be temperamentally unsuited for conversion into operators of motor vehicles were transferred to other divisions to operate cars there. Two car mechanics who formerly worked in the pits at the North Lexington carhouse have been converted into auto mechanics, and one extra man has been hired. A few shopmen were laid off.

At Natick, the Middlesex & Boston Street Railway operates five buses on a crosstown line. Here the situation is similar to that at Lexington, and the same general method of operation is followed. Service on 10 miles of railway route has been suspended. Buses operate from South Wayland to Natick, a distance of 8 miles, and a branch line covers 2 miles more. Because of very light traffic at the ends, the bus routes have been shortened a little from what the car routes used to be. The motor vehicles are housed here in a converted carhouse similar to that at Lexington.

Contracts have been made with the town of Wayland for the regular transportation of school children and with the Roxbury Carpet Company for carrying its employees. In order to handle this service properly the railway has just purchased an additional bus.

The Readers' Forum

*Comments on Foreign Report**

METROPOLITAN ELECTRIC TRAMWAYS LIMITED
LONDON UNITED TRAMWAYS LIMITED
SOUTH METROPOLITAN ELECTRIC TRAMWAYS & LIGHTING COMPANY LIMITED
55 Broadway, Westminster,
London, S.W. 1.

Nov. 19, 1924.

I have to acknowledge receipt of your letter of the 11th inst. and am very glad that you and your deputation, while having a very strenuous time in this country, enjoyed your visit. Any little thing that I was able to do to make your visit useful and enjoyable I was very glad to have the opportunity.

I received some few weeks ago a copy of your report and should like to congratulate you and your colleagues on its excellence.

In a very short time you seem to have got at the essentials of our problems in this country, especially in London, and I consider that your conclusions. while being frank and in consequence all the more valuable, are in the main, correct.

It is true, as you state, that in this country there has not been any considerable change in design of tramcars for the last 20 or 25 years. We are, I suppose, instinctively conservative. On the other hand, it is only fair to realize that the zone system of fares, or rather the stage system of fares in this country, has prevented the development of the "pay as you enter" system which is so well known in the States.

The time taken to collect fares, issue tickets, etc., on the platforms has been a difficulty preventing the introduction of "pay as you enter" principles.

Personally I believe that these difficulties are capable of solution, and some progress is being made on these tramways with platform fare collection.

Another point that you raise in your report is the question of the low average speed in this country as compared with the average speed on American systems.

I am, of course, not in a position to defend all the undertakings in this country against the charge of slowness of operation, but I think you will agree with me that in London at any rate the average speed of tramcars both on our systems and on that of the London County Council is, at least, as high if not higher than the average speed of your American systems operating under similar conditions.

C. J. SPENCER,
General Manager.

METROPOLITAN DISTRICT RAILWAY COMPANY
LONDON ELECTRIC RAILWAY COMPANY
CITY & SOUTH LONDON RAILWAY COMPANY
CENTRAL LONDON RAILWAY COMPANY
55 Broadway, Westminster,
London, S.W. 1.

Nov. 21, 1924.

I received with unusual pleasure your letter of the 10th inst., and am very glad that you found your visit to the Old Country both interesting and edifying.

The report of your peregrinations was almost crowded with useful and informative data, much of which will be very handy for future reference. In the short space of time at your disposal I think that your report could hardly have been more complete, and your kindly personal references are appreciated. But the pleasure was not only on your side. Our several meetings with you were most enjoyable, and the interchange of experience and thought must necessarily stimulate and widen our interests in transportation from an imperial point of view.

J. P. THOMAS,
Operating Manager.

Tire Failures Can Be Reduced

THE GOODYEAR TIRE & RUBBER COMPANY
AKRON, OHIO, Nov. 19, 1924.

We wish to express our appreciation for your timely comments in the Nov. 8 issue of the ELECTRIC RAILWAY JOURNAL, under the heading "More Attention to Tiring Will Save on Re-tiring."

The rapid strides being made in the bus industry call for a close co-operation between the bus engineers as well as the actual operators of the buses. In cases where mass transportation is a factor and standees are permitted, the tires are badly overloaded and go out of service prematurely.

It has been our experience that manufacturers have equipped their units with tires of the proper size based on the seating capacity of the bus, but where overload is a factor the use of larger tires is very desirable, and is a distinct advantage for the operator.

Continuity of service is of great importance to the bus operator. When delays occur on the road due to tire failures, the loss of revenue is a serious factor, while the interruption in operating schedules seriously affects the good will of the service.

We have endeavored to assist members of the American Electric Railway Association by making analyses of their operating conditions and making impartial recommendations regarding their tire equipment. This service is always available to members of the association.

J. M. LINFORTH,
Manager Highway Transportation Department.

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*This report of the committee on foreign operation, American Electric Railway Association, was published in full in this paper, issue of Sept. 20, 1924, pages 413 to 459, inclusive.

Association News & Discussions

Midwest Has Good Meeting in St. Louis

Association Hears Papers on Street Congestion, Noise Reduction, Bus Operation, Freight Haulage, the Future of the Interurban and Many Phases of Electric Railway Work of Current Interest

ON NOV. 24 and 25 approximately 150 members of the Midwest Electric Railway Association, embracing the states of Colorado, Nebraska, Oklahoma, Kansas, Arkansas and Missouri, assembled at St. Louis, Mo., for the midyear meeting of the association. Subjects of current interest, ranging from an analysis of city street congestion to a study of bus operation by electric railways, furnished a full technical program, which was supplemented by an inspection trip on Tuesday afternoon to points of interest on the property of the United Railways of St. Louis and a visit to the plant of the St. Louis Car Company.

The meeting was opened by President Charles W. Ford, general superintendent Kansas City, Clay County & St. Joseph Railway. He called on R. J. Lockwood, assistant manager for the receivers United Railways of St. Louis, to introduce, in turn, Hon. H. W. Kiel, Mayor of St. Louis, and Hon. Rolla Wells, receiver United Railways of St. Louis and former Mayor of the city. Mayor Kiel expressed a firm conviction in favor of providing rates which would make high grade service to the public possible. He warned railway men that they must keep abreast of the times and of changing conditions in their industry if they intended to continue handling the transportation facilities of the modern city.

Rolla Wells said that the primary thought of the receivers of the United Railways was to insure adequate and improved service to the public. He stressed the importance of making favorable public contact through employees. So far as the public's interest in the utilities is concerned, Mr. Wells went a step beyond Mayor Kiel in saying that the public is not only interested in the condition of the utilities, but is in a measure actually responsible for this condition because of the control which is exercised through public regulatory bodies. Restriction of the rate of fare below that necessary to render proper service involves a question of the right of any public official to restrict the quality of service rendered the public, which, he maintained, wants good service and is ready and willing to pay for it.

F. G. Buffe, general manager for the receivers Kansas City Railways, responded to the addresses of welcome. He said that the optimism expressed by the speakers relative to the future standing of the utilities in the public mind augured well for the prospects of the industry. The broadening viewpoint of railway men was held up as another encouraging sign and he pointed to the rapid crystallization of opinion in favor of fitting the motor bus into the general transportation scheme, wherever it is suitable, as an example of this. He also held that the public and the commissions are regaining confidence in the electric railways, and pointed to the popular sentiment in Kansas City in favor of the railway company operating buses, exclusively, in such locations as they are required.

Mr. Stoffel Shows Progress of Freight Haulage by Electrics

The technical program was opened by T. H. Stoffel of the Westinghouse Electric & Manufacturing Company, who read a paper on electric railway freight haulage. A comprehensive illustrated article on this subject by Mr. Stoffel was published in the Sept. 27, 1924, issue of the ELECTRIC RAILWAY JOURNAL. In his present paper Mr. Stoffel said that the transportation of freight by electric railways has now reached a stage where it has become an important part of their business. It can no longer be considered an experiment, either from an operating or revenue producing standpoint. The results obtained from freight operation in practically every case where a consistent plan of development has been laid out and followed have more than met expectations. The gross income from this business during 1923 was three times what it was in 1913 and amounted to more than $50,000,000. In addition, the progress made in the development of freight business during the current year is greater than for any similar period in the past. Net earnings vary from 15 to 30 per cent of the gross, after paying in full all items directly chargeable to freight operation and allocating other items, including taxes, on a prorated basis.

Some of the advantages which accrue to certain classes of shippers from the service made available by electric railways were outlined by Mr. Stoffel and specific examples of such situations were described. This included instances of jobbers and manufacturers extending their markets by being in position to make electric railway deliveries in territory formerly monopolized by competitors more favorably located geographically. He also cited instances of the development of profitable merchandise business by electric lines not able to handle heavy or long-haul tonnage. This was done by active co-operation with chambers of commerce and other civic bodies in the towns for the purpose of locating new industries on the road, and by working with farmers' associations to aid them in reaching or developing new markets for farm products.

Mr. Stoffel described one situation in which the railway had been instrumental in inducing farmers to raise tomatoes on land which had formerly yielded only poor grain crops and was rewarded by the development of a thriving new canning industry that produces a very profitable freight business for the road. In another case a profitable business from handling fruit direct from grower to market was built up as the result of the railway taking the initiative in bringing the farmers and the commission men together.

The place of the motor truck in building freight business for electric lines was analyzed. Mr. Stoffel went into this subject both from the standpoint of using the truck as a feeder for extension of service into territory beyond the rail line and also for various terminal purposes. The present status of pick up and delivery service was discussed and some of the problems connected with this subject were outlined. He said that complications arise when the railway attempts to give pick up and delivery service. Shipments are forwarded subject to delivery on presentation of bill of lading only, and usually such bill of lading is at a bank attached to the draft and is not available when the shipment is delivered. This makes it necessary in many cases to haul the shipment back and forth several times before delivery can be legally effected. A consignee, such as a large department store, which may have two or three warehouses in addition to the retail store, requires shipments to be moved twice or more before correct delivery can be made. A consignee may be only a broker having desk room in an office building, in which case shipment would have to be taken back to the freight terminal and held until disposition is given.

Mr. Stoffel concluded that all rail lines will eventually find it necessary and expedient to furnish pick up and delivery service, but expressed the belief that when that time comes the service can be most economically and efficiently rendered by employing a single responsible and dependable agency to do the work for all lines in a given terminal community.

In answer to a number of questions Mr. Stoffel explained some of the various phases of pick up and delivery service in connection with freight traffic. He said that on the basis of experiments conducted by the steam railroads at Baltimore the actual cost of such service would require a charge of approximately 15 cents per 100 lb. in excess of the regular tariff. Under the experiment being conducted there, the shipper pays the 15-cent charge at his end of the movement and the consignee pays the same charge for the delivery at the other end. He said further that where such pick up and delivery service was made optional with shippers it had not proved to be successful, as most heavy shippers were equipped with their own motor trucks and preferred to keep these busy handling their shipments to and from freight houses rather than to pay the extra charge for this service by the railroad. He said that such optional service was used most by the infrequent shipper, and that the tonnage on this class of business was very light and did not pay for the service. Another objection to optional pick up and delivery service was held to be the delay caused by the necessity of the agent to determine whether or not such service is desired on each shipment.

DISCUSSION ON STREET CONGESTION REMEDIES

City transportation and congestion were treated in a paper by C. E. Smith, consulting engineer city of St. Louis, which is printed elsewhere in this issue. In the discussion of the paper Mr. Bennett of the United Railways said that although he was heartily in accord with no parking regulations a large part of the short-haul riding produced on street cars by such regulation would come in the rush hour, thus increasing the peak on the railway. R. P. Woods, vice-president and general manager Kansas City, Clay County & St. Joseph Railway, said that marking of arterial highways was a forward step recently taken in Kansas City. He also felt that no-parking regulations should be made to meet the specific conditions existing at certain points in the business district. Raised safety platforms are impracticable on narrow streets, according to Mr. Woods, and are objected to by fire departments.

Samuel Weimer, chairman of the rapid transit committee of the St. Louis Board of Aldermen, expressed the belief that a subway for street cars in St. Louis would be beneficial and was practicable. He said that buses and street cars on the same streets increased congestion and that one or the other must be taken off.

The use of the bus in city transportation service was the subject of a paper presented by B. Hilburn, general manager Tulsa Street Railway, which will be abstracted in a later issue. Discussing the paper, A. E. Reynolds, vice-president and general manager Springfield Traction Company, said that the selection of the proper type of bus to meet the service requirements was a difficult problem. He expressed the conviction that there is a place and a future for the bus in the general scheme of city transportation.

E. R. Kinsey, president of the Board of Public Service of St. Louis, said that the bus is here to stay and that it has a useful field to serve. He maintained that every rapidly growing city needs some form of flexible transportation to give service in new communities where railway extensions are not practicable financially. It is not reasonable to expect the railway company to speculate on the development of a new community to the extent of making the heavy investment required to put in an extension of the rail service, and consequently he felt that during the period of development the bus is the logical form of transportation until the community grows to a point where the increased traffic justifies the extension of the rail line. Buses should be on the same footing as railways in regard to regulation, according to Mr. Kinsey, and the existing utility company should handle the entire transportation service of the city, including the buses. This makes for economy and efficiency, he said, because of the elimination of unnecessary duplication of service. However, bus service should be given where there is a demand for it and where the people are willing to pay the increased fare necessary to support this service. Allowing independently operated buses to skim off the cream of the profitable traffic in competition with street cars works to the ultimate ruin of the entire transportation service of any city.

In answer to a question, Mr. Hilburn said that the company is operating 16 and 25-passenger buses in Tulsa and that the saving in cost of gas on the smaller vehicle is offset by the increased maintenance. Comparatively high maintenance is caused by lack of provision in the design for overloads. The total operating cost was given at 19 cents per bus-mile, including 3 cents for depreciation and 1¼ cents for insurance. He said that insurance was purchased on a mileage basis, the rate being the figure given. In answer to another question, he said that the total amount paid by the insurance companies in settlement of claims was less than the accumulated premium paid.

Mr. Woods outlined some of the experiences of the Kansas City, Clay County & St. Joseph Railway in going into the bus business to fight competition by independent operators paralleling the interurban line. He said that modern bus equipment in competition with the railway had caused a serious drop in the gross income, and that this had forced them to fight the competition by putting buses of their own into service. Study of the effect of a new hard road which was built parallel to the interurban, he said, disclosed the fact that 19 per cent of the passenger business lost was attributed to the use of private automobiles.

INTERURBANS MUST INTRODUCE NEW SERVICES AND NEW SELLING

A paper by D. W. Snyder, vice-president Illinois Power & Light Company, on the future of the interurban was delivered on Tuesday morning. This future, Mr. Snyder pointed out, is uncertain only in the same sense as that of any other business in process of evolution. The passing out of some of the smaller and weaker roads has created a false impression of the status of the electric railways. He attributed these failures to the natural reaction from a boom building period in which some roads were built that were not justified by density of population or conditions of competition.

The situation of the interurban road following the advent of the hard roads and the bus was likened to that of the barber shop when the safety razor was introduced. By making their shops more attractive and by pushing other lines like massages, shampooing, hair singeing, etc., the barber has actually put his business on a higher plane and has become much more prosperous than when his very existence was threatened by the safety razor. It was pointed out that the barber accomplished this by first putting his business in better position to serve his customers, and then adopted modern methods of selling this improved service to the public. Similar methods, it was held, would assure a useful and profitable future for the electric railways.

Results accomplished by the North Shore Line in going from receivership to the first Coffin prize in seven years were held up as a shining example of what can be done by proper management. Although the North Shore Line is in a special situation, he maintained that the same fundamental methods would apply to the industry as a whole. He advocated building on the principle that the first essential in selling service is to have good service to sell.

Mr. Snyder felt that more publicity should be given to the comparative cost of travel by automobile and interurban, and cited experience on the Illinois Valley division of the Illinois Traction System as an example of what could be done in inducing traveling salesmen to use the interurban. He said we have heard much about modernization, but that as a whole the industry has not yet grasped the full significance of what modern equipment and methods will do in reducing operating costs and attracting new business.

INTERURBANS ESPECIALLY CAN UTILIZE THE BUS

Although the motor bus can be and has been ruinously destructive to interurban electric railways when allowed to compete unrestrictedly, this vehicle is only another transportation tool, Mr. Snyder said, which in the hands of competent transportation men can be profitably applied to improve existing facilities and attract new business. He felt that there are few interurban railways that cannot make use of the motor bus, and none that can afford to ignore it. He sounded a note of caution, however, by saying that even now the same ill-advised overexpansion that has marked the development in other lines of business is going on in the introduction of buses in some situations.

FREIGHT BUSINESS OFFERS GREAT POSSIBILITIES

Referring to the growth of freight and express business, Mr. Snyder said that the future is far from gloomy. He cited the recent completion of a $1,000,000 freight terminal in Indianapolis as an example of the proportions which this business is beginning to assume. Last year's gross freight revenue on the North Shore Line exceeded its total revenue of eight years ago from all sources. Statistics prepared by the A. E. R. A. showed an increase in electric railway freight business during 1923 of 35 per cent. The Illinois Traction System freight business is now greater than its passenger business. He said that 32 electric locomotives are now in service on his road for handling this business and that the first of six new 80-ton locomotives of the articulated type has been put into service. Long-haul freight business is being developed, M. C. B. standard equipment is used and is interchanged with steam roads. Through rates, switching agreements and physical connections have been established with practically all steam railroads.

In the discussion, he advocated development of local trucking business by short interurban lines serving a number of towns. He pointed out that inefficient methods and improper maintenance make present independent truckers very wasteful, whereas an organized trucking service would attract business and make substantial savings in operating costs. He said the time has come for the small interurban lines to go into the trucking business, and unless they do so other interests will organize the terminal trucking within the towns they serve, and will then expand this service to duplicate that given by the railway between the towns.

A paper by R. W. Bailey, superintendent of the power and equipment Kansas City Railways, on the subject of noise reduction will be published in an early issue. In the discussion it was brought out that the practice of casting graphite plugs into comparatively hard brake shoe material is being tried out and seems to reduce materially the squealing of such shoes.

BUS SUBSIDIARIES OF RAILWAYS ELIGIBLE TO MEMBERSHIP

In the business session that followed the prepared papers Mr. Lockwood brought in a report prepared by a special committee on revision of the by-laws, which changes the rules of the association so as to admit bus subsidiaries of railway companies as active members and allows the representatives of bus manufacturers to join the association as associate members. This report was adopted. The resignation of Charles W. Ford as president of the association to take effect Dec. 1, at which time he will sever his connection as general superintendent of the Kansas City, Clay County & St. Joseph Railway to become a member of the sales organization of the Yellow Coach Manufacturing Company, was accepted by the executive committee. A special committee was appointed to draw up a resolution of appreciation of Mr. Ford's services to the association, and he was also elected to honorary membership. The executive committee elected Ernest Stenger, receiver Denver Tramway, president, to fill the unexpired term of Mr. Ford, and elevated R. B. Campbell, secretary and general manager the Arkansas Valley Interurban Railway, to the office of vice-president. Bruce Cameron, vice-president and general manager Joplin & Pittsburg Railway, was elected to fill the place made vacant on the executive committee.

At the banquet on Monday evening J. C. Hall, legal representative Missouri Public Utility Association, advocated increased interest on the part of utility men in legislative activity. He said that such interest should be directed toward supplying members of the legislatures with authentic information regarding the utility business. There has been a woeful lack of such activity in the past, with the result that indiscriminate competition and many other conditions detrimental to the service and growth of the utilities have been permitted to exist.

E. F. Wickwire, vice-president Ohio Brass Company, told of the work that is being carried on through the American Association for "friendlyizing" the public and also told of the publicity given the pleasant good-natured "Traction Tom" conception of the electric railway industry to take the place of the despotic "Traction Baron" attitude which had been allowed to develop in the minds of the public and the press. Mr. Wickwire closed a humorous and entertaining presentation of this subject with the serious admonition that anything can be accomplished in the work of improving public opinion providing personal ambition is subordinated to the general objective of promoting the welfare of the industry. This thought was summarized in the words, "Anything can be accomplished if no one cares who gets the credit."

City Transportation and Street Congestion*

Importance and Permanence of the Street Railway in Any Scheme of Local Transportation and Various Methods of Relieving Street Congestion, Speeding Up Cars and Attracting Patronage

By C. E. Smith
Consulting Engineer City of St. Louis

TRAFFIC congestion came on suddenly with the automobile and will continue in varying degree depending on the success of relief measures. Business men are not yet thoroughly awake to a realization of the importance of the traffic congestion evil.

It is axiomatic that the transit lines should offer the smallest possible interference with other traffic, should be least interfered with, and should promote comfort and convenience to the greatest number. Nevertheless, the street car has been the worst sufferer from the increasing use of the automobile, because: (1) The normal increase in street railway business has been interrupted; (2) accidents and consequent costs of operation have increased; (3) service has slowed down, and as the automobile has educated the people to higher speeds they have been less tolerant of the speed of street cars; (4) there is a popular idea that the street car should be taken out of the way of other traffic and that it should be superseded by other means of transit. That the latter is not true is proved by the fact that each year the street railways of the country establish new records for passengers carried, showing that in spite of the auto bus and automobile which will supplement and not supersede the street cars, they are here to stay and must be provided for.

Even in New York City, which has the greatest measure of rapid transit and bus service, the street car business continues to increase. In 1923 more than 1,000,000,000 passengers were carried on street cars there, rapid transit lines carried 1,500,000,000, and the buses about 100,000,000. Even in London, where buses are used to the greatest practicable extent, the street cars carry more than half the surface travel.

There is ample evidence that street cars carry more than other agencies of transportation and take less space on the streets. Thus, in the Chicago Loop district 50 per cent of the traffic consists of automobiles that carry 19 per cent of the traveling people, while street cars that constitute about 2 per cent of the street traffic carry 74 per cent. In Baltimore a traffic census showed that street cars, less than 15 per cent of the traffic, carried 89 per cent of the people, while other vehicles constituting 85 per cent of the traffic carried only 11 per cent. In Los Angeles during a rush hour street cars constituting 4 per cent of the traffic carry 66 per cent of the people, while other vehicles constituting 96 per cent of the traffic carry 34 per cent. Similar figures might be continued indefinitely. A conservative estimate would place the street car riders at not less than 75 per cent of the traveling public. It would seem that their interests should have at least 75 per cent of the consideration.

City transportation for the great masses of people must continue to be provided by street cars. The peculiar nature of this business, requiring a large investment in proportion to the revenues, and preventing expenses from being increased or decreased in proportion to changes in volume of business, makes it peculiarly susceptible to changes in business conditions.

Nothing is clearer today to those familiar with the problem than that competition in street transportation is wasteful and must be eliminated so that facilities may be best co-ordinated with the traffic. Particularly must street car service be protected from unfair competition of favored, subsidized or unregulated agencies of transportation. Otherwise the mainstay of the public's transportation system will break down and the great mass of the people will struggle along with inadequate transportation facilities.

Until the advent of the automobile the street car was the fastest means of transportation for general use in cities without rapid transit facilities, and it is still and will continue to be the preferred vehicle for mass transportation, properly co-ordinated with bus service as may be expedient. But people are less tolerant of slow motion than ever before, and the average of 10 m.p.h. made by city street cars no longer seems attractive. Speed is the slogan of the day and it seems that people are intolerant of even a moment's delay. The automobile is responsible for this speed mania.

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*Paper presented before meeting of Midwest Electric Railway Association at St. Louis, Nov. 24-25, 1924.

It is most irritating to car riders to drag along while the motorman kills time in slack hours because his schedule time is too long or for other reasons. Slack time and needless stops and waits should be rigidly eliminated from the schedules of both city and interurban properties. The drift of street car passengers to automobiles will decrease and may actually turn back if the service can be speeded up and generally made more attractive.

There are many places where, by reason of former competitive and duplicate railway service, street car lines are unnecessarily long and may be shortened and reduced in number by a carefully studied plan of rerouting. Such a study in St. Louis indicated that 25 or 30 miles of track might be done away with and service improved by rerouting. This is being carried out a little at a time. When handled properly the cost is small. Another way in which service may be improved, where conditions are favorable, is to run street cars express through areas of light business between areas of heavy loading and unloading, the intermediate business being handled by buses. This is being done successfully at Providence, R. I. (see ELECTRIC RAILWAY JOURNAL for March 15, 1924, page 411).

Both relief of congestion and improved transportation service in cities will be secured by the following measures:

1. Unification of all systems of transportation within a city, including street cars, buses and other agencies of mass transportation.
2. Single fare and free transfers within a single-fare zone, with appropriate charges beyond.
3. Expansion of facilities in amount and character best suited to the service.
4. Route through traffic so as to avoid the congested business areas.
5. Speed up service whenever possible; shorten schedule time in off-peak hours.
6. Establish loading platforms on busy streets for protection and convenience of car riders.
7. Provide storage yards for cars in or just outside business districts to store peak-hour cars during day and thus avoid interference with other traffic and dead mileage when taking them out empty in the morning and back empty before the evening rush.
8. Reduce looping of cars and turnbacks in congested districts and operate through runs to the greatest possible extent.
9. Avoid crossing of busy lines in congested districts.

City planners are quite free in recommending as one of the ways of reducing or rather avoiding increased congestion in business centers that building heights be restricted. The right to do this has been amply sustained in the courts. Boston is a notable example in this country. There building heights have been restricted for about 25 years. But that precaution would seem to safeguard the interests of succeeding generations rather than to offer any measure of relief now.

Building heights may not be so easily controlled. Regulations to that end are welcomed in the abstract but not in the concrete. In a large mid-Western city the City Plan Commission recommended an ordinance to restrict building heights to 120 ft. The Board of Aldermen after public hearings and over the protest of the City Plan Commission established 150 ft. as the maximum height. Shortly thereafter the chairman of the City Plan Commission, as the architect for an owner, defended and helped to secure the passage of an ordinance for a new building 280 ft. high, although he had previously appeared in protest against the ordinance allowing 150 ft. in the same location.

Whether traffic congestion is increased more by high buildings than by the increased travel made necessary when business is transacted in smaller buildings spread over a larger area is still worthy of further discussion. Certainly the cost of transacting business over a larger area is more expensive and raises the question of whether concentrated business or traffic congestion shall control. The tremendous investments for aggregations of large buildings would appear to justify the concentration of business; the property values and concentration of travel resulting therefrom create conditions that permit expenditures for rapid transit and other expensive means of transportation that would be impossible if they had to be spread over a great area.

Boston has had a stringent law restricting building heights for many years, the result of which has been to spread the business district over a large area. Apparently this has brought into the district many automobiles that might not be used if business were transacted in a smaller area. Notwithstanding the low buildings and the enlarged business area, Boston traffic congestion is so bad that recently a new street through the business district was recommended for relief at a cost of about $30,000,000. There is nothing in the Boston situation that would indicate that the restriction of building heights has ameliorated traffic congestion.

On the other hand, in New York City, where there has been no control of building heights, the surface traffic congestion in the districts containing the tallest buildings is no worse than in Boston. True, there is terrific crowding and congestion of the underground transit facilities, but that is because the facilities have not been provided to keep pace with the volume of traffic, by reason of a deplorable controversy between state and city authority. Engineers long ago determined on additional facilities, and New York can well afford to provide them. The annual charge on each $100,000,000 of public money spent there amounts to only about $1 per capita of population per year, so the end of New York's spending capacity for the improvement of local transportation is quite far off.

Decentralization has been suggested by many as one permanent solution of the traffic problem; that is, the development of a number of outlying business districts. This is apparently taking place to a greater extent than ever before in most large cities, but there is no indication that it will materially decrease the importance and expansion of the main business center, where most of the congestion troubles are experienced. Rather it appears that each additional outlying district creates new centers of congestion and raises problems which may cost more in the aggregate to solve than if more intensive remedies be applied to a centralized area. There is no doubt in my mind that decentralization will result in increasing the amount of automobile traffic between the various centers while at the same time street car travel may also be increased correspondingly. In spite of traffic congestion and in spite of the growth of outlying business centers, surveys of downtown business show conclusively that business there continues to increase. In the case of the large department stores, this is much greater even than would normally be expected.

Traffic conditions in the congested central business district can be relieved by moving out of it certain lines of business or trades that can be transacted as well or better elsewhere. Thus the writer recently recommended, after a careful survey, that the fruit and produce merchants be moved from the most congested part of the retail district at New Orleans to a much more suitable location 2 miles away. Similar results are about to be realized in Chicago by the movement of that business out of the congested Water Street district. This method may be applied to other lines of business, always, however, with the possibility that there may be a drop in property values in the old district that may or may not be recovered.

EVERY CITY SHOULD HAVE A CITY PLAN

Every city large enough to have a street railway system should have a city plan, the foundation of which, from a traffic standpoint, should be a major street plan. As the great majority of the people depend upon street cars for their transportation, the interests of these car riders should be represented by the street car company's officials taking a keen and continuing interest in the planning as it affects street car service and traffic control. The ELECTRIC RAILWAY JOURNAL of March 8, 1924, after the American Electric Railway Association meeting in St. Louis on March 4, said: "To emphasize the importance of railway men taking part in the broad planning for relief of street congestion, it may be said that while they are only indirectly interested in some of the planning, they will directly profit or suffer by the success or failure of the broad relief plan considered as a whole."

In city planning more attention should be given to the improvement of marginal streets around the edge of the congested districts so that traffic may be detoured. At present, streets leading directly into the congested districts are being widened and improved at a cost of millions of dollars, while smaller expenditures on marginal streets would in many cases give better results. Such streets will be of particular importance in providing free routes to and from garages on the edges of such districts, thus keeping many automobiles out of the area of congestion.

In addition to providing for proper street circulation, the city plan should give attention to transit, railroad facilities, grade crossings, zoning, etc. In planning for the future it is well to keep in mind that all the needed improvements will not be made at once. Wherever cutoffs and street widening projects have been carried out, the benefits have usually exceeded the cost. While the cost for some of these improvements seems high, it does not amount to much per capita when spread over the entire community. In fact, city government is one of the cheapest benefits we possess, as it costs only from 10 to 20 cents per capita per day, and very considerable public expenditures can be undertaken without being felt very seriously.

Many palliatives have been suggested for the relief of traffic congestion. The Midyear Meeting of the American Electric Railway Association held at St. Louis on March 4, 1924, was devoted to this subject. Abstracts of the papers presented are contained in the March 8 issue of the ELECTRIC RAILWAY JOURNAL. It was brought out in that meeting that means should be found to secure the best use of present facilities before making large expenditures for new construction. Mr. Bartholomew, engineer of the City Plan Commission of St. Louis, said: "During the rush hour, when every available square foot of roadway ought to be devoted to movement, parked cars absorb 20 per cent of the roadway. The vehicular flow, thus restricted and confined to narrower channels, slows down to such an extent that from 50 to 100 more street cars accumulate in the district than should be there according to schedule. Two thousand vacant standing automobiles cause the street cars, carrying 75,000 or more persons home from work, to lose from 5 to 15 minutes of scheduled time."

One of the very best things that could be done to remedy this would be to stagger the hours of offices, stores and factories, but unfortunately it is difficult to do enough of this appreciably to relieve the congestion. City traffic control can help in the following ways:

1. Left turns should be prohibited as far as reasonably practicable.
2. Width of commercial vehicles should be limited to not more than 8 ft.
3. Automatic traffic signals should not be installed at intersections in congested districts, but such control should be effected by means of traffic officers. (It was thought that synchronized traffic control by automatic signals would serve well in such places, but where tried—as at Los Angeles—the results were disappointing because of the varying traffic at the different intersections.)
4. Traffic officers should be instructed to give right of way immediately to street cars when the gong rings ready to go.
5. Pedestrians should be compelled to move with the traffic and to wait for signal.
6. One-way streets should be established. (Excellent results have been secured from this in New York, Philadelphia, Boston, St. Louis, Pittsburgh, New Orleans and many other cities.)
7. Use of streets in congested districts should be prohibited to trucks and drays during rush hours.
8. Parades in congested districts should be absolutely prohibited.
9. Truck service to buildings during night hours should be encouraged, also during slack hours of the day.
10. Individual heating and power plants within the congested district should be shut down and service secured from central public utility plants removed from the congested area.
11. Building occupants who continually occupy street space for loading or unloading trucks should be compelled to use alleys or provide set-back spaces for trucks within their own buildings.
12. Where parking is permitted in the business district it is desirable to keep the automobiles off streets occupied by street cars. (A survey of all cars parked in the streets day after day may be used to ascertain the owner, his business, the necessity for his car downtown. If the car is not necessary in his business effort should be made to determine why it should not be kept at home. Good results were thus secured at Boston.)
13. Autos should be compelled to be parked within 6 in. of curb and provide not less than 5 ft. of space between parked cars to avoid delays to other traffic when getting in and out of parking place.

The movement of traffic within the congested districts is most seriously hampered today by the parked automobile and by moving automobiles that might be kept out of the district by proper planning and regulations. It is the practically unanimous opinion of all who study the problem that parking must be totally prohibited in such districts. Parking at the curb is an inheritance from the horse and wagon days and the hitching post. In those days the street widths were generally in excess of the traffic requirements, and no harm was done by such hitching. But the same streets are totally inadequate for present-day traffic that could not have been foreseen when they were laid out, and automobile parking in them causes great harm. The provision of parking space for automobiles is not a public duty and there is no equity in thus withdrawing valuable street space that is needed to expedite moving traffic.

Parking in the congested district will soon be a thing of the past. There is no justification for it. The automobile owners would never think of paying taxes, upkeep and a fair return on the value of the property occupied by standing cars. Why should they have its use free, especially when this space is imperatively demanded for more important use? There would seem to be no more equity in allowing this parking than to allow merchants to set up booths for the sale of goods in an equal area of the streets. By forcing owners to store their cars at points that may be somewhat removed from their offices, fewer automobiles will be driven downtown. This will still further help other necessary traffic movement.

Where no-parking rules are enforced, it should be done after and to the extent to which garage facilities are provided, and over a considerable area. Such a rule cannot be enforced on a single street within a district without upsetting the balance of trade. Automobiles will continue to be parked around the corners and on the next streets. The cleared street will be used as a thoroughfare on which there may be less local business transacted than when parking was permitted. Where the no-parking rule has been applied to a single street it has been modified later at the request of the merchants to permit parking for short periods up to one hour. This gives little permanent improvement in conditions. The curb is soon full all the time, and in fact, the movements to and from the curb interfere with and delay traffic more than all-day parking, and create dangers of collisions and accidents. A considerable part of the automobile traffic in congested districts is due to cruising around looking for parking places.

A better treatment is gradually to enlarge the no-parking area as fast as garage facilities are available. In the larger cities it will not be possible to support the most expensive property by garage rentals, and the storage will be somewhat removed from the centers of the district. In St. Louis a number of private garages have been constructed around the business district, but they are generally about five city blocks from the center. This distance and the rentals will discourage idle driving of autos downtown and confine it to those whose business demands will afford that cost. In the medium-sized cities it will be possible to locate garages and storage places at various strategic points in and around the business district to the great convenience of the drivers. Kansas City is a good example of this; there are numerous parking places which are so scattered as to be convenient to every part of the district.

In smaller sized cities, where there are many one and two-story buildings in the business centers, there is no good reason why the basements or roofs of such buildings cannot be made available for auto storage by means of ramps and advance preparation. In such cities there is the same parking problem as in the larger cities, but of course over a smaller area.

Traffic outside the congested district may be expedited and simplified by separating it into classes. It is desirable where several parallel streets are available for traffic to have car tracks not more frequent than on alternate streets, the other streets to have wide smooth pavements to attract automobile traffic away from the street cars.

Where such parallel streets are not available, a study of the city plan will frequently show how sections of streets may be connected by extending them across private property and widening them when necessary to get an adequate through street system. Streets occupied by car tracks should be paved for not less than 40 ft. between curbs where there is no through traffic, and preferably 60 ft. between curbs where there is through traffic and parking is permitted. Autos should be compelled to stop before entering or crossing streets with car tracks.

Minimum speed as well as the maximum should be specified for slow moving vehicles on certain streets. Trucks should be prohibited from certain streets where they would interfere with the free movement of street cars and other traffic.

In isolated cases where intersecting traffic is very heavy and the topography is favorable, it may be desirable to separate the grades of intersecting streets, either for street cars or all traffic. This has already been proposed for several cities. Where streets are wide enough to divide into three parts, traffic will be expedited and accidents reduced by providing a street car space between curbs in the center of the street and a roadway on each side, not less than 25 ft. wide and preferably not less than 30 ft. On Delmar Avenue, St. Louis, where the car tracks occupy a separate space curbed off in the middle of the street for about a mile, a saving of 3 minutes results in the rush hours, and accidents have been much less than where the tracks are in the open street beyond each end of the curbed space, as indicated by the following figures: 3,800 ft. in the open street to east in 5 months had 80 accidents; 5,400 ft. in the curbed space in 5 months had 15 accidents; 5,000 ft. in the open street to west in 5 months had 39 accidents.

Most of the accidents in the curbed space were at street crossings. As far as possible it is a good thing to compel different kinds of traffic to follow different lanes, and in some instances this might be carried so far as physically to separate them by curbs or other devices.

The enforcement of traffic regulations requires a large police or traffic squad with persistence and determination. This enforcement of traffic regulations should be under a separate department with adequate laws, funds for checking and enforcement, court backing and determination. An important feature of traffic control should be the examination of automobile drivers for age, knowledge of traffic rules, hearing and good sense before a license is issued.

It is simpler to enforce a no-parking rule than a limited-time rule. The latter requires more policing and careful records of arriving and departing cars. In either case the law should provide for impounding the cars of violators, and they should be hauled to the pound just as soon as they violate the laws. Kansas City and New Orleans, in particular, have had good results from such positive enforcement of the law. Such rigid enforcement is more effective than toleration, reminders and light penalties.

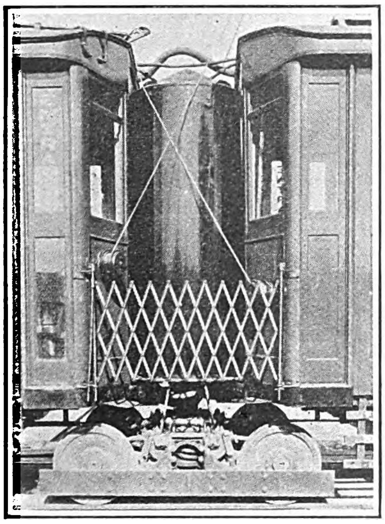
The Articulated Car*

A Résumé of Existing Designs of This Type of Car for Surface Line, Rapid Transit and Railroad Service

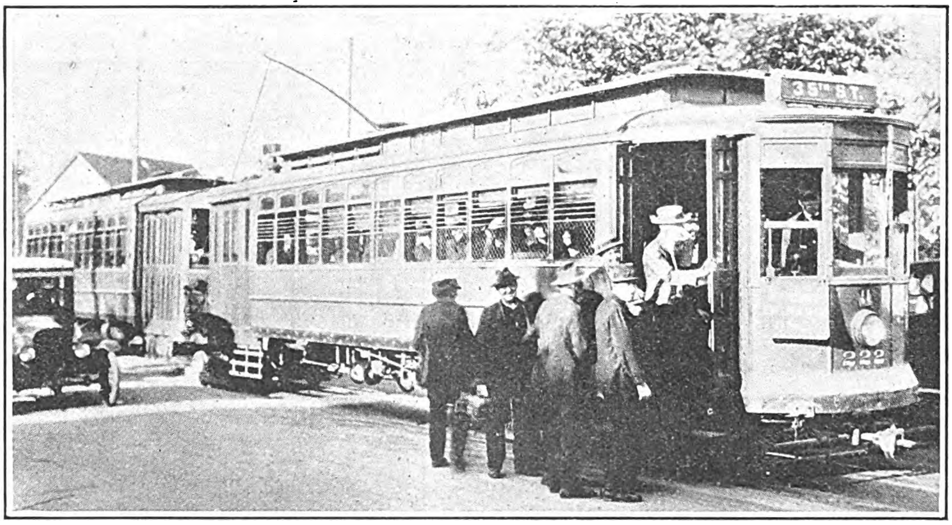
By W. G. Gove

Superintendent of Equipment Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

THE introduction of the principle of articulating steam railway cars is said to have originated in England, the first trains being placed in service on the Great Northern Railway. There are now more than 200 sets in service. These English articulated cars range in length from two-body suburban cars to a five-body car which includes a dining section permanently incorporated in the middle of the unit. A two-body articulated sleeping car has also been introduced. In September 1924, a three-body articulated car was placed in service on the London & North Eastern Railway, consisting of a kitchen body articulated with a dining saloon body at either end. A two-body articulated car has also been introduced in the Royal Mail Service, Great Indian Peninsula Railway of India.



Detailed View of Drum Connection on Milwaukee Articulated Car



Recent Type of Milwaukee Articulated Car, Using Drum Connection

All these cars were built from designs furnished by the Leeds (England) Forge Company under the British patent No. 4512 of 1907, issued to H. N. Gresley, chief engineer Great Northern Railway. On April 11, 1922, United States Patent No. 1,412,053 was issued to Mr. Gresley, who described a form of articulated car support combined with draft springs. We understand that this patent is controlled in this country by the Commonwealth Steel Casting Company of St. Louis. The objective on the English roads was primarily reduction in weight and in first cost. This depends upon the number of bodies composing the car. The principal items omitted from a two-body car are one truck, two drawbars and couplers, two draft gears, two sets of buffers, two end sill constructions, various parts of brake rigging and sundry incidental items of equipment. The saving accomplished by articulating five bodies on six trucks, as in England, is said to have amounted to 20 per cent in weight and 8 per cent in first cost.

Nomenclature Proposed

In preparing this paper I have been confronted with the difficulty of employing appropriate and brief terms specially characteristic of the articulated car. For the purpose of brevity and accuracy I will use the following terms:

Articulated Car — A multiple-bodied vehicle having the adjacent ends of the bodies supported by a single truck. In this connection an articulated car having two bodies is a *duplex car*, one having three bodies is a *triplex car*, one having four bodies is a *quad car*.

The Pilot Truck is at the outer end of the car. *The Pivot Truck* is at the point of articulation. The inclosed passageway at point of articulation when cylindrical is a *Drum;* when with an expanding canvas diaphragm, it is a *Bellows.*

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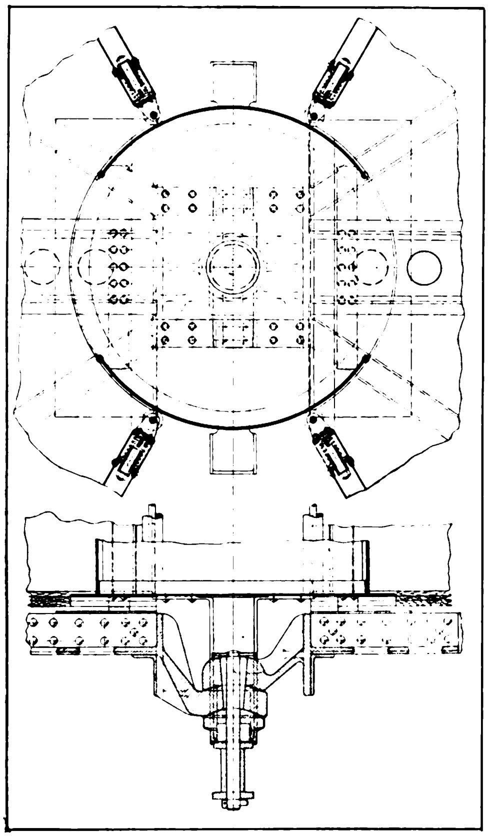
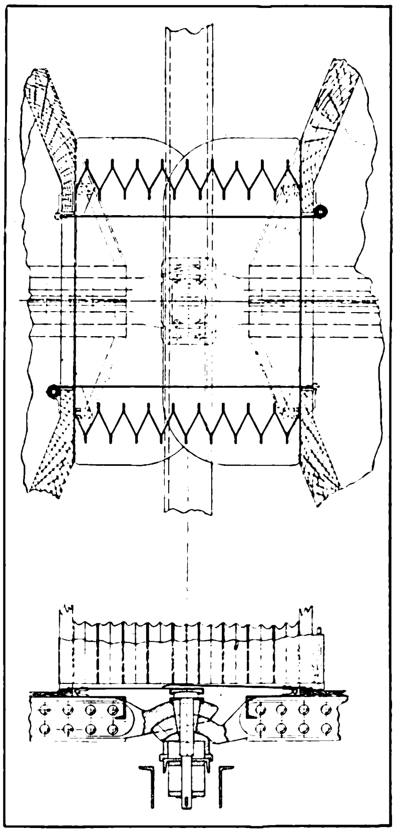
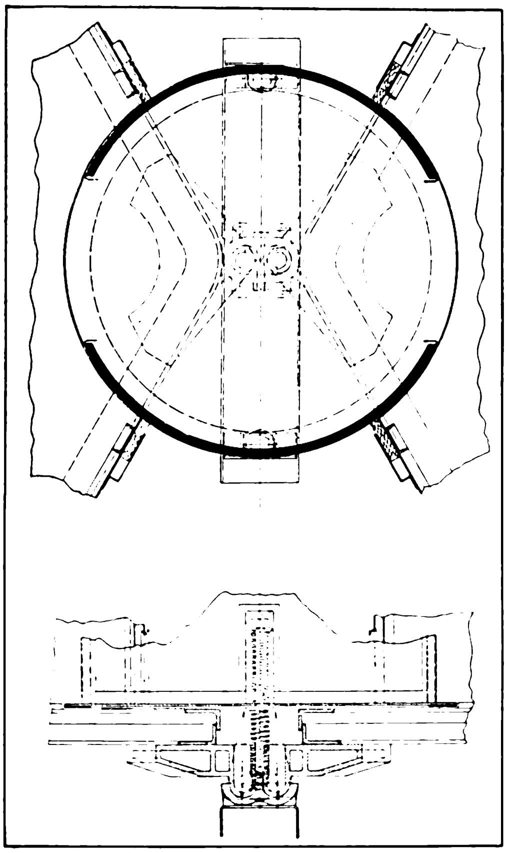
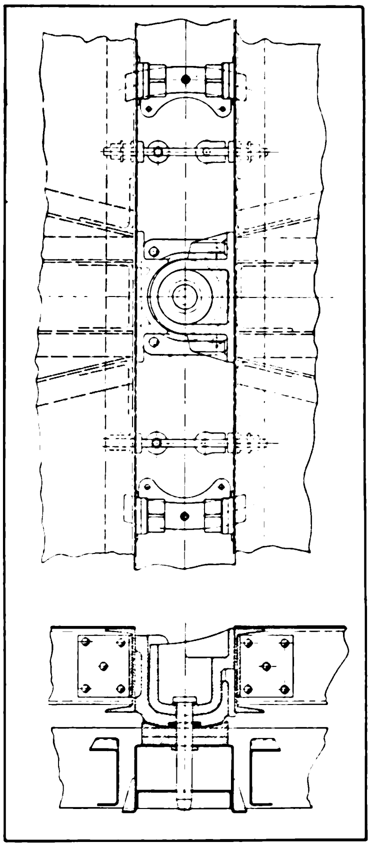
*Abstract of a paper presented before the New York Railroad Club, Nov. 21, 1924.

At the present time the design and operation of articulated cars in the United States is in the early state of development. Considerable progress has already been made, but the practicability of some features remain to be demonstrated under prolonged operating conditions.


Brooklyn Duplex Car for Surface Operation


Milwaukee Duplex Car for Surface Operation


Detroit Municipal Triplex Car


London & North-Eastern Car

Details of Connections and Passageways for Articulation in the Principal Designs

The most prominent examples of articulated cars in this country are on the following railways: The Milwaukee Electric Railway & Light Company; Department of Street Railways, city of Detroit; Brooklyn-Manhattan Transit Corporation, surface division; United Railways & Electric Company, Baltimore; Brooklyn-Manhattan Transit Corporation, subway division.

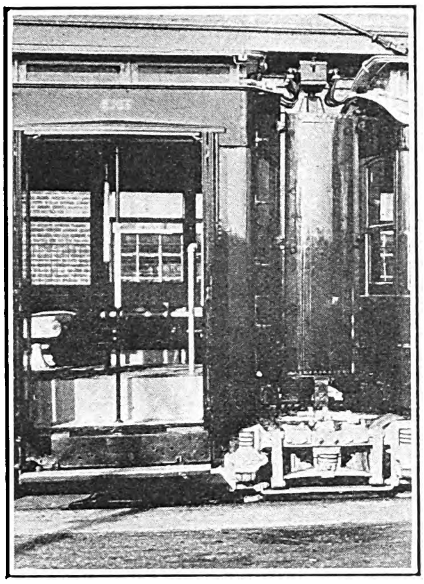
The Milwaukee Electric Railway is now engaged in a rebuilding program which will ultimately couple 384 bodies into 192 cars. Of these there are now in service 103 articulated cars of two bodies each, connected at the point of articulation by a weathertight passageway mounted on the pivot truck. On the first articulated cars in Milwaukee the passageways were of the bellows type, while the latest cars are fitted with steel drums. The pivot truck is an idler and each of the two pilot trucks has two motors. The cars are arranged for double-end operation. Each platform controller is connected with a full set of resistance on its own body of the car, thus reducing the number of wires carried from body to body across the pivot truck. [This car was described in the issue of ELECTRIC RAILWAY JOURNAL for Jan. 15, 1921, page 131.—EDS.]

The Department of Street Railways, city of Detroit has in operation an articulated car giving excellent service on the most congested route in the city. The car is composed of three center-entrance, center-exit steel bodies mounted on four trucks and arranged for single-end operation. The pilot trucks are fitted with motors, the pivot trucks are idlers. The distribution of the weight is such that 56 per cent of the total weight without passengers is on the driving wheels. [This car was described in the issue of ELECTRIC RAILWAY JOURNAL for arch 8, 1924, page 357.—EDS.]

In February, 1924, the Brooklyn-Manhattan Transit Corporation placed in service a two-body, three-truck articulated car. This vehicle, known on the road as the "duplex car," was constructed from the bodies of two cars which had been in service for some years. The bodies are connected by a drum of ample size to permit of a clear passage while the car is operating on the shortest radius curve. The over-all length of the car is 63 ft. 10 in., with seats for 71 passengers. The standing room will accommodate about 100 more passengers under rush-hour conditions. [This car was described in the ELECTRIC RAILWAY JOURNAL for Feb. 16, 1924, page 252.—EDS.]

THE BALTIMORE CAR

The United Railways & Electric Company of Baltimore has recently placed in service a two-body articulated car formed from two standard semi-convertibles. It is fitted for double-end operation with four motors. The over-all length is 74 ft. 8 in. The total weight of the car without passenger load is 67,800 lb. The total seating capacity is 87 and there is standing space motor leads are carried from body to for 78 passengers. The passageway between cars is of the drum type. The



The Center-Exit Door Is Retained in the Baltimore Car Immediately to the Rear of the Center Drum

body by way of a junction box supported on the top of the drum. Nine more articulated cars are to be built at once by this road.

BROOKLYN CAR FOR RAPID TRANSIT SERVICE

Constantly increasing density of traffic has led the New York Rapid Transit Company to place an order with the Pressed Steel Car Company for four cars, each consisting of three articulated body sections, for service in the subway. The bodies and trucks closely conform in design to those in use on this system. The three bodies will be mounted on four trucks, with an over-all length of 137 ft. The unit has seats for 160 passengers and a total capacity of 550. The total weight light is 175,000 lb., or about 1,100 lb. per seated passenger. This compares with the weight of 1,230 lb. per seated passenger of the single body type of cars in this same service.

A drum type passageway connects the bodies, affording opportunity for free circulation of passengers. These cars are equipped for operation in trains and are fitted with wide doors at their ends. The overhang is reduced to permit free passage between cars throughout the train even on the shortest radius curves of the system.

Each car is fitted on each side with six doors, each opening 4 ft. in the clear. The conductor operates all doors from his position at the rear of the car. When two such cars are coupled together one trainman operates the doors of both cars from his position at their adjacent ends.

The two trucks at the outer ends are fitted with motors, and the two intermediate pivot trucks are idlers. The equipment is also distributed to balance the weight on the trucks to the greatest advantage, the two air compressors being located on the intermediate section and a multiple-unit control equipment located near each motor truck. The hand brake and foundation brake rigging is all placed on the end sections.

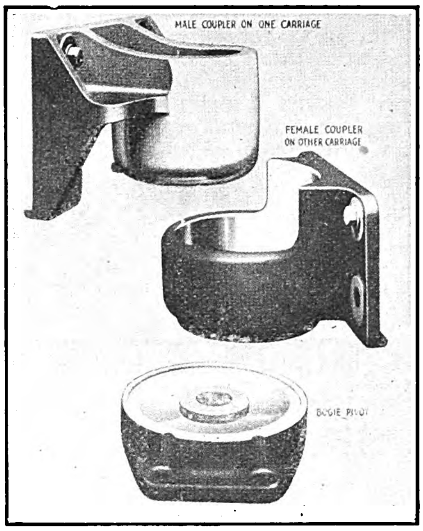
The bodies and trucks are being built by the Pressed Steel Car Company. The air brake equipment will be furnished by the Westinghouse Traction Brake Company and will include the latest form of empty and load brake which automatically adjusts the brake shoe pressure and the current input to the motors to correspond with the total weight of the passengers in the car.

Two of the four cars will be equipped with motors, control and air compressors made by the General Electric Company; the other two cars will have corresponding equipment furnished by the Westinghouse Electric & Manufacturing Company. Other items of equipment will also be furnished by competing manufacturers to determine by actual equivalent service the comparative operating reliability of their respective products.

ADVANTAGES EXPECTED

It is confidently expected that when fully developed the system of car articulation will result in a number of desirable improvements in the operating characteristics of passenger cars either in subway, surface or interurban or steam suburban service. The hoped for improvements may be briefly outlined as follows:

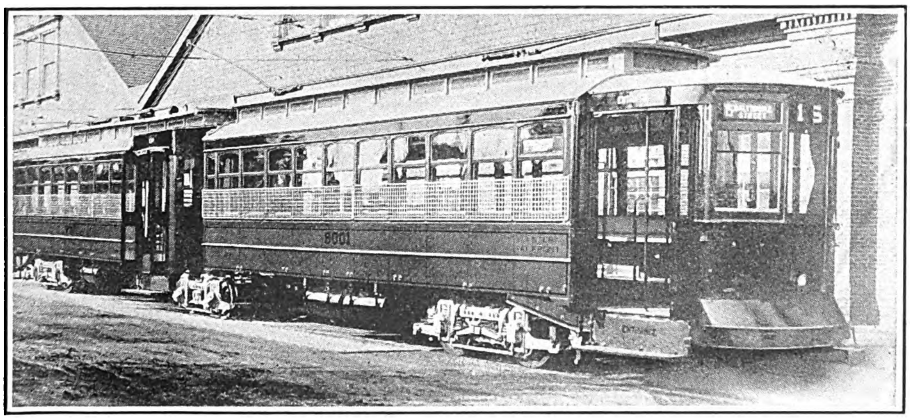
Comfort of Passengers.—It is claimed for articulated cars in service both in Europe and this country that there is a notable improvement in their riding qualities, the lateral motion or side rolling of the body having practically disappeared. This is accounted for by the fact that the articulated car body is supported at its extreme end where it rests on the bolster of the pivot truck and consequently has no overhang. As the articulated ends of the bodies are in close contact, there can be no slack between bodies, and consequently the cars start and stop smoothly. The passageway between the articulated bodies provides at all times for free and safe movement of passengers throughout the car. This passageway is also weatherproof and draftproof.


MALE COUPLER ON ONE CARRIAGE
FEMALE COUPLER ON OTHER CARRIAGE
BOGIE PIVOT

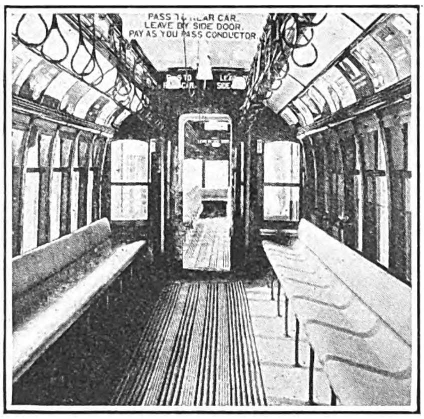
Details of Articulation Connections, London & North-Eastern Car

Noise.—One of the most disagreeable features of rapid transit subway service is noise, which is a composite of many sounds emanating from the wheels and other moving parts of the trucks, motors, gears and gear cases, as well as drawbars, safety gates and other connections between cars. These sounds are echoed and merged into an almost intolerable racket or roar by the walls of the subway or tunnel. The use of articulated cars will reduce the number of trucks, eliminate drawbars and safety gates and in consequence the noise of operation of such cars should be considerably less than a coupled train of single cars.

Reduction in First Cost.—The articulated units should cost less per passenger than the equivalent capacity of single cars. When forming articulated cars by rebuilding bodies of existing equipment, the salvaged material, consisting of trucks, motors, controllers and other parts of equipment, amounts to a considerable item either when returned to stock or applied to the equipment of new cars.



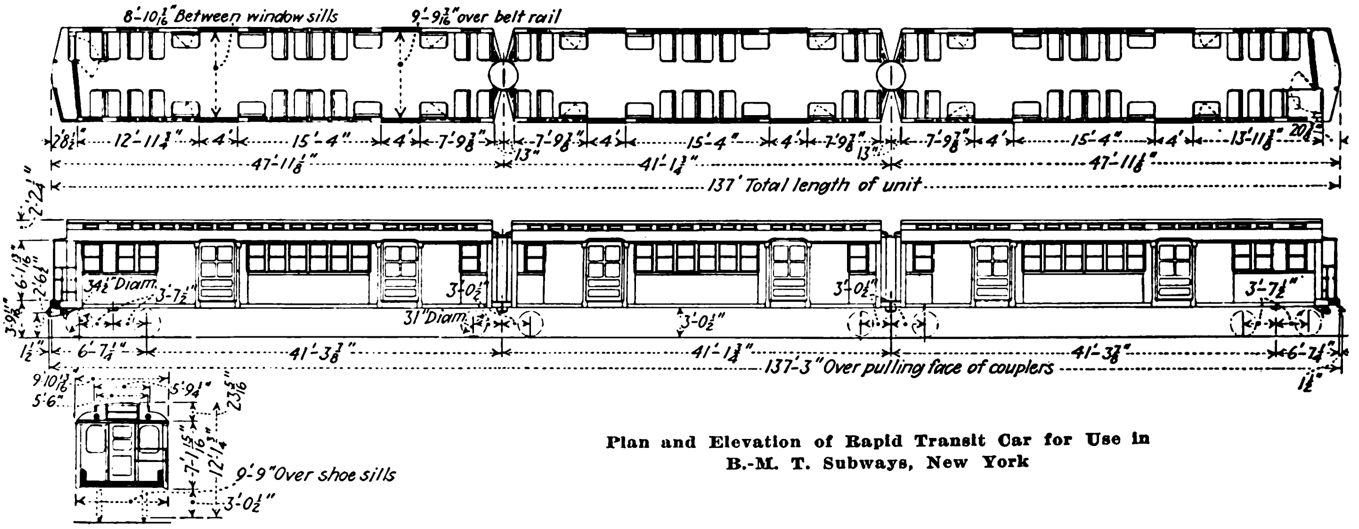
Type of Articulated Car Developed in Baltimore for Surface Operation



Interior of Baltimore Car, Showing Continuous Passageway Through the Drum

Reduction in Weight.—The greatest saving in weight will of course be realized when cars and trucks are specially designed for articulation and when every feature is given careful consideration from the point of view of economy in weight combined with reliability of service.

Reduction in Operating Cost.—There will be a direct saving in cost of energy required to operate the lighter cars with fewer trucks, a direct saving of labor in the inspection and maintenance of the consolidated units and also a reduction in the platform expense. These savings will vary according to the extent of the consolidation.



Plan and Elevation of Rapid Transit Car for Use in B.-M. T. Subways, New York

FEATURES OF DESIGN

The items of cars and truck construction involved in the system of articulation can only be briefly referred to in this paper. The function of the members is the same in most of the cars, though the details of design may vary in accordance with specific requirements of clearance, door arrangement, etc.

Bolsters. — In the first articulated cars in England the outer trucks were of the usual type, but the single truck was fitted with two bolsters, the theory being that the two bodies in passing over uneven track and around curves would have a tendency to rock independently of each other and would therefore have to be supported on separate bolsters fitted with separate side bearings. Actual experience disclosed that, under the conditions prevailing, the rolling movement was actually so slight that a truck with a single bolster could be used.

Center Plate Design. — The design used on the English cars is such that the center plate load of one body is carried on the upper surface of the center plate of the adjoining body, the lower surface of which engages the center plate of the truck. The early designs in this country followed this arrangement. More recent designs arrange for twin car body center plates, each with a separate bearing on a common truck center plate casting. This latter arrangement provides a better opportunity for lubrication and for disengaging the articulated bodies from the pivot truck when in the shop.

Side Bearings. — The design of side bearings for the pivot truck will require careful attention to provide for the proper support of the pivoted ends of the bodies and at the same time permit of the necessary freedom of each body to conform to the canting caused by the elevation of the outer rail on curves, change of grade and all the various combinations of these factors. The method of support must be such that there will be no tendency to produce torsion in the bolster of the pivot truck.

Vestibule Design. — The articulated cars in England operate on comparatively long radius curves and consequently the flexible vestibule connections consist of accordion-like diaphragms with the edges in some cases permanently attached to the respective bodies, while in other cases the diaphragms are fitted with face plates.

In the United States the development of the articulated unit was first applied to surface cars operating on short radius curves. This has led to various forms of passageways having semicylindrical side walls mounted on top of the pivot truck and maintaining free communication between the bodies even when on curves of the shortest radius. These cylinders are of steel, usually with the walls lined with a temperature insulating material. The space between the cylinders and the car bodies is fitted with rollers or other devices to provide weathertight joints. The top head of the cylinder is formed to shed water and the inside of the bottom head forms the floor of the passageway.

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Mass Transport Is Cure for Parking Evil

THE National Highway Traffic Association met on Dec. 2 in New York City to consider better uses for the streets. Prof. Arthur H. Blanchard of the University of Michigan was re-elected president of the association. Traffic congestion has reached such a point, it was said, that highway authorities are now worried about minimum speed rather than maximum. The problem now is to find ways to make the speed of the stream of vehicles higher so as to facilitate movement and get greater use of the highways.

Several speakers suggested that mass transportation was the principal remedy for the parking problem. This was urged by C. M. McCreery, vice-president Six-Wheel Company, Philadelphia. He believed there would be practically a revolution in mass transportation if the parking evil was eliminated. Faster schedules could be made, more and better transportation supplied. The thing to do, he said, was to keep the private automobiles out of congested areas. To make this possible street cars and buses must provide fast, comfortable, flexible and safe service.

Prof. Roger L. Morrison, in his

paper, while favoring greater use of street cars, buses, taxis, or other forms of public transportation as one method of solving the parking problem, called attention to the effect of stops at the curb. On streets where parking is not allowed, he would not permit any stops of either public service or private vehicles. If necessary, buses could be rerouted, he said, to keep them off the restricted streets.

A vehicle has no right to stop anyway, it was held by several speakers. Fundamentally the highways are for passage, and vehicles may be stopped to let off or take on passengers, or to park for various times, only at the sufferance of the public, through the legal authorities.

Ernest P. Goodrich favored a 30-second parking ordinance. He said this would prevent parking but would permit momentary stops to take on or let off passengers.

In an address on methods of forecasting future traffic and the saturation point in the utilization of motor vehicles, Mr. Goodrich told of studies made by the Russell Sage Foundation in its monumental investigation of the future of New York City and its environs. Figures collected from all over the country indicate that the number of automobiles is rapidly approaching a saturation point. In the future, residential sections of cities should be laid out with main thoroughfares about 6,000 ft. apart. On these, street cars and buses would be operated alternately. That is, the trolley and bus should work on alternate thoroughfares. The Russell Sage studies have also shown that there is an economic limit to the amount of traffic carried on any one street for the benefit of the community. Vehicular and pedestrian movement may become so dense that it would be better economy to build other streets, instead of trying to provide more space on the ones crowded. With increase in the number of lanes of traffic, even where these lanes are separated by a parkway or a line, the efficiency falls off. From the center toward the outside each successive lane carries less traffic at a given time, so the effective width of a thoroughfare is definitely limited.

Professor Blanchard, in discussing state fees for motor common carriers, said that these should consist of two parts: first, a charge based on the wear of the highways due to such carriers; second, a charge based on the direct cost of regulation.

New England Motor Transport Conference

A CONFERENCE of those engaged in or dependent on the transportation business of New England has been called under the auspices of the National Automobile Chamber of Commerce. It will be held on Dec. 8 and 9 at the Copley Plaza Hotel, Boston, Mass. Morning and afternoon sessions will be held each day beginning at 10:30 a.m. and 2 p.m.

The problem of highway transportation in New England, both freight and passenger, will be discussed, as will co-ordination of highway transportation with other forms.

Banker Urges Caution in Customer Ownership Financing

SPEAKING before the New Jersey Public Utilities Association at its convention in Atlantic City this week, Ralph S. Child of Bonbright & Company, New York, indicated the enormous magnitude of the funds now required annually to finance extensions and improvements in the public utility field. For the first 9 months of 1924, $1,181,434,112 of new corporate issues were brought out by power, gas and railway utilities. This is 42 per cent of the total issues for all new corporate securities. The amount for the full year in 1923 was $1,138,396,000; in 1922, $980,433,000; in 1921, $671,085,000, and in 1920, $496,822,000.

He spoke also of the now general practice of issuing "open end" mortgages with additions against new construction.

Perhaps the principal point of interest to electric railway men was Mr. Child's comment about customer ownership financing, as follows:

"I would like to dwell upon the question of 'Customer Ownership.' This method of financing has been so generally taken up by public utility companies, and has almost universally been so successful that it appears to some in the investment banking business that there are certain elements of danger which may be lost sight of.

"This success has perhaps led the managements of some companies to the conclusion that selling stock is one of the easiest things in the world to do. Statistics on customer ownership sales show that the great majority of sales are made to people of small or moderate means who have had little or no previous experience in the matter of investment. They are sold, as a rule, through the personal contact of some employee of the public utility company and on the strength of a 6½ or 7 per cent return, and because of the ease with which the stock may be purchased on the partial payment plan. These buyers of stock know little about earnings statements or balance sheets—little about property values, rate of return, or margin of safety. In fact, many companies, in their customer ownership campaigns, never show an earnings statement, the meaning of it not being understood by the average stock purchaser. The customer generally becomes a stockholder or partner in the business through sales persuasion and the fact that the investment is a local one, and that the local banker speaks well of it.

"It goes without saying that the investment banker, interested in the senior securities of public utilities, has been most favorably impressed with the development of customer ownership. Naturally the placing of this equity back of the senior securities improves just that much the position of the senior securities that the banker has marketed to the public. This may be looked upon as a selfish viewpoint on the part of the investment banker. However, it may be said that with a broad view of the public utility business, the investment banker recognizes in the customer ownership movement something of value beyond that of added equity. He sees the growing list of customers who are partners in the business making for improved public relations for the utility. He sees that this experience in investment may well develop among these customers habits of thrift which can be of national benefit, and he sees an improved understanding on the part of utility employees of the problems of their company in the conduct of its business and of the importance of their company's position in the economic life of their community. These factors mean a great deal and are looked upon by the investment banker as elements that will give added strength to the position of public utilities in the coming years.

"The banker also sees certain other angles to the question of customer ownership which from his viewpoint are equally important, though perhaps not held quite so clearly in mind by the public utility companies themselves.

"It is generally recognized that there is a definite responsibility upon a public utility to give good service. However, the responsibility assumed by the company when, through its own employee organization and its own representations, it sells stock in its enterprise to its customers, is of quite another character. That utility company has invited its customers to become partners in its business and has taken on a definite responsibility which cannot be shirked or evaded, if through a succession of circumstances something should occur to impair the value of the investment and make necessary dividend cessation.

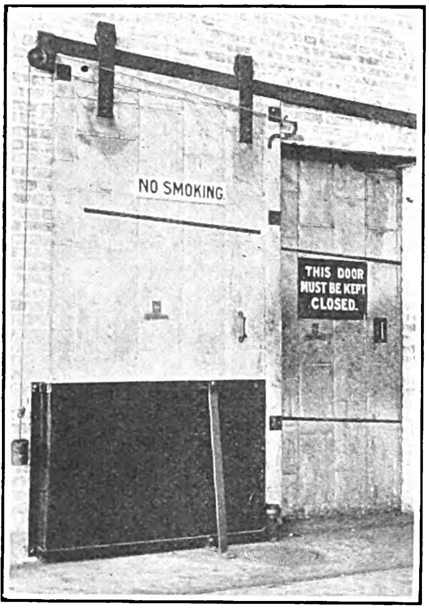
"Obviously, in the sale of senior securities there are safeguards, such as a mortgage lien on the property and a claim on earnings prior to dividends, which are not enjoyed by the investor in preferred stock. It is vitally necessary to the continuance of the strong position of the public utility industry that there be no failure in the payment of dividends on the part of any company which has sold preferred stock to its customers. Should such a failure occur it would reflect on the entire industry and might bring about complications which would be very far-reaching and possibly have disastrous results.

"It might be added that it has been noticeable in some quarters that in view of the readiness with which stock has been sold to customers by almost every public utility company which has undertaken this kind of financing, the public utility managements have naturally been much pleased with themselves. They have perhaps not taken sufficiently into consideration that the success of their initial campaign was due to a considerable extent to the fact that the people sold were new investors, who as a rule put in money out of earnings instead of out of surplus funds, and that the employee organization entered into this work with energy and enthusiasm because it was a new and unusual job, one in which the spirit of competition and personal accomplishment counted for much."

Maintenance of Equipment

Keeping Fire Doors Free and Clear

IN THE Wheaton shops of the Chicago, Aurora & Elgin Railroad sheet steel screens have been made so that the operation of fire doors cannot be impeded by material carelessly placed against them. A shield of 1/16-in. steel, reinforced at the edges and corners and braced by means of 1½-in. x ¼-in. steel, is set up around the fire door in its open position. This shield is 3 ft. high and long enough completely to protect the door. The offset at one end is fastened to the brick wall by means of expansion bolts, while the other end is fastened to the floor and braced at the top by means of a 1½-in. x ¼-in. steel bar. It is painted black and gives a very neat appearance to the shop as well as being an efficient means of preventing materials and equipment being piled against the fire door.

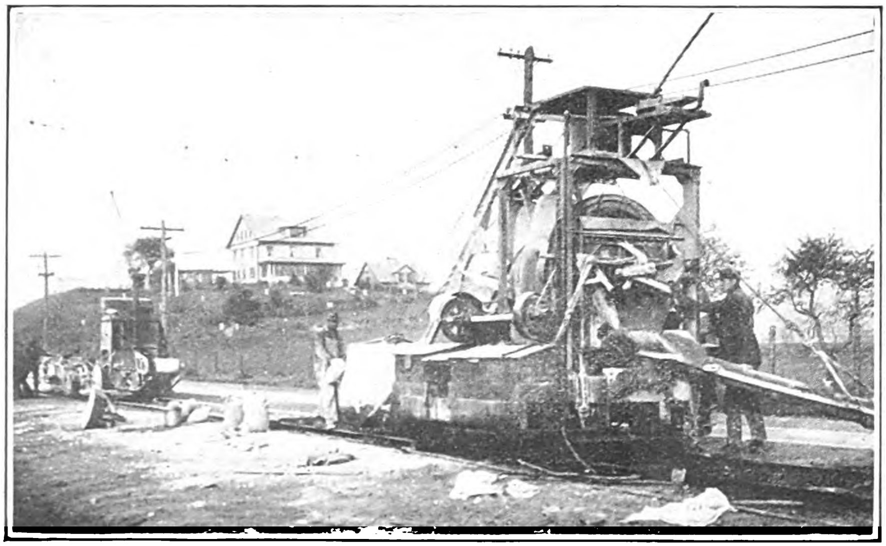


Sheet Steel, Reinforced Shield Protects the Fire Door from Materials and Equipment Which Might Render It Inoperative

Paving Old Track in Private Right-of-Way

UNTIL recently the tracks of the Boston Elevated Railway on Bright Road, Belmont, were in a reserved strip in the center of the roadway. A short time ago, however, it was desired by the municipality to pave the street, including the track area. The existing construction of the railway was with 70-lb. T-rail with bolted joints. Wood ties and rock ballast were used. The track structure was in good shape and it was felt that it was unnecessary to take it up or rebuild it when paving the streets. For this reason the company simply retamped the ballast and tightened up the joints. The latter was accomplished by driving wedges between the rail end and spot welding them in position.

Concrete was then poured inside and outside of the rail right up to the level of the rail head. Flangeways were made by means of an arch-shaped wooden form placed between the rails while the concrete was soft and moved lengthwise of the track. In this way the desire of the municipality to have the entire street paved was accomplished without the necessity of expensive track reconstruction by the railway.



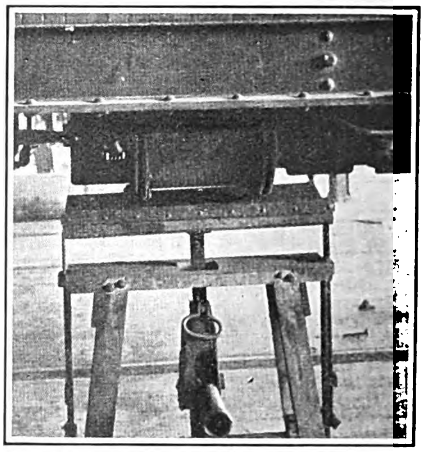
Laying a Concrete Pavement Along Tracks Which Used to Be on Private Right-of-Way

Jack for Brake Cylinder Mounting

By R. S. Neal

Assistant Superintendent of Equipment
Kansas City Railways

WHEN it is desired to change the brake cylinder on a car for any reason such as repairing or overhauling of the old cylinder, these heavy castings are found to be hard for even two men to handle. Even then it becomes necessary to block the cylinder up into place while it is being fastened to its supports. All this takes considerable time, makes it a difficult physical task, and in addition introduces an accident hazard.



Brake Cylinders Are Mounted or Removed Conveniently and Safely by Means of This Simple Device Constructed in the Shops of the Kansas City Railways

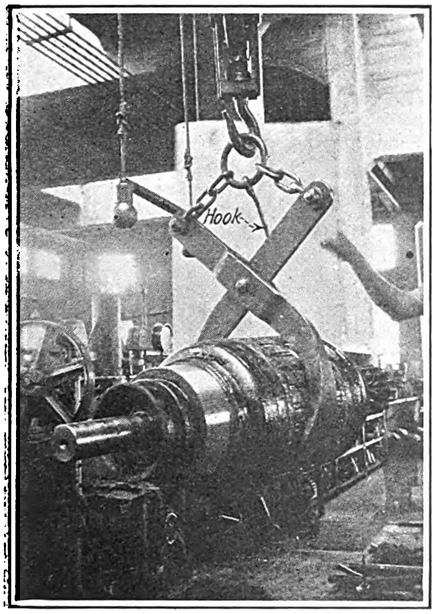
In the shops of the Kansas City Railways a simple and inexpensive jack has been designed and constructed for holding brake cylinders in position while they are being either removed or replaced on a car.

This jack is shown in the accompanying illustration. It is simply a trestle with a false top which can be either raised or lowered by means of an ordinary car jack. The false top is guided in its movement by strap-iron guides on the ends.

The 10-in. and 12-in. brake cylinders which are being installed on all cars of the Kansas City Railways weigh 200 lb. and 300 lb. respectively, and this jack has been found to be very convenient for the use of workmen when installing these cylinders.

Armature Tongs Speed Up Handling

MANY methods and devices have been developed in various railway shops for handling armatures from place to place. The specially designed pair of tongs which was developed by the mechanical department of the Twin City Rapid Transit Company has proved to be an unusually efficient tool for this purpose.

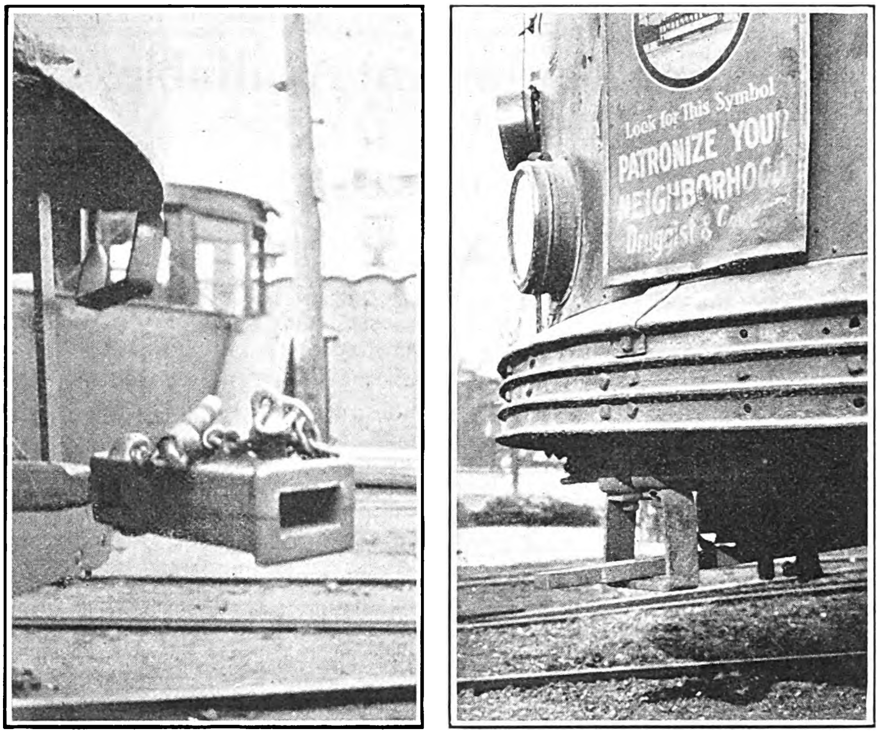


These Tongs Have Proved Very Useful for Handling Armatures About the Twin City Rapid Transit Company's Shop

These tongs are arranged so that they are simply dropped over the armature, and when raised by the two short lengths of chain and the ring above grasp the armature securely between the two curved jaws.

It is evident that an armature can be picked up from any position on the floor by means of this device, without the necessity of passing a band under the core, as is the customary method. When the armature is to be placed down on a bench or in a machine, the tongs are released as soon as they are relieved of the weight.

In order to keep the jaws open when the tongs are suspended without a load, a small hook is provided on the suspension ring shown at the ends of the two short sections of chain. This hook drops under the center joint and holds the jaws apart until the operator is ready to pick up an armature. By this arrangement the tongs are readily manipulated on a hoist or crane by one man, when moving armatures from place to place in the shop.

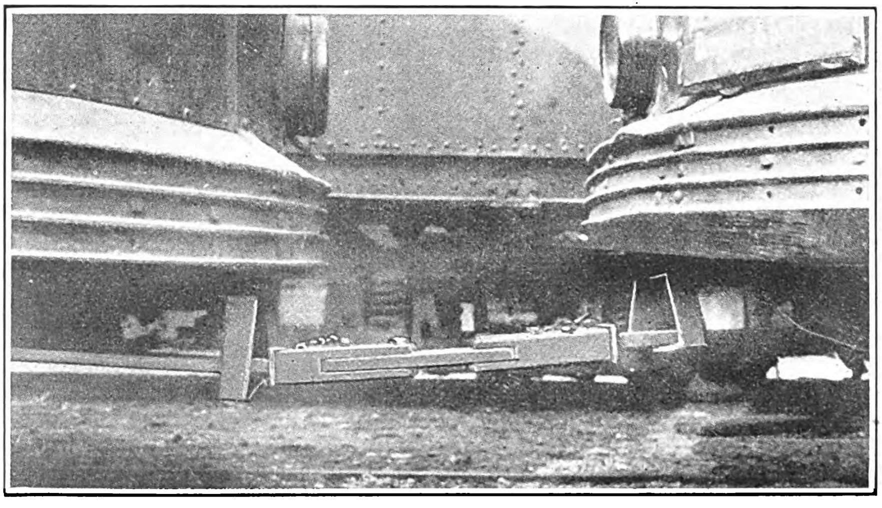


At Left, Old Coupling Head Which Protruded Beyond the End of the Car. At Right, the New Coupling Bar Does Not Extend Beyond the Bumper

Coupling Modification Reduces Accident Hazard

WHEN a change in the laws of the state of Massachusetts permitted the Eastern Massachusetts Street Railway to remove the old-fashioned fenders from its cars the change left the coupling heads protruding at the ends of the car in a way that was not only unsightly but also dangerous. A number of accidents occurred on account of these protruding couplings striking pedestrians on the street. To eliminate this danger the railway decided to remove the shackling blocks and use a shortened coupling bar which is entirely underneath the car platform, as shown in an accompanying illustration.

Each car carries two old coupling heads permanently held together by a short bar. They are loosely connected to allow freedom of movement. Cars are coupled by putting this piece between the two drawbars and dropping pins in place to take the tension. Two cars thus coupled are shown in one of the illustrations.

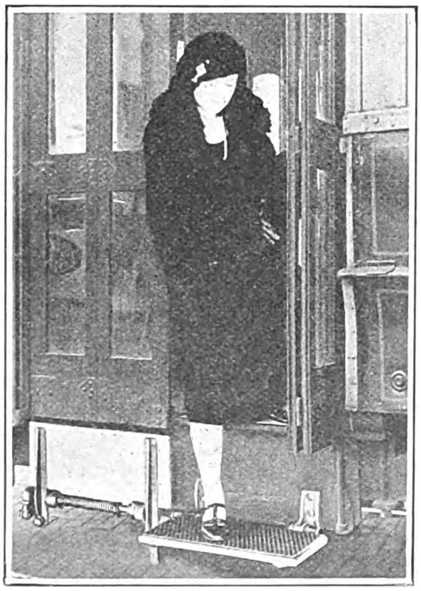


Coupler Composed of Two Coupling Heads and a Bar in Position Between Two Cars

New Equipment Available

Electric Treadle-Controlled Doors

TO MEET the demand for automatic control of exit doors by use of a treadle, the Consolidated Car Heating Company, Albany, N.Y., has developed a mechanism for controlling the operation of the door engines electrically. Standard electro-pneumatic control features have been applied to the treadle, the construction of which is greatly simplified through use of electro-magnetic valves. With this construction the treadle pan can be made very shallow, so that it can be set in a platform with the ordinary type of flooring construction without the need for extensive modifications.



Depressing the Treadle Automatically Opens the Exit Doors, Which Continue Open Until the Passenger Is Off the Step

In regular operation the treadle pan is held in its raised position level with the platform floor by springs. A passenger stepping onto the treadle presses it and forces the plunger of the electric door switch down so as to make contact; this energizes the magnet valve, admitting air to the door engine, so as to open the doors and lower the steps. The lowering of the step actuates another electric control switch, which closes a circuit in parallel with the magnet valve. The doors will then remain open as long as the step is held in its lowered position, even though weight is removed from the treadle, so it returns to its normal position. As soon as the passenger leaves the step, this is raised slightly by spring pressure and the electric switch opens the door engine circuit, so that the doors are closed and the step is raised. The closing motion is delayed sufficiently so that after the passenger has left the step there is plenty of time for him to get clear of the car before the door starts to close.

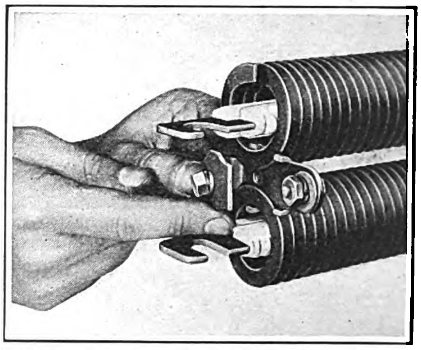
The accompanying illustration shows the treadle mechanism on a one-man, two-man car. In this case, the pair of folding doors next to the car body is used for exit. With one-man operation the treadle mechanism provides automatic control of the exit doors, while with two-man operation, both the entrance and exit doors are controlled by the conductor from his operating station.

Edgewound Resistor

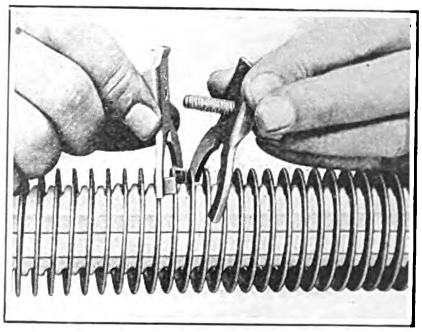
A RIBBON-TYPE resistor, wound on edge, has recently been developed by the Monitor Controller Company, Baltimore, Md. The resistor unit consists of a high-resistance alloy ribbon wound in helical form and mounted on a steel-reinforced porcelain support which passes through the unit. This method of construction relieves the resistor ribbon from mechanical strain and permits of thorough ventilation. The ribbon can operate at any temperature up to red heat without sagging.

A system of terminals and taps enables a unit to be connected into a circuit and to be interconnected with other units. Two simple forms of clamps are provided. One is a bridging clamp which makes mechanical connection between two adjacent units and serves as a terminal when the units are connected in parallel. The other may be used as a terminal clamp or as a tap.

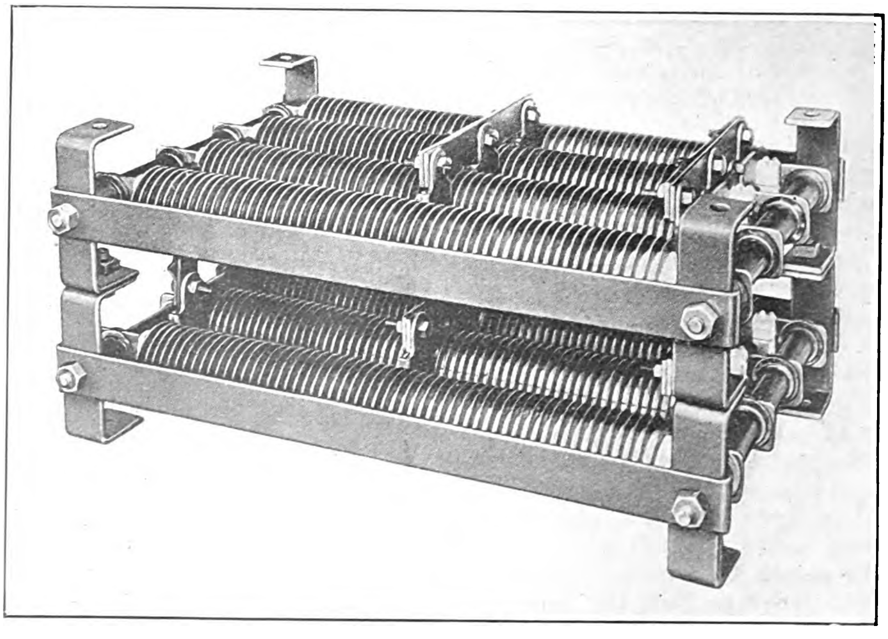
Monitor edgewound resistors are made in standard units and mounted in frames so that they can be employed like the usual cast-iron grids for use with car motors or wherever heavy currents are handled.



Clamp for Connecting Adjacent Units Serves as Terminal When Units Are in Parallel



Clamp for Taking Off Tap



Bank of Eight Units with Standard Method of Mounting

The News of the Industry

Favorable Move at Chicago

City and Companies Appear Now to Be Closer to Agreement on Some Points

The city of Chicago has receded from its previous position and has arranged to get a list of disinterested engineers to evaluate the surface lines, and possibly the elevated lines, with a view to purchase at the valuation price. The city did not commit itself to a deal, but the bankers went on record as recommending to traction security holders the acceptance of the city's notes, known as Schwartz certificates, in exchange for traction securities should the city buy.

Frank O. Wetmore of the First National Bank, who attended the semi-public traction conference of Dec. 2, stated to the committee of Aldermen that the bankers could not sanction a recession from the capital account value of the surface lines of $162,000,000, unless experts appraised the lines at less. With him were John J. Mitchell of the Illinois Merchants' Bank and Melvin A. Traylor of the First Trust & Savings Bank. Leonard A. Busby, head of the south side lines of the Chicago Surface Lines, also was present.

The city had offered slightly more than $142,000,000 prior to the conference. The appraisal was consented to with the provision that if agreement was made for a sale, the price should not exceed $162,000,000 regardless of any excess in the evaluation. This the bankers said was satisfactory. Alderman Fick was ordered to get city and traction lawyers together to agree on three engineers from a list submitted by R. F. Kelker, Jr., city traction expert.

Mr. Busby declared a satisfactory evaluation could be arrived at within six weeks from a list containing every item of surface lines equipment which is on the records of the Board of Supervising Engineers. The city, however, agreed to stand the expense of an appraisal.

Six public hearings beginning Dec. 5 were ordered with a view to getting the demands of each section of the city on record regarding the transportation facilities afforded each of the six zones in the city's traction plan.

Wages Cut in Bloomington, Decatur and Danville

Simultaneously with the wage reduction in Peoria, Ill., from a maximum of 57 cents an hour to 50 cents the wages in Bloomington, Decatur and Danville, Ill., were reduced a proportional amount. As these wage scales are based on the Peoria scale, the high rate in Bloomington was lowered from 50 cents to 47 cents and in Danville and Decatur from 51 to 49 cents an hour.

As explained in the ELECTRIC RAILWAY JOURNAL for Sept. 21, page 461, with the expiration of the contract between the Illinois Power & Light Corporation and the railway men in Peoria on May 1, the company entered into negotiations with the men for a new agreement. After conferences between the local manager at Peoria and a committee of employees, at which a satisfactory wage scale could not be agreed upon, it was decided to submit the question to an arbitration board of three members for decision. It required 90 days before the arbitrator for the company and the one for the men could agree upon the third member. Following another period of 30 days, during which time every phase of a "living" wage was considered, the board recommended a reduced wage scale. This recommendation was set for hearing on Sept. 15 and the wage reduction adopted as of Oct. 1. The new wage scale was not made retroactive to May 1, the time of expiration of the contract, but took effect on Oct. 1. During the period of negotiation and arbitration the railway men received the former rate of pay. The new agreement expires on May 1, 1925.

Investigator Becomes the Investigated

Tables Turned on Mayor Hylan, New York, Who Sought Partisan Arraignment of Commission—Grave Political Consequences Are Seen Ahead

TONGUES have been set to wagging again in New York over the transit situation. More traction letters are being written and they are attracting more attention than did the previous correspondence, that between Mayor Hylan and G. M. Dahl, chairman of the board of the Brooklyn-Manhattan Transit Corporation. It is not a matter of the vivacity of the correspondence, but rather the personalities of the participants and the seeming deep significance of the possible future political aspects of the matter. The participants are Mayor Hylan and Governor Smith.

In this connection a little local history may not be amiss for the especial benefit of those outside of New York not acquainted with the recent local political events. Governor Smith, a Democrat, was recently re-elected to office by a big vote. He was the only one of his party on the State ticket so put into office. Back of him are a Republican Assembly and a Republican Senate. Mayor Hylan, a political anachronism and a Hearst partisan, gunning for the scalps of the members of the New York Transit Commission, filed charges with the Governor against the commission alleging dereliction of duty and misconduct in office. He demanded that the commissioners be removed from office. It was really a pre-election backfire which the Mayor started.

Mark the celerity with which the removals might be accomplished—if the Governor was willing! There's the rub. All the Governor had to do or all that Hylan undoubtedly thought he would do would be to constitute himself a judge, summon the commissioners before him, question them and then if he saw fit dismiss them. The Governor pondered the matter for two weeks. At least, he didn't reply to the Mayor for that period. When he did, the answer he gave was one that startled the Mayor and set all New York to talking. Instead of following the procedure demanded by the Mayor the Governor named Justice McAvoy, another Democrat, as special commissioner to sit as referee with almost unlimited powers and "report the actual facts regarding the transit situation." He indicated that with that information before him he would determine how to proceed. That flabbergasted the Mayor. He then threatened not to play. More of that later. In naming Justice McAvoy, the Governor said:

> The transit problem in New York City has become a matter of sharp controversy between the city administration and the Transit Commission. Charges against the commission have been made by the Board of Estimate and filed with me. Other charges against the city administration made by the Transit Commission have appeared in the public press. The problem is acute. The present intolerable conditions must be remedied at the earliest possible moment. The people must have the facts.

It appears, according to Mr. Hylan, that the Governor completely misunderstood him. He says that neither he nor the Board of Estimate has requested "an investigation of anything." They are "substantial, formal charges" against the commission that the Mayor has filed. He has said so himself. Of them a trial was requested. At the end of a letter which took almost two solid columns of newspaper space, the Mayor says the Smith plan "neither has my approval nor will it have my participation, save to the extent required by law." He pretends to see ahead "an investigation from which nothing can come except reports and no decision." He wants in place of the present transit commissioners, of whom two are Democrats and one a Republican, "a commission free from present or former railroad or utility affiliation." He concluded:

> When news of your appointment of Judge McAvoy first came to me I assumed that he was named to hear and try the charges and I welcomed such appointment. I now understand from your reported statement that such is not the fact and he is only an investigator, and apparently I misapprehended the scope of the appointment.

Governor Smith was quick to reply. Best of all he did so in just 176 words.

The kick is all in the last 35 words. To the Governor it was quite clear that "the welfare of the people requires complete investigation to ascertain and report all the facts." Then came the 35 words, deeply significant in their portent. Arranged as the Governor put them they follow:

> I am confident that upon reconsideration you will change your decision to participate in the investigation only to the extent required by law and conclude to co-operate with Justice McAvoy fully in the public interest.

On Dec. 5 the Mayor declared that he still believed that a general inquiry by a Moreland act Commissioner was not the proper procedure and that the proper way would have been to proceed under the Public Service Commission act so that proof of the charges against the commissioners might have been presented properly.

It is expected that Judge McAvoy will begin the inquiry as quickly as possible. It was said that he probably would begin to hold public hearings for the taking of testimony in the Aldermanic Chamber at City Hall immediately after the adjournment of the Appellate Division for the holiday period and would continue the hearings through the holidays.

As for the Transit Commission it is reported to be ready and waiting to lay all the cards on the table before an impartial judge. Big doings and more interesting reading about the seven years of delay during the Hylan hierarchy appear to be ahead.

George Van Slyke, who writes politics for the *Sun* and is regarded as being unusually well informed on his specialty, said in the *Sun* for Dec. 3 that Mayor Hylan by his repudiation of the transit investigation by the Governor "has brought Tammany Hall to the verge of the greatest political warfare New York has experienced since the historic battle between Charles F. Murphy and Mayor McClellan 20 years ago." Mr. Van Slyke said in part:

> The Hylan bolt has shaken Tammany Hall from cellar to attic, but the leaders appear to be standing together today in their demand that Smith go through with the investigation regardless of the outcome. Not the slightest doubt was entertained anywhere that such a clash could mean only a knockdown fight between the Smith-Tammany and the Hylan-Hearst factions.
>
> The Mayor will not risk losing his pet issue by submitting it to the test of an impartial investigation. His plan of action is made clear. He seeks to buttress his position by ousting the Transit Commission, getting control of a new commission and putting through his own scheme of transit with a city owned and operated line and extensive bus routes.
>
> The Mayor is fighting with his back to the wall. He is desperate, and even his political enemies are crediting him with displaying real courage in risking an open fight with Tammany on uneven terms. Should the split come it will mean the alignment of Tammany Hall and its allies in the several boroughs on the Governor's side, and Hearst, Copeland and a remnant of the Democratic organization in Brooklyn, Queens and Richmond on the Mayor's. The test would come probably in the primaries, when Hylan would appear for renomination against a candidate picked by Smith and Tammany.

Hearings on New York Central's Electrification Projects

The Public Service Commission of New York has fixed Dec. 15 for a hearing on the application of the New York Central Railroad for approval of equipment and location to bring about the necessary electrification of its road other than the west side tracks, in New York City, as required by the Kaufman law of 1923. The hearing will take place at 30 Church Street.

Proceedings for the electrification of the company's freight lines on the west side of New York are now under way before the commission, which has authority over changes which may be necessary to street grades in New York City prior to the approval by the commission of the electrification plans.

The hearings scheduled for Dec. 15 are on the proposed electrification of the Putnam division of the New York Central, from Sedgwick Avenue, the Bronx, to Getty Square, Yonkers, and the Port Morris branch on the Harlem division.

On Dec. 16, at 30 Church Street, New York City, the commission will conduct a hearing on the petition of the New York Connecting Railroad Company for the electrification of its tracks within the city of New York from Bowery Bay Junction on Long Island to Fresh Pond Junction.

Madison Railways Must Have More Income for Improvements

Dudley Montgomery, vice-president of the Madison Railways, Madison, Wis., at a recent meeting in the office of the Railroad Commission made it clear that more income must be derived in order to carry out the program of improvements, and that the only source of revenue was the street car fare. The prospective improvements were outlined in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 25, 1924. Company officials declared that they had not decided on any fixed increase in fares, but all were satisfied that the recent audit of its books made by Harry H. Wilson, accountant of the commission, confirmed the need for more income to insure further development of the system.

Officials of the company volunteered the information that the employees had not been fairly treated on the wage question during the past 10 years, not because the company did not realize that they were entitled to higher pay but that with the present income it was impossible to pay any more. Several years ago the men accepted a reduction of 3 cents an hour after it had been explained to them that a cut was necessary if the system was to be kept in operation. Officials of the company are now anxious to grant an increase to the men. The average salary paid to the employees is $135 a month. Men are not paid for their days off and they are not allowed vacations with pay.

To carry out the physical improvements called for in the plan would cost approximately $700,000. The program is to be spread over a period of 7 years and the major portion of the expense is to come out of the company's revenues. The audit of the railroad commission for the year ended Aug. 31 last showed a net income of $36,934 before providing for depreciation. A large amount of the net income must be used to pay off loans which have been made in order to carry on improvement work, and according to the company officials practically only $7,000 would be left for the program as outlined.

Various types of fares were discussed at the meeting. Officials of the company informed the committee that three-fifths of the income of the company was derived from cash fares and two-fifths from the sale of tickets. The company now sells nine tickets for 50 cents. The cash fare is 6 cents.

Foreign Bus Lines Entering Detroit to Be Regulated

Action is to be taken by the city of Detroit to regulate the increasing number of bus lines entering the city. Steps looking toward this end were first advocated by John W. Reid, Commissioner of Public Works. Interest in the matter on the part of city officials was aroused by the announcement that the Detroit United Railway would transfer interurban passengers at the city limits to buses which will be operated to downtown Detroit in place of the interurban cars. The idea of the railway is that the buses can make better time inside the city than can the interurbans. A hearing is to be held on the matter.

The D. U. R. already operates a bus line from its downtown station to Trenton and several bus lines are operated from points downtown to suburban cities. Temporary revocable permits were issued to these operators by the Detroit Police Department. It is the opinion of John C. Lodge, president of the City Council, that the city must regulate these buses and be properly compensated for the use of the pavements.

The withdrawal of the D. U. R.'s interurban cars from the city will result in a loss of revenue to the Street Railway Department as the railway now pays the City Department rental for the use of the municipal tracks. It is proposed by Mr. Lodge that a tax be considered by the Council, similar to the one required from companies operating buses within the city. One cent per bus-mile is collected by the city from the Detroit Motor Bus Company. This tax is considered as part compensation for the wear and tear on the city pavements. It is levied against other bus companies operating in the city.

The fixing of routes for the buses is also to be considered.

Accidents Reported

No fewer than four accidents have been reported within the past few days from various parts of the country. On Nov. 30 six persons were injured in a fire in a one-man car of the Public Service Railway at Kearny, N. J. The following day 18 persons were hurt when a bus of the same company was overturned through the recklessness of the driver of a private automobile. On Dec. 4, as a result of a collision between a one-car train of the Sacramento Short Line and a three-car Key Route System train in Oakland, six persons are reported dead and seven probably fatally injured. The day before that five people were burned to death in a fire which followed a collision between a two-car interurban train and a motor truck in Wyandotte, Mich., the truck being loaded with turpentine, which took fire.

Jitney Candidate Defeated at Springfield

Fordis C. Parker, Republican, was elected Mayor of Springfield, Mass., on Dec. 2 by 925 votes over Robert W. King, Democrat, with Josiah Dearborn, independent, and Richard J. Talbot, jitney candidate, weakly trailing. The vote was as follows: Parker, 9,691; King, 8,766; Dearborn, 3,780; Talbot, 2,583. It was an exciting contest, and Parker's victory was clinched only by the last three precincts reporting. The vote, 26,935, nearly doubled that of any preceding city election. Mr. King, a young lawyer, made a most remarkable bid for the office.

The election is of special interest because all four candidates had committed themselves on the transportation subject, particularly with respect to the future place of the bus in the city. As a matter of fact, one of the candidates, as explained in the ELECTRIC RAILWAY JOURNAL for Nov. 15, page 857, is counsel for the jitney men ruled out of Springfield last May by Mayor Leonard.

Mr. Parker, the successful candidate, takes the stand that the first duty of the city is toward the street railway. Previous to his nomination he said that if he were elected it was his idea to appoint an expert to look into the transportation situation, but that he would favor a return of the jitneys only if it were shown that the Springfield Street Railway did not appear disposed to do all it could to furnish such service.

Co-ordination Talk Continued in Chicago

Universal transfer negotiations are going forward between the Chicago Surface Lines and the elevated roads. Samuel Insull, chairman of the board of the Chicago Rapid Transit Company, announced this fact to the City Council committee on local transportation. Like Henry A. Blair, head of the Surface Lines, Mr. Insull has submitted himself to questioning in an effort to help the city frame a traction policy.

Mr. Insull joined in Mr. Blair's contention that co-ordination of the lines is necessary, but he differed from Mr. Blair as to the extent. The universal transfer negotiations are a definite step toward his idea of co-ordination. It is expected the companies will soon announce whether they can make the plan practicable from a financial standpoint.

The scheme embraces 136 points where passengers would be permitted to transfer between elevated trains and surface cars. Whether this can be accomplished with a single fare or whether a transfer charge or a higher rate of fare would be necessary are points for the experts to determine.

Mr. Insull took occasion to rebuke the city for not acting on his request for authority to build $23,000,000 of extensions in outlying and crosstown districts and to lengthen platforms in the loop district so as to accommodate 8-car trains. He said he had ordered 100 subway-type cars costing $2,300,000 for delivery next fall. This will permit a 15 per cent increase in loop service.

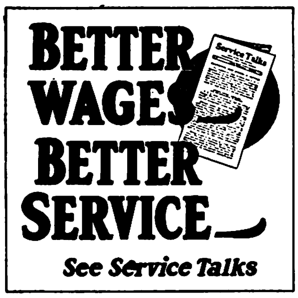
If the city builds a subway, Mr. Insull will increase rush-hour service from 1,200 to 2,400 cars an hour. He said private companies will give the city all the transportation it needs if the city will cease its dilatory consideration of petitions. As to city ownership of lines, he said: "Take away the incentive for profit and you lose efficiency."

It was Mr. Insull's first appearance in seven years before a body of this kind and he did not lose the opportunity to demand fair treatment from the city. He objected especially to Mayor Dever's reiterated statement that the elevated lines cannot get the money for extensions. Mr. Insull said:

"Credit is like a woman's reputation; a whisper and it's gone. Quit talking and give us the authority and you will get rapid transit enough in a hurry."

3,000,000 Messages Distributed in Philadelphia

Three "Read as You Ride" Service Talks were distributed during the week ended Nov. 22 on the cars of the Philadelphia Rapid Transit Company, each for a period of two days. Each approached the 1,000,000 mark in distribution. Dash signs were used in calling attention to the message. They were entitled "Better Wages, Better Service," "Your Fare and Others" and "Why No Fare Boxes." In each case the admonition was added: "Ask for Service Talks."



Dash Sign Used in Philadelphia

Railway Preferred to Bus in Eastview, Ont.

The ratepayers of Eastview, Ont., voted on Dec. 1 in favor of granting a franchise to the Ottawa Electric Railway by a majority of 247 over that in favor of granting a franchise to the Eastview Transit Company for the operation of buses. The railway has offered to lay the tracks for a distance of 1½ miles without cost to the town and to charge a fare of 10 tickets for 25 cents to city limits. It was agreed that if the city of Ottawa at any time purchased the company's lines the town of Eastview would be given the opportunity to purchase at the same terms and for the actual cost of the line within the town limits. The Eastview Transit Company offered to run four buses from ½ mile east of the town limits to the Ottawa main post office, 2¾ miles, at a 5-cent fare and a 10-cent rate on Sundays. The bus and railway tangle in Eastview has been referred to previously.

New Agreement in Dallas Expected

The present arrangements between the city of Dallas, Tex., and the Dallas Railway whereby a 6-cent fare is charged in the city will expire on Dec. 27. Unless a new agreement is made and authorized by a city ordinance the fare will automatically return to 5 cents as specified in the city charter. It is expected that an application for a continuance of the 6-cent fare will be filed shortly by the company.

The present 6-cent fare was extended for 18 months from June 27, 1923, on condition that the railway spend $705,915 in extensions, rebuilding and repairs and in the purchase of 30 additional cars during that period. This proposal made by the City Commission is known as the Everman Plan No. 2. The agreement constituted an understanding between the city officials and the traction company and was negotiated by John W. Everman, supervisor of public utilities for the city. At the time the extension was authorized it was agreed that the improvements and extensions would not be required until after the completion of improvements in the Everman Plan No. 1 of 1922, which gave the company eight months for completion of the program.

The railway extensions that may be projected now as a commitment on the part of the company for the increased fare have not been made public, but have been under discussion. When the agreement expires on Dec. 27 the railway is to take over operation of the Trinity Heights line from the Texas Electric Railway under the franchise agreement.

One-Man Operation Started in Cleveland—Arrests Made

One-man car operation on important lines in Cleveland, Ohio, during non-rush hours was started by the Cleveland Railway on Dec. 1. It was followed immediately by arrests of the operators by authorities in the city of Cleveland, Lakewood and Newburgh Heights, who invoked police ordinances forbidding running of street cars with fewer than two men. During the first two days of operation twelve of the operators were arrested, but the Cleveland Railway insisted that one-man operation would be thoroughly tried. The hearings for those arrested are to be held within the next two weeks. The city ordinances prescribed penalties of fines ranging from $5 to $25 for each violation.

Railway men insist that one-man car operation was started as an economic measure because not sufficient funds are allowed for two-man operation on lines that are losing money. Secretary Wilson said that if operation of one-man cars interfered with or impaired service, they would be discontinued.

An interesting feature of the arrest of the operators lies in the fact that if any of them are fined, the fines will be paid by the railway out of the pockets of the car riders, because under the Cleveland arrangement, any money made by the company over and above the 6 per cent paid to stockholders goes into a fund to reduce or increase fares.

Aldermen Act Against One-Man Cars in New Haven

Primarily for the purpose, it seems, of determining the extent of the jurisdiction of the city of New Haven, Conn., over the railways operating within its limits, an ordinance to this effect was passed by the Aldermen on the evening of Dec. 1, which would ban the use of one-man cars. Up to Dec. 3 the measure had not been approved by the Mayor. It is pretended that the purpose of the ordinance is "to prevent accidents in the streets of the city and the highway district of New Haven, facilitate traffic therein and preserve good order and secure the safety of persons using the city streets."

In passing the act the Aldermen proceeded on the advice of Assistant Corporation Counsel Thomas R. Robinson. The intention of the Connecticut Company is to appeal to the State Public Utilities Commission for relief from the terms of the measure if the Mayor signs the ordinance. Its contention is that the city has no such power as it is now seeking to wield.

This is not the first time that a similar issue has been raised in Connecticut. Last January the Council of Hartford passed an ordinance against the use of one-man cars in which the time limit was fixed at July 15. When the expiration date rolled around a resolution was passed giving the company permission to continue one-man cars until it received a month's notice to withdraw them. It was pretended at the time by the city that the ouster measure was involved with a tax measure then pending determination by the courts.

The position of the railway in that case was the same as it has taken in connection with the New Haven matter, namely, that the Public Utilities Commission has jurisdiction.

Suit to Reduce Nashville Fare Fails

Chancellor John R. Aust recently dismissed the bill filed in Chancery Court by a citizen in which it was sought to enjoin the Nashville Railway & Light Company, Nashville, Tenn., from charging a 7-cent fare. In dismissing the bill the chancellor said that reliance was put solely on a city ordinance which fixed the fare at 5 cents, but no reference had been made to the act of the General Assembly creating the Utility Commission, nor did the complaint raise the question of the validity of that act.

The opinion further stated that the railway rested its defense upon the order of the commission which, after a full hearing, permitted the railway to charge and receive a 7-cent fare; that the commission's order must stand unless the ordinance of the city is superior to the legislative act, or the act is contrary to the constitution of the state or of the United States. Chancellor Aust said that it would be an anomaly if the city could deprive the people from exercising jurisdiction through a legislative body.

He referred to the situation in Memphis, where the order of the commission there permitting a 7-cent fare had the effect of overriding and of superseding an ordinance of that city fixing the fare at 5 cents.

New Franchise Proposed at St. Louis

A new franchise from the city of St. Louis to cover a period of 50 years is proposed in the interest of the successor company to the United Railways. Mayor Kiel wants the franchise bill to go through as initiated by the people. He apparently doesn't want the responsibility of accepting a franchise for the city. As Mr. Kiel is a tentative candidate for re-election to a fourth term as Mayor his attitude is regarded as most important. The Mayor and fourteen Aldermen come up for re-election in April. Fourteen other Aldermen and President Walter Neun of the board hold over for two more years.

The new franchise will provide for service at cost and a co-ordinated bus and railway line. Provision will also be made for the subway system the city contemplates building. The railway is expected to agree to use the subways on a leasing arrangement, the city to furnish the capital to build them if present plans are consummated. The city is making a survey to ascertain the best means of solving its rapid transit needs. A special aldermanic committee has recommended the expenditure of $100,000,000 for a subway system in the congestion sections of the city.

The city under the new franchise measure would have direct representation on the board of directors of the railway and it is very probable that a plan for a gradual purchase of the system by the city will be worked out.

A special election on the franchise together with the cost of conducting an educational campaign would probably run the bill to $100,000. It is regarded as imperative to vote on the bill on a day different from the one on which officials are elected to public office in order to keep the element of politics out of the election. In any event it would probably be impossible to prepare the franchise measure in time for submission at the Spring election. While the various financial interests have accepted the plan for the reorganization of the railway many steps remain to be taken before the franchise can be acted upon. The present franchises expire in about 15 years.

The program of the reorganization committee provides for full, open and public discussion of all questions involved in the new franchise.

Bus Fares in Michigan Advanced —Accounting System Likely

The Michigan Public Utilities Commission recently authorized a temporary fare increase of half a cent per passenger-mile on buses operated between Detroit and Pontiac by the Star Motor Coach Company, between Detroit and Mount Clemens by the Wolverine Motor Bus Company and on the electric cars of the Detroit United Railway's Pontiac and Mount Clemens divisions. The new rates went into effect on Dec. 1. They represent half of what the three companies asked in their recent petition. It is said that the 1½-cent mileage rate just instituted was a makeshift order because of lack of evidence submitted at the recent hearings. It is expected that the commission will order the bus companies to install a system of accounting more complete with respect to details so as to enable the regulatory body to learn exactly how much loss or profit per passenger-mile is being encountered.

Promptly following the decision of the commission fixing the temporary rate of fare the Detroit United Railway announced its plans for the co-ordination of bus and rail service wherever possible. The trolley and bus service between Detroit and Pontiac will be co-ordinated. The rail fare will be a straight fare at the rate allowed, while the bus fare will be in increments of 5 cents. The minimum rail fare is 5 cents and that on the buses 10 cents. The Detroit United is now charging 1 cent a mile on its Pontiac and Mount Clemens Division and has a petition before the commission for authority to charge 2 cents a mile.

Elliott G. Stevenson, president of the Detroit United Railway, recently stated in connection with the proposed fare advances for Mount Clemens and Detroit that the business rivalry between the railway and the interurban bus lines had led to a service very much in excess of that warranted by the combined volume of business, and at a rate of fare wholly inadequate to meet the costs of doing business. He said that the result had been a severe financial loss to both railway and bus operators. This, he said, had been particularly emphasized in the deterioration of bus equipment, most of which would have to be replaced.

Philadelphia Rapid Transit to Participate in Terminal Plan

Plans have been made for conferences between the Pennsylvania Railroad and Philadelphia Rapid Transit Company officials regarding the inclusion of elevated and other transit lines in the new railroad station. The intention is to remove the road's station to the west bank of the Schuykill. This plan involves the initial expenditure of $40,000,000 by the Pennsylvania Railroad and $12,000,000 by the city.

In this connection the Philadelphia *North American* has revived the story about plans for electrification of the principal divisions of the Pennsylvania Railroad. It says that this work will be started as soon as business conditions develop to a point where the financing of the giant project can be properly handled. It is probable that with the beginning of the work on the proposed new railroad terminal on the west bank of the Schuylkill River the railroad will institute the necessary preparations for the electrification of its lines between New York and Washington and across the Allegheny Mountains. The first step on the New York and Maryland divisions will be the use of electricity between this city and Wilmington, to be followed rapidly by transformation of the line between New York and Bristol.

Rules Governing Bus Operation Tightened

The Public Service Commission of New York has issued an order providing for certain safety equipment on buses after Jan. 1, 1925. The order reads as follows:

> The commission being of the opinion that public safety requires that gas tanks on buses operated on stage routes, bus lines and motor vehicle lines shall be located outside the body of said buses, and that an emergency exit is necessary on certain types of buses, it is
>
> Ordered that no person or corporation owning or operating a stage route, bus line or motor vehicle line under a certificate from this commission, granted pursuant to the provisions of the transportation corporation law shall, on or after Jan. 1, 1925, operate motor buses, unless said buses shall be equipped in accordance with the following requirements:
>
> 1. The gasoline tank shall be located entirely outside the body of the bus with an inlet for filling which shall permit filling from the outside exclusively.
>
> 2. In those buses having longitudinal seats or a longitudinal aisle between seats, in which there is a common exit and entrance, there shall be provided an emergency exit door located at the opposite end of the bus body from the regularly used entrance and exit, which emergency door shall be securely fastened in a manner which will prevent it being opened except when opened for emergency purposes.

The Public Service Commission has also prepared a set of rules applicable to operators of buses throughout the State of New York. The commission in 1922 required that all persons or corporations operating bus lines should adopt regulations for the guidance of employees, but the new rules of the commission provide for uniformity throughout the state.

Rules have been promulgated by the commission covering every phase of the employees' duty, divided under four general heads—general, personal appearance and conduct, garage rules and operation. Disregard of orders, violation of rules or neglect of duty will always be considered a sufficient cause for dismissal or discipline.

Emphasis is placed on the rule that all buses must be brought to a dead stop before crossing a railroad.

Buses must be operated under a schedule and under no conditions pass schedule points ahead of time; in case of delay operators may not make up lost time by reckless driving.

It is provided that operators before leaving the garage or when relieving another must inspect the motor bus to determine the amount of gasoline in the tank, amount of oil in the engine case, amount of water in the radiator, condition of fare box and tell-tale, condition of service brake, condition of emergency brake, condition of lights, cleanliness of interior of bus, and presence of a fire extinguisher. A record of such inspections must be kept on a daily inspection card provided for that purpose. All defects observed must be immediately reported.

Another rule provides that the maximum standing passenger load must not exceed 35 per cent of the seating capacity. Running lights must always be displayed at least 15 minutes before sunset and at such other times as existing conditions may require. In conclusion the order says:

> The safety of the passengers must at all times be the first consideration. Employees must exercise constant care to prevent injury to persons and property and in all cases of doubt must take the safe course.

In case of accident injured persons must not be left until arrangements have been made for proper care, and verbal and written reports of every accident must be made by the operator.

Copies of these rules will be mailed to all bus lines as soon as printed.

Subway Draft Under Way in Philadelphia

City Solicitor Gaffney of Philadelphia announced on Dec. 1 that the draft of an agreement between the city and the Philadelphia Rapid Transit Company for the building of the Broad Street subway would be submitted to the Mayor's Transit Commission before the Christmas holidays. It was made clear that under the terms of the loan bill through which funds for both projects were made available, $10,000,000 is definitely set aside for the Chestnut Street subway, while $67,000,000 is just as specifically allocated to the Broad Street line.

In the proposition submitted to the city several weeks ago by railway officials the company undertook to pay the interest and sinking-fund charges on a $50,000,000 50-year loan for the construction of the Chestnut Street subway. If work were begun at once, it was pointed out, the tube would be completed and ready for operation sooner, perhaps, than the Broad Street subway, which is scheduled to open late in 1928.

The proposition was placed in the hands of the Transit Commission by the Mayor and in turn the City Solicitor, the Transit Director, and Mr. Swaab were delegated to consider the drafting of an agreement which the city might present to the company.

Engineers Expected to Report Soon in Los Angeles

The comprehensive report of Major R. F. Kelker, Jr., outlining a complete rapid transit system for metropolitan Los Angeles, is scheduled to be filed with the Board of Public Utilities about Jan. 1. It is also expected that about the same time the board and the State Railroad Commission will receive the report of Richard Sachse and Chief Engineer J. O. Marsh, covering the proposed merger of the electric lines. A statement made by one of the commissioners said:

> Major Kelker's report will embody a practical working plan under which there will be no need of waiting for the city to vote a $100,000,000 bond issue in order to carry out the program. A rapid transit system will be recommended which can be established in units, and a financial program will be submitted so the city can begin at once on the system as soon as the plans have been approved by the proper authorities.

The report of the special engineering committee will recommend the formation of a holding company to operate the two lines until municipal ownership is an accomplished fact. If this is not found practical at the earliest possible moment, both Engineer Sachse and his associates are said to favor the purchase of the Pacific Electric metropolitan lines by the Los Angeles Railway.

Sixty-three Buses Wanted by Kansas City Receivers

The receivers of the Kansas City Railways, Kansas City, Mo., favor the purchase of 40 single-deck, 18 double-deck and 5 de luxe buses for use in service supplementary to the railway lines. Action to this effect was recommended in a report filed on Nov. 29 with Judge Kimbrough Stone. Judge Stone is asked to permit the purchase and service providing the railway obtains protection against bus competition from the city administration.

The report to Judge Stone is signed by Francis M. Wilson and Fred W. Fleming, the receivers. Its presentation follows a series of public hearings. Ten routes are recommended as follows:

> Four main lines in Kansas City, Mo.
>
> One parlor car line in Kansas City, Mo.
>
> Three cross-town, or feeder, lines in Kansas City, Mo.
>
> Two cross-town, or feeder lines in Kansas City, Kans.

A 10-cent fare would be charged on all lines except the parlor car line, on which a 25-cent fare would be required.

Transfers from cross-town lines to street cars would be permitted. Transfers from street cars to cross-town lines would be permitted with the payment of an additional 3-cent fare. No transfers to or from main line buses would be permitted.

Judge Stone has instructed the receivers to negotiate at once with the city to secure franchises that would protect its proposed investment in buses. When these reach a point where the court considers such an order justified it is expected that the receivers will be instructed to buy buses and begin service.

Will Suspend Auto Parking Agitation.—The subject of the degree at which automobiles shall be parked in the business district of Oklahoma City, Okla., is to be allowed to rest indefinitely, according to announcement of the Retailers' Association after a conference with John W. Shartel, president of the Oklahoma Railway. The merchants prefer 45-deg. parking as it permits more automobiles to park in the business district. The company prefers parallel parking as it reduces automobile monopoly of the company's rails to a minimum. The rule at present in effect is for 20-deg. parking, which Mr. Shartel says is a very substantial benefit to the company and the public using its cars, traffic having been speeded up materially and accidents substantially reduced in number since this rule became effective.

Jitney Lines Attacked.—Citation has been issued by the Alabama Public Service Commission, naming as respondents 32 individuals in Huntsville, and four bus and taxi lines in Gadsden, Attalla and Alabama City, requiring them to show cause why they should not be required to discontinue operation of jitney service for alleged failure to comply with the laws of the state. Under the Alabama law, when a jitney or motor vehicle is operated in competition with a railway, application to operate such jitney must be made to the Alabama Public Service Commission for a certificate of convenience and necessity.

Nine-Cent Fare in Effect.—The Des Moines City Railway, Des Moines, Iowa, instituted a 9-cent cash fare with a ticket rate of 8.5 cents Nov. 30. The rate for children, school children and owl car service is unchanged. F. C. Chambers, general manager of the company, reported that the stabilizing fund of the company, which was to be maintained at $150,000, had not only fallen below the $100,000 mark, which automatically brought a fare readjustment, but that it had been depleted, and that to meet operating expenses, fixed charges and taxes a loan of $25,459 had been incurred.

Acquires Bus Lines.—The Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, has acquired the bus lines operating in the city of Newark for $40,000 and will continue their operation with new equipment and universal transfer privileges on a 6-cent fare. The City Council recently passed an ordinance granting a 25-year franchise to the company. It was vetoed by the Mayor and passed over his veto on Nov. 17.

Bus Operation for Lockport. — The International Railway and its subsidiary, the International Bus Corporation of Buffalo, N. Y., have informed the City Council of Lockport that they will apply for a franchise to operate buses in Lockport as part of a new interurban bus line service from Buffalo, Lockport and Olcott Beach. A committee has been appointed by the Lockport Mayor and Board of Commerce to confer with President Tulley of the railway on the proposed bus line.

Granted Fare Increase. — Fare charged bv the Chickasha Street Railway, Chickasha, Okla., was increased from 7 cents to 8 cent effective Dec. 1 in accordance with permission granted by the State Corporation Commission following a hearing Nov. 26. The application for the increase was not opposed, the company's request having been indorsed by the Chamber of Commerce and the City Council. The Chickasha Gas & Electric Company, co-operating to keep the electric railway operating, has granted a substantial reduction in the price of power to operate the line.

Seeks Higher Fare.—The Manchester Street Railway, Manchester, N. H., announced on Nov. 22 that it would seek permission to increase cash fares from 8 to 10 cents. If granted, the increase will become effective Jan. 1. General Manager J. Brodie Smith claims that during the last six months the company has operated at an average loss of $10,710 a month. Ten months of this year, ending Oct. 31, show a loss of 1,093,646 passengers compared to the same period for 1923.

Will Accept Bus Lines.—The proposal of the Quincy Street Railway. Quincy. Ill., to substitute bus lines on State and South Eighth Streets for the car tracks will be accepted by the municipal authorities as a solution of the repaving problem which has been in contention between the traction line and the city. The railway has 3 miles of track on South Eighth and State Streets and to tear up the present lines, relay and repave would cost $120 000. The company, however, has agreed to pave between its tracks on lines on Chestnut Street from Eighteenth Street to Twenty-eighth Street. Ralph F. Carley, western division manager for the Illinois Light & Power Company, represented the public utilities in the conferences.

Ordinance Against One-Man Cars Unlawful.—Efforts on the part of the City Council of Buffalo to prohibit the operation of one-man cars on local lines of the International Railway are opposed by the city law department, which has handed down a decision saying such an ordinance would be unlawful. It was proposed to provide a penalty for violation of the proposed ordinance of fines of $100 to $250 for each offense. A ruling by the Public Service Commission on the operation of one-man cars in Buffalo is expected within the next week.

Alton Company Seeks Franchise.—The Alton, Granite City & St. Louis Traction Company, which charges a city fare of 10 cents in Alton, Ill., has proposed to the Alton City Council a reduction in fare in return for a 20-year franchise to operate on Broadway, Alton. The Broadway line has been operating without a franchise for some time. The Council has passed several new franchise bills which the company has declined to accept because of the special taxation provisions of the measures. The franchise proposal was made in the name of the receiver of the railway.

New Company to Operate Buses.—The Spartanburg Bus Company, a subsidiary of the South Carolina Gas & Electric Company, Spartanburg, S. C., has been granted a charter. Officers of the company are, R. L. Peterman, general manager of the Barstow interests in South Carolina; vice-president, J. H. Axtell, assistant general manager of the South Carolina Gas & Electric Company, and secretary and treasurer, A. S. Jolly, treasurer of the South Carolina Gas & Electric Company. The company is to be financed by the W. S. Barstow Management Association.

Will Operate One Man Cars.—Directors of the Fitchburg & Leominster Street Railway have decided to put one-man cars into operation on the company's line between Fitchburg and Ayer, Mass. President Wesley W. Sargent in disclosing the plan said the change was made to economize during the winter when traffic was light. The change will mean a considerable cut in expenses. This is the fifth line of the company to change two-man to one-man type of car.

Fight for Lower Rates.—The beach cities served by the Pacific Electric Railway have started action to bring about the improvement of interurban railway service from Los Angeles to Redondo, Venice, Ocean Park, Santa Monica and Alhambra. The cities at the same time demand a tariff reduction of approximately 40 per cent. A committee of fifteen has been appointed composed of representatives from all the cities affected. The petition, it is expected, will be filed with the State Railroad Commission by the end of this month.

Foreign News

Mexican Railway Being Electrified

Electrification of the branch line of the Mexican Railway between Esperanza, Puebla and Orizaba, Vera Cruz, a distance of 29 miles, is now in progress. The contract was secured by an American company, but the actual construction work is being done by the Mexican Railway under the supervision of American electrical engineers. The work is up-grade from 4.7 to 5.25 per cent.

The overhead construction will cost approximately $250,000; the substation, $250,000, and 10 electric locomotives, $1,250,000. The substation will be equipped to convert a 42,000-volt, 60-cycle, three-phase, high-tension alternating current into a 3,000-volt direct current. Power will be furnished by the Puebla Electric & Power Company, Tuxpan.

New Electric Railway for Guatemala.—A contract for construction of an electric railway from Santa Maria to Quezaltenango, Guatemala, and a power plant at Santa Maria has been signed by the Secretary of Finance and Public Credit of Guatemala. The work will be done by the Allgemeine Elektricitäts Gesellschaft of Berlin. Bonds to the value of $3,000,000 will be issued by the government to finance the work.

Croydon Tramways to Be Reorganized.—Croydon Town Council, England, is planning to reorganize the municipal tramway system, in an effort to meet bus competition. Being only a few miles from London, the Croydon tramways are subject to severe competition of buses owned by private companies. Bids have been asked for 30 additional street cars.

Speed of London Tramcars.—The average speed of the London County Council tramways is 9½ m.p.h., including stops, according to a report made at a recent meeting of the Council. This is said to be the highest average speed on any street lines in Great Britain, comparing with 7.57 m.p.h. in Glasgow, 8.5 in Birmingham, 7.87 in Manchester and 8 in Liverpool.

London Officer Resigns.—Ivor Fraser, publicity manager of London underground electric railway companies, has resigned that office in order to become manager of the *Morning Post*, London. A. L. Barber, commercial manager to the companies, will for the time carry on also the duties of publicity manager.

Equipment Contract Let for Australian Electrification.—A contract has been secured by the Metropolitan-Vickers Electrical Company, Manchester, England, to furnish electrical equipment for 150 motor coaches and 150 trail cars to be used on the Sydney, Australia, suburban railways which are being electrified. The price is about £500 000. The equipment for each motor coach includes two 350-hp., 1,500-volt motors with electro-pneumatic control. The overhead contact system will be employed.

Financial and Corporate

$3,986,059 Net in Brooklyn

First Annual Statement of Successor to Brooklyn Rapid Transit Reflects Great Increase in Traffic

A net income of $3,986,059 is shown in the first annual report of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., for the year ended June 30, 1924. This is after the deduction of interest, rentals and accruals to minority interest. After allowing for preferred stock dividends paid during the year the company earned $3.23 a share on the 769,911 shares of no par common stock. The consolidated statement shows that there were paid for the fiscal year ending June 30, 1924, two quarterly dividends on the outstanding preferred stock of the Brooklyn-Manhattan Transit Corporation, aggregating $748,404. No other dividends were paid on the B.-M. T. stock nor any dividends declared by any of the operating companies during the fiscal year. The figures in the consolidated statement include the result of operation of the Brooklyn Heights Railroad, still in receivership.

The report gives a condensed summary of the results of operation under the contract with the city for the year ending June 30, 1924, and also for the eleven-year period from the commencement of the contract, namely, Aug. 4, 1913, to June 30, 1924. Referring to these figures the report states that they indicate the extent to which, both for the year just closed and the period from the commencement of the contract, the operations of the rapid transit lines under the contract of the city on a 5-cent fare have failed to earn the stipulated return of interest and sinking funds of the company's and the city's contribution to the construction and equipment of the new line.

The contract with the city provides that the revenues derived by the company from the operation of the city-built and the company-owned rapid transit lines are to be pooled and from such pooled earnings certain deductions are to be made in the order specified, the balance being divided between the city and the company in equal parts.

The contract provides that the company is to receive out of the pooled earnings the stipulated interest and sinking fund on its investment before the deductions are made in favor of the city. The deductions stipulated in the contract are, in condensed form, and in the order of priority, as follows:

(1) Operating deductions, including rentals, taxes, operating expenses, maintenance and depreciation;
(2) The company's first preferential of $3,500,000, representing the average annual income for 1911 and 1912 from the operation of the company-owned rapid transit lines contributed to the pooled system, out of which the company must pay interest on its capital investment in such rapid transit lines;
(3) The company's second preferential of interest and sinking fund on its contribution to the cost of construction and equipment of the new lines and on cost of reconstructing and adding to existing lines;
(4) The city's preferential of interest and sinking fund on its contribution to the cost of constructing the new lines.

Each of these deductions is to be made in the order given and deficits in any period are to be cumulative and paid out of subsequent earnings before any deductions are made on succeeding items.

The relative volume of traffic handled on the rapid transit lines and street surface lines of the company is shown by the number of passengers carried for the year ended June 30, 1924, namely, on the rapid transit lines 539,069,076 and on the street surface lines 266,421,409. The great increase during the past seven years in traffic handled was shown in the report. In 1924 805,490,480 passengers were carried on both the surface and rapid transit lines compared with 520,969,604 in 1918. On the matter of traffic the report states that the problem is that of providing adequate facilities to handle the tremendous increase which is bound to result in the future under the limitations and restrictions imposed under the contract with the city.

In submitting the first annual statement of the company to the stockholders G. M. Dahl, chairman of the board of directors, gives the historical facts in connection with the organization of the property and the contract of the rapid transit lines with the city. He said that the city of New York had $150,000,000 invested in the subway and elevated lines leased to the New York Rapid Transit Corporation, which was controlled through stock ownership by the B.-M. T. He said that the prosperity or adversity of the subway and elevated lines was determined by the earnings of the New York Rapid Transit Corporation and not by the earnings of the Brooklyn-Manhattan Transit Corporation. The latter property has a substantial income from bonds and other indebtedness of the surface line companies owned by the holding company and those earnings contribute to the income of the B.-M. T. During the year ended June 30, 1924, the B.-M. T. owned 188,138 shares of stock of the New York Rapid Transit Corporation. During that same period, the revenues of the New York Rapid Transit Corporation failed by $5,148,948 to meet the annual interest and sinking fund of the company's and the city's investment.

STATEMENT OF EARNINGS AND EXPENSES FOR YEAR ENDED JUNE 30, 1924, BROOKLYN-MANHATTAN TRANSIT SYSTEM AND AFFILIATED COMPANIES

Revenue from transportation:	
Passenger revenue	$38,376,581
Freight revenue	650,172
Chartered car revenue	873
Miscellaneous transportation revenue	516
Total revenue from transportation	$39,028,144
Other street railway operating revenues:	
Advertising	$534,389
Other car and station privileges	297,475
Rent of buildings and other property	147,573
Rent of equipment	170
Rent of tracks and terminals	22,283
Miscellaneous receipts	42,289
Total other street railway operating revenues	$1,044,181
Total street railway operating expenses	$40,072,326
Operating expenses:	
Maintenance of way and structure	$3,742,677
Maintenance of equipment	5,671,801
Operation of power plant	3,428,726
Operation of cars—trainmen's wages	6,514,423
Operation of cars—other expenses	3,908,713
Damages	1,277,771
Legal expenses in connection with damages	174,478
General law expenses	105,333
Other general expenses	1,156,119
Freight expenses	519,303
American railway traffic company—expenses	60
Total operating expenses	$26,499,408
Net revenue from operation	$13,572,917
Taxes accrued on operating properties	2,738,946
Operating income	$10,833,970
Non-operating revenue:	
Rents accrued from lease of road	$61,467
Miscellaneous rent revenues	297,376
Interest revenues	428,865
Dividend revenues	61
Profits from operations of others	12,318
Miscellaneous	151,366
Total non-operating revenues	$951,456
Non-operating revenue deductions:	
Rent expense	$1,000
Net non-operating income	$950,455
Gross income	$11,784,425
Income deductions:	
Interest deductions	$7,431,050
Rent for lease of other road and equipment	25,000
Other deductions	306,309
Total income deductions	$7,762,360
Balance	$4,022,065
Less accruing to minority interests	36,006
Net income	$3,986,059

OPERATING RESULTS OF RAPID TRANSIT LINES UNDER FIVE-CENT FARE CONTRACT WITH CITY

	Year Ended June 30, 1924	Period Aug. 4, 1913, to June 30, 1924
Revenue	$27,707,951	$182,485,439
Operating deductions and company's first preferential	23,463,470	170,443,916
Balance available for return on new money invested under contract	$4,244,480	$12,041,522
Company's second preferential representing interest and sinking fund on company's contribution to construction and equipment under contract	5,316,510	27,667,840
Deficit representing amount by which revenue failed to equal interest and sinking fund on company's contribution to construction and equipment under contract	$1,072,029	$15,626,318
City's preferential representing interest and sinking fund on city's contribution to construction under contract, unearned and unpaid	4,076,918	32,917,231
Deficit representing amount by which revenues failed to equal company's and city's interest and sinking fund on contributions to construction and equipment	$5,148,948	$48,543,550

Hearing on Receivership Claims Closed

The second and closing hearing on claims growing out of the receivership for the Pittsburgh Railways, lifted last February, was held recently by former

Judge Henry G. Wasson, special master for the court in railway receivership matters. C. S. Mitchell, auditor, and Thomas Fitzgerald, general manager, for the railway, with others were heard, and Mr. Wasson announced he will now prepare his final report to the United States District Court, whose ward the railway was while in the hands of receivers.

It developed at one of the previous hearings that the receivers have paid no money out of the $500,000 left in their hands last April and that payment of their counsel and others ceased on Feb. 1, at which time the company took over the property. The receivers will be discharged officially when Mr. Wasson's report on the case is approved by the United States District Court.

$1,000,000 Detroit Equipment Trust Issue Includes Buses

Eight heavy interurban passenger cars with motors, 6 interurban passenger chair cars with motors, 15 double-truck, 52-passenger one-man cars with motors, 50 box cars each of 30 tons capacity, 25 29-passenger, single-deck, six-cylinder motor coaches, 10 66-passenger, semi-closed, double-deck, six-cylinder motor coaches and 40 29-passenger, single-deck, four-cylinder motor coaches have been pledged to the Union Trust Company, Cleveland, by the Detroit United Railway as security for an issue of $1,000,000 of general equipment trust 6 per cent certificates, series A. The securities are being offered to the public by Watling, Lerchen & Company, Detroit, and the Union Trust Company, Cleveland, at prices to yield from 5 per cent to 6 per cent, depending upon the maturity. The equipment pledged as security for the loan cost in excess of 133 per cent of the principal amount of the issue.

The equipment certificates are dated Nov. 1, 1924, and are due in equal semi-annual payments in annual amounts of $150,000 for the first five years and $50,000 for the remaining five years. Payment of principal and interest is unconditionally guaranteed by the Detroit United Railway by indorsement on each certificate. The equipment will be leased to the Detroit United Railway at rentals sufficient to provide for the semi-annual installments of both interest and the amount due to amortize the purchase cost.

Service Resumed in Kewanee

After a suspension of more than a year railway service was resumed in Kewanee, Ill., on Nov. 29 by the Kewanee Public Service Company. Cars in Kewanee and on the interurban line between Kewanee and Galva ceased to operate because of a combination of circumstances, prominent among which were jitney competition and the increased use of the private automobile. The property was then under the management of the Galesburg & Kewanee Electric Railway.

The intention was to scrap the line, but in June of this year the citizens of Kewanee, a town of 17,000 inhabitants, voted to accept suggestions made by B. F. Lyons, the new owner, for rehabilitating the property. All Mr. Lyons wanted was assurance that in the future the company would be dealt with fairly by the public.

The action of the voters granted the Kewanee Public Service Company a franchise to operate the electric and gas utilities in Kewanee for a period of twenty-five years. The railway franchise, granted at the same time, extended that grant for a period of twenty years, the longest term obtainable under the Illinois law. As a result of the negotiations conducted at that time the Kewanee Public Service Company was organized to own and operate the electric light and power, gas and street railway business in Kewanee, the gas business in Galva, and do electric light and power business in Sheffield and Neponset. The company, through its subsidiary, the Kewanee & Galva Railway, will also operate a short interurban line connecting Kewanee and Galva. The whole undertaking was financed largely through the sale last July of $1,200,000 of first mortgage 6 per cent gold bonds, Series A of the Kewanee Public Service Company, Kewanee, Ill. The proceeds of this issue was used by the company to take over the properties of the Consolidated Light & Power Company, the municipal plant built by the city of Kewanee and to acquire the street railway and interurban properties.

Status of Denver Viaduct Claims Fixed

The title "$200,000 Verdict Against Denver Tramway," with which an item about the Denver Tramway in the ELECTRIC RAILWAY JOURNAL for Oct. 25 was introduced, was somewhat misleading. The facts are that the city of Denver applied to the lower court for an order to have the monthly payments under the 1906 franchise declared to be in a preferred class. This plea was denied. The city then appealed to the Circuit Court of Appeals. That court held that the payments accruing subsequent to the receivership were in the nature of operating expenses and therefore entitled to preference, while those accruing prior to the appointment of the receiver were entitled to preference only over ordinary creditors but junior to lien holders which had attached. The only question involved in the proceedings was whether these payments were in a preferred class. It was never the contention of the railway that it did not owe the money.

The Sixteenth Street viaduct and the extensions thereto were originally constructed in 1889 and 1910 respectively by predecessor companies of the Denver Tramway at a total cost of $256,231 and deeded to the city under an agreement that the city was perpetually to maintain it. The steam railroads and other interests subsidized the construction of the old viaduct to the extent of $79,897.

It was decided by the city in 1921 to rebuild the viaduct, and in order to insure that the work would be done expeditiously and at the least cost to the city, it was decided to use the facilities of the tramway. An agreement was made with the city to pay on the basis of actual cost for such work as it ordered done by the tramway. The actual cost of the work performed for the city by the company was $67,677 and bills were rendered accordingly.

In addition to the work done for the city, the company expended for its own account $100,033 on track, overhead, paving, etc., and also suffered an increase of $76,444 in operating expenses by reason of the rerouting of service while the viaduct was under construction. No part of these two amounts was included in the bill against the city.

Mortgage Bonds Offered. — Dillon, Read & Company and Tucker, Anthony & Company, New York, are offering at 95 and interest to yield about 5.35 per cent $1,000,000 in first refunding mortgage 5 per cent sinking fund gold bonds of the Manchester Traction, Light & Power Company, Manchester, N. H. The bonds are dated Aug. 1, 1917, and are due Aug. 1, 1952. The company operates railways in Manchester and vicinity.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week $2,000 of Twenty-eight & Twenty-ninth Streets Crosstown Railroad, New York, first mortgage 5 per cent gold bonds due October, 1996; October, 1908, and subsequent coupons attached, $50 lot. Last week at the same offices there were sold 20 shares of West Virginia Traction & Electric Company 7 per cent cumulative preferred, $5 for the lot, and certificates of deposit for 116 shares of Kansas City Railways preferred; certificates for 26 shares Kansas City Railways common, $36 lot; also $12,650 Berwick & Nescopeck Street Railway first mortgage 5 per cent bonds, due 1944, $550 lot.

New Directors for Illinois Properties.—George F. Otis, president of the Central Trust Company of Illinois, Chicago, has been elected a director of the Illinois Power & Light Corporation, and George T. Buckingham, of the law firm of DeFrees, Buckingham & Eaton, Chicago, has been elected a director of the North American Light & Power Company, both of which are included in the group of properties of which the Illinois Traction System is a part.

Stock of Jamaica Company Increased.—Shareholders of the Jamaica Public Service Company, Ltd., Kingston, Jamaica, B. W. I., on Nov. 28 approved a resolution increasing the authorized capital of the company from $1,500,000 to $2,000,000, the increase to take the form of $250,000 in 7 per cent cumulative preference stock B of a par value of $5 per share and $250,000 in shares of ordinary stock of a par value of $50 each. Included in the property of the company are 26 miles of electric railway.

Restoration of Service on Proper Guarantees.—The Worcester Consolidated Street Railway has not entirely abandoned the idea of restoring service from Worcester, Mass., and Leicester and Spencer. Clark V. Wood, president, says that service might be restored if there was any indication of a sufficient demand or any assurances of support from town officials. The Spencer line at one time was one of the principal suburban lines of the company. It was discontinued several months ago when bus competition made it impossible to operate the route to advantage. At that time townspeople expressed preference for buses.

Discontinuance Expected.—The Medway & Dedham Street Railway, which runs through the towns of Medway, Millis, Westwood and Dedham, Mass., planned to suspend operations Dec. 1. The action was decided upon when it became apparent that the accumulating deficits could not be overcome. Last year each town which the road served appropriated $1,000 for assistance. The deficit kept growing, however, and the directors decided not to burden the towns any longer. The line has been in operation for 25 years. It originally ran to Franklin. Failure to show profit resulted in the junking of the Franklin line several years ago. Present plans call for early disposition of the entire property, including the carhouse and power station at Westwood. The road is 18 miles long. It was leased by the Milford & Uxbridge Street Railway for several years. That company gave up control three years ago.

Mortgage Bonds Offered. — Harris, Forbes & Company and Spencer Trask & Company, New York, are offering at 97½ and interest yielding more than 5.15 per cent $1,100,000 of first mortgage gold bonds of the Wisconsin Gas & Electric Company, Kenosha, Wis. The bonds, known as 5 per cent series A, are dated June 1, 1912, and are due June 1, 1952.

Deficit of $628,480.—The total revenue of the Interborough Rapid Transit Company, New York, N. Y., for the four-month period ended Oct. 31, 1924, was $18,422,630. This represented an increase of $465,524 over the similar period a year ago. The operating expenses, taxes and rentals paid the city for the old subway were $12,426,868, a decrease of $426,957 over the similar four months in 1923. The income available for all purposes for the four-month period of 1924 ended Oct. 31 was $5,511,379, an increase of $1,473,183 over a similar period a year ago. The balance after actual maintenance in 1924 was a deficit of $628,480, an increase of $1,168,234 over the four-month period ended Oct. 31, 1923.

Hearings on Abandonment Concluded.—Hearings on the proposed abandonment of the lines of the Pacific Electric Railway in Riverside, Cal., before the State Railroad Commission closed recently. The company provided statements to show that it had been losing money steadily on the local lines. The matter has been referred to before in the ELECTRIC RAILWAY JOURNAL.

Final Judgment in Receivership Case.—The Court of Appeals in Albany has handed down a decision confirming a judgment obtained in June, 1923, by Newton M. Hudson, receiver for the Central Park, North & East River Railroad, against the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway. The amount of the judgment is $51,506. The decision will bring to an end a receivership dating back to 1912, and make it possible for the Central Park Company to pay to its creditors 100 cents on the dollar. The Central Park Company formerly was one of the leased lines operated by the Metropolitan Street Railway. In August, 1908, the United States District Court ordered it turned back to its stockholders, terminating the lease. George W. Linch, at that time receiver for the company, succeeded after a long legal battle, in reducing the claims against the company to $303,000. Finally there remained a claim on the part of the Central Park Company against the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway under an old trackage agreement. This claim was prosecuted and resulted finally in the decision mentioned previously. Mr. Linch died in 1915 and John Beaver was appointed to succeed him. He died in 1917 and Mr. Hudson succeeded him.

Expenses Lower.—The Grand Rapids Railway, Grand Rapids, Mich., recently reported to the city manager that operating expenses were reduced $2,047 in October from the October, 1923, figure. The report shows the company failed by $11,853 to return its allowable 7¾ per cent on its valuation. There was only 1.13 per cent decrease in the passenger revenue and the gross income of $49,632 showed an increase of $2,584 over October, 1923.

$1,250,000 of Preferred Stock Offered.—Offering is being made by Pynchon & Company, West & Company and Jackson & Curtis, New York, of a new issue of $1,250,000 Broad River Power Company 7 per cent cumulative preferred stock. The Broad River Power Company was organized in July, 1924, in South Carolina for the purpose of acquiring the entire outstanding common and preferred stock of the Columbia Railway, Gas & Electric Company, which owns or controls all the outstanding common stock of the Parr Shoals Power Company and Columbia Gas Light Company, Columbia, S. C. In pursuance of this plan the company will now take over substantially all of such preferred and common stock of the Columbia Railway, Gas & Electric Company and of the preferred stock of the Parr Shoals Power Company.

Legal Notes

MISSOURI. — *Passenger Remains Such Until He Has Alighted and Is Entitled to High Degree of Care While Alighting.*

In this case, the conductor on an interurban road was assisting passengers to alight at a stop and after helping a woman down part way, turned to help another, and the first one fell and was injured. The court held that a passenger remains such until he alights and that a very high degree of care is imposed by law on the railway during the time that the passenger is attempting to alight. Since the conductor undertook to aid this passenger, he should have used due care in doing so. (Lackey vs. Missouri & K. I. Railway, 264 Southwest. Rep., 807.)

OKLAHOMA.—*Powers of Public Service Commission—Regulation Does Not Mean Management or Operation by Commission.*

This case was an appeal from a ruling of the State Corporation Commission of Oklahoma that persons who dine in the railroad restaurants of the Santa Fé Railroad must wear coats was unreasonable. The ruling was directed to Fred Harvey, a corporation operating the dining rooms, but the railroad company joined in the appeal. The Oklahoma Supreme Court, in deciding against the commission, laid down certain principles in regard to commission regulation which are of interest. One was that the commission has authority to deal with the servants of a public utility only so far as may be necessary to carry into effect a lawful order against its master or principal, and against such principal should all such orders be entered. A second was that while much power is by law given to the Corporation Commission in the regulation of public utilities, yet the utility is not the property of the commission or the state, but belongs to the company and its stockholders, and the officers and directors by them selected must, under proper regulation, be permitted to manage the property in such proper way as to earn and pay, if they lawfully can, just dividends to the stockholders. Regulation must not be so far extended as to constitute management or operation. A third was that a public utility has the right to prescribe and enforce reasonable rules and regulations for the government and use of its property, and no such rule should be abrogated by the Corporation Commission, unless it is contrary to the law of the state, or is clearly proved to be unjustly and injuriously discriminatory, or is so arbitrary and unreasonable as to be decidedly unjust to its patrons. A rule that is made applicable equally to all and with which all can comply with equal ease is not discriminatory. (Harvey et al. vs. Corporation Commission of Oklahoma, 229 Pacific Rep., 428.)

TEXAS.—*Duty of Railway Company to Warn Employees of Independent Contractor of Danger. Damages Collectible from Both Railway and Employer.*

A causeway which was used by an electric railway and several steam roads was destroyed in part by a storm, and its reconstruction was let to a contractor who agreed to be responsible for injuries developing in the work. An employee of the contractor while operating a derrick was killed by an electric shock when the cable on the derrick came in contact with the overhead trolley wire. The decedent's representatives collected a certain amount from the insurance company protecting the contractor under the workmen's compensation act and an additional amount from the electric railway, it being held that the railway had not sufficiently warned the employee of the contractor of the danger from its uninsulated wires. (Galveston-Houston Elec. Ry. Co. et al. vs. Reinle, 264 Southwest. Rep., 783.)

Personal Items

Stone & Webster Managerial Changes Announced

Walter M. Bird, formerly manager of the Keokuk, Iowa, Electric Company, has been appointed manager of the Paducah, Ky., Electric Company and the Paducah Railway, succeeding Alfred S. Nichols, who is now manager of the Jamaica Public Service Company, Ltd., at Kingston, Jamaica. Philip M. Wentworth, formerly manager of the Fort Madison, Iowa, Electric Company and Dallas City, Ill., Light Company, succeeds Mr. Bird as manager of the Keokuk company, and J. Bertram Hayes, for the past eighteen months assistant to the manager of the Jamaica Public Service Company, Ltd., is the new manager of the Fort Madison and Dallas City companies. All these utilities are under the executive management of Stone & Webster, Inc., Boston, Mass.

A. L. C. Fell an Outstanding British Tramway Figure

The duties of A. L. C. Fell, who will retire as general manager of the London County Council Tramways, London, England, on Dec. 31, will be carried on after that time, temporarily at least, by J. K. Bruce, traffic manager of the system. As explained very briefly in the ELECTRIC RAILWAY JOURNAL for Nov. 8, Mr. Fell is retiring owing to ill health. For 21 years he has occupied the post that he is now about to relinquish.

In a full-page appreciation of Mr. Fell which the *Tramway and Railway World* published in its issue of Nov. 20, that paper explained that during Mr. Fell's tenure of office in London, traffic receipts and the number of passengers went up rapidly for a long time, but that there was a slacking down during the war, followed by great increases of working expenses. Finally came the great development of omnibus competition. This same English authority points out that it is a notable fact that the average speed of the lines under Mr. Fell has been gradually increased until it is now 9½ m.p.h., the highest in Great Britain.

Mr. Fell is by training an electrical engineer. He was responsible for the installation of electric traction on the tramways of Cork. In 1900 he became tramway electrical engineer to Sheffield Corporation and superintended the electrification of the lines there. Thereafter he became general manager, and in 1903 he resigned his position at Sheffield to become general manager of London County Council Tramways.

A. J. Klatte in New Post at Chicago

A. J. Klatte

A. J. Klatte has been appointed assistant electrical engineer of the Chicago Surface Lines. There has been no such title in the Surface Lines organization since 1915, at which time H. M. Wheeler died. The electrical engineer, J. Z. Murphy, has not been in good health for some time past and during his absence the department will be under the supervision of Mr. Klatte.

Mr. Klatte was born at Milwaukee, Wis., on July 1, 1879. He received his preliminary education at Beloit College and was graduated from the school of engineering at the University of Wisconsin in 1905. His first work was as level man and transit man on steam railroads. He has been connected with the Chicago street railway properties since 1908. His first work there was as conduit engineer with the Chicago Union Traction Company. Later he was engineer in charge of conduits and since the Surface Lines was formed in 1914 he has been engineer of electrical distribution.

E. G. Dunlap Vice-President at Youngstown

Elton G. Dunlap was elected vice-president of the Pennsylvania-Ohio Power & Light Company and the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, on Nov. 20 to succeed the late Randall Montgomery. The two companies operate the power and light properties in Youngstown and in New Castle, Pa.; Sharon, Pa., and elsewhere in eastern Ohio and northwestern Pennsylvania and the interurban and city railways and coach lines in the same territory. Mr. Dunlap was born near Youngstown on Oct. 20, 1881. He entered the employ of the railway and electric companies in 1901 in the accounting and treasury department and rose through various grades of accounting and treasury work till he was elected treasurer of the properties in 1910. He has held that office since and continues now as treasurer as well as vice-president.

E. G. Dunlap

Obituary

John Lyell Harper

John Lyell Harper, at one time operating and construction engineer for the Twin City Rapid Transit Company, Minneapolis, Minn., and recently vice-president and chief engineer of the Niagara Falls Power Company, Niagara Falls, died on Nov. 28. Mr. Harper was considered one of the leading hydro-electric engineers in the United States. In 1902 Mr. Harper became associated with the Niagara Falls Hydraulic Power & Manufacturing Company as assistant engineer to the late Wallace C. Johnson. Sixteen years later, when the various power interests at Niagara Falls were grouped into a new corporation, under the name of the Niagara Falls Power Company, Mr. Harper was made chief engineer. Upon completion of the war-time power plant, he was elected vice-president of the corporation. Mr. Harper was graduated from Cornell University. He was fifty-one years old.

J. M. McElroy, formerly general manager of the Manchester Corporation Tramways, Manchester, England, died on Nov. 16 in Lancashire. He retired from the managership in February, 1922, owing to ill health. Mr. McElroy had been in the Manchester municipal service in different capacities since 1880. In 1901 he was appointed manager of the tramway undertaking after it was acquired by the municipality. It was under his auspices that the Manchester system was developed. He visited the continent of Europe and the United States to study tramway matters and during the war was a consultant to the government on transportation questions. Mr. McElroy was an original member of the Municipal Tramways Association and in the position of secretary and later as president he contributed largely to the growth of that body. He was largely responsible for the formation of the National Joint Industrial Council for the tramway industry.

Dr. Charles A. Abbott, who for many years has been an examining physician and surgeon for the International Railway, Buffalo, N. Y., died Dec. 1 after an illness of less than two weeks. He was stricken after testifying in court in a negligence case for the railway company.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Order Placed for Experimental Buses in Detroit

The city of Detroit proposes to rent 25 buses from the Dodge Brothers Motor Company. Action to this end was recommended by the Street Railway Commission following a conference between the members of the commission and John W. Smith, Mayor of Detroit. Bids were asked for the rental of buses to the city for use in conjunction with the municipal railway. The City Council has informally approved the plan.

The commission also recommended the purchase of five buses from each of three firms: The Yellow Coach Manufacturing Company, Chicago; the Standard Motor Truck Company, Detroit, and the Gotsfredson Truck Company, Detroit. The idea is to make a comparative test of the various types of vehicles in actual service.

The commission's recommendation relative to the purchase of 15 double-deck buses, five from each of the two Detroit concerns and five from the Yellow Coach Manufacturing Company, was also approved by the Council in committee. Following a conference with Mayor Smith, it was announced that all were agreed that the city should encourage and support the motor bus industry in Detroit, but that orders should not be placed with local manufacturers on the basis of civic pride alone, particularly if the purchases involved equipment that carried with it the possibility of still further experimental work on the part of the manufacturers.

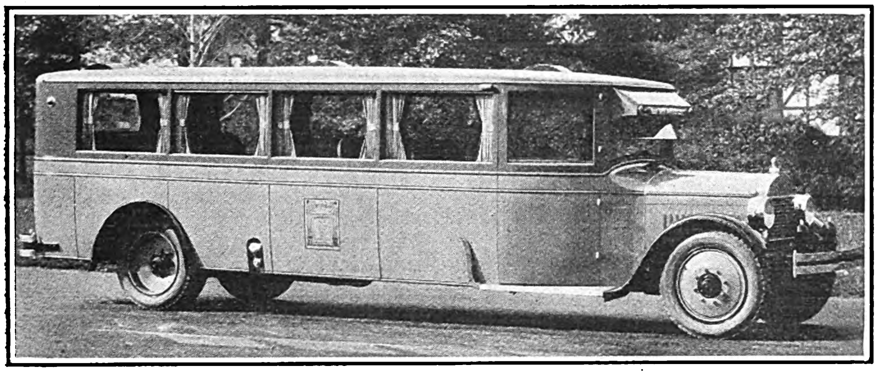
The buses which the commission proposes to rent will provide transportation facilities for stub-end lines in outlying districts during the winter months. Each bus will accommodate 21 passengers, whereas the buses which are to be purchased will carry approximately 60 passengers each.

According to the terms proposed the city will pay a rental of 29 cents per mile. This rental will be applied on the purchase price of the buses at the end of four months if it is decided to purchase them from Dodge Brothers.

Mack Parlor Car Buses on Rochester Run

The Third Avenue Bus Company, a subsidiary of the New York State Railways, Rochester, has recently placed in service two of the latest type of luxurious Mack parlor car buses. These buses are operating on a regular schedule between the downtown section of Rochester and the town of Browncroft. The fare charged is 25 cents.

The bodies were built by the Lang Body Company, Cleveland. They seat 22 passengers in comfortable individual wicker chairs upholstered in genuine leather. Space is provided over the rear wheel for housing passengers' baggage. Wide clear-vision windows, automatically operated by springs, are easily adjustable to any elevation desired.



Mack Bus Intended for De Luxe Suburban Service

The Mack bus chassis on which these bodies are mounted have a wheelbase of 230½ in. They are powered by four-cylinder bus engines of special design. having a 4¼-in. bore and 5-in. stroke. Each is equipped with two independent sets of brakes, one set operating on the rear wheels and the second set on the drive shaft just rearward of the transmission. Patented Mack rubber shock insulators on the spring ends support the unusually low frame.

Big Bus Order Divided

Decision has been made by the Public Service Railway, Newark, N. J., to divide its order for 100 new buses between the Yellow Coach Company and the White Motor Company. This order was mentioned in ELECTRIC RAILWAY JOURNAL, issue of Nov. 15, 1924. Of the new buses 50 will be type Z, 29-passenger Yellows, and 50 will be Whites, type 50-A with Bender bodies. It is expected that deliveries will begin within the next three weeks.

New Tramway System in Argentina

The municipal authorities of the city of Rosario, Argentine Republic, in May, 1924, sanctioned an ordinance calling for public bids for the construction of nearly 150 km. of a new system of electric street railway. This new installation will practically double the length of track now in service. The successful bidder will have 5 years within which to complete the contract, and is obligated to open for public service 25 km. of new lines each year.

In the descriptive matter sent out by the municipality it is specified that the gage of the track shall be 1 m. 435, that the trolley wire shall be of hard-drawn copper or phosphorus bronze at least 8.5 millimeter diameter and that the rails in all paved streets shall be of the type called Phoenix, weighing 45 kilos per lineal meter or of the Vignole type weighing 33 kilo per meter in unpaved streets.

Other things specified have to do with various phases of the technical and financial sides of the contract and the conditions under which they may be operated during the life of the concession.

The bids will be opened in Rosario on April 2, 1925. Requests for the usual data sheets and contract forms should be made to Senor Don Carlos Edwards, pro-secretario, Secretaria de la Intendencia Municipal, Rosario de Santa Fé, Argentina.

Mention was made of this project in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 22, page 900. Details covering the complete specifications may be inspected at the New York offices of this paper.

200 Gas-Electric Buses for Philadelphia

The Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, has placed orders for 200 gas-electric buses after a series of tests. All of the electrical equipment on the first bus and on the 200 now on order is supplied by the General Electric Company for the Yellow Coach Manufacturing Company, Chicago.

These are double-deck buses, seating 64, of the type usually equipped with mechanical drive. The bus on which the first electrical equipment was installed weighs 16,760 lb. completely equipped.

Power is supplied by a six-cylinder Herschell-Spillman engine with a 4-in. bore and 6-in. stroke. The clutch and change gear transmission which are ordinarily used are replaced by a generator, which is direct connected to the engine flywheel through an internal external gear coupling.

Two GE-1079 motors, rated 85 amp. at 125 volts and 1,650 r.p.m., mounted sire by side in the chassis, transmit the power to the rear axle through two propeller shafts, each geared to a rear wheel, eliminating the differential, and providing constant torque on both wheels. These motors are self-ventilated and have a relatively long frame of small diameter permit-

ELECTRIC RAILWAY MATERIAL PRICES—DEC. 2, 1924

Metals—New York

Copper, electrolytic, cents per lb.	14.25
Lead, cents per lb.	8.65
Nickel, cents per lb.	29.50
Zinc, cents per lb.	7.40
Tin, Straits, cents per lb.	55.00
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.275
Somerset mine run, Boston	2.075
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	1.475
Central, Ill., screenings, Chicago	1.30
Kansas screenings, Kansas City	2.35

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.875
Tie plates (flat type), cents per lb.	2.425
Angle bars cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	3.875
Steel bars, cents per lb.	2.10
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.85
Sheet iron (28 gage), cents per lb.	3.50
Sheet iron, galvanized (28 gage), cents per lb.	4.60
Galvanized barbed wire, cents per lb.	3.65
Galvanized wire, ordinary, cents per lb.	2.60

Waste—New York

Waste, wool, cents per lb.	16
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–19
Colored	10–15

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$1.08
White lead (100 lb. keg), cents per lb.	12.00
Turpentine (bbl. lots), per gal.	$0.81
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

* These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	16.375
Rubber-covered wire, No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, cents per lb.	17.75

Paving Materials

Paving stone, granite, 4x8x4, f.o.b.	
Chicago, dressed, per sq.yd.	....
Common, per sq.yd.	....
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	$2.67
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	2.00
Sand, cu.yd., N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.75
Light copper, cents per lb.	10.00
Heavy brass, cents per lb.	7.375
Zinc, old scrap, cents per lb.	4.125
Yellow brass, cents per lb. (heavy)	6.125
Lead, cents per lb. (heavy)	7.75
Steel car axles, Chicago, net ton	$20.25
Cast iron car wheels, Chicago, gross ton	19.75
Rails (short), Chicago, gross ton	19.25
Rails, (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	11.25

ting assembly under the body without sacrifice of road clearance.

After a series of exhaustive tests the bus using the electric drive was put into regular passenger service in August, 1924, and has been in constant operation since, averaging 150 miles daily.

Rolling Stock

Johnstown Traction Company, Johnstown, Pa., is considering the purchase of a number of light-weight, double-truck, one-man, two-man cars for city service.

Fresno Traction Company, Fresno, Cal., has received two of the new universal type cars; the remaining 10 are en route. They were built by the St. Louis Car Company and cost $13,000 each. The cars are 48 ft. long. Each has a seating capacity of 50 persons. They may be operated by one or two-man crews. They are the first Fresno cars to be equipped with four motors, each of 30 hp. The cars were ordered more than a year ago, but delay in construction was due, it was stated, to difficulty in obtaining the safety door mechanism with which the cars are equipped.

Key System Transit Company, Oakland, Cal., has placed orders for 12 new cars to be shipped within 60 days from the plant of the American Car Company, St. Louis, and will be assembled in the Oakland shops. They will be of steel construction, mahogany interior trim and monitor topped. The weight of each, including body, truck and equipment, will be about 68,000 lb. The cars are of the center-door type and each one will have a seating capacity of 68.

Power Houses, Shops and Buildings

Penn Public Service, Warren, Pa., operating an interurban line between Warren and Jamestown, N. Y., has work under way for a complete remodeling of its terminal at Warren. Under the terms of the new plan the company's general offices will hereafter occupy the entire second floor of the company's three-story building at Liberty Street and Pennsylvania Avenue West.

Detroit, Mich., Department of Street Railways, suffered the loss of $50,000 recently when its power plant "A" was crippled by fire. The damage was confined principally to machinery.

Trade Notes

Magnetic Signal Company, Los Angeles, Cal., announces that Ralph W. Payne has been appointed exclusive Southern representative for the company. His headquarters are in the Metropolitan Bank Building, 613 Fifteenth Street, N. W., Washington, D. C. He is in charge of sales and engineering for the Southern territory. Mr. Payne assumed his duties in Washington on Nov. 15.

Philadelphia Storage Battery Company, Philadelphia, Pa., together with the Roberts Battery Company, its New England distributor of starting, lighting and radio equipment, has moved its Boston office on Nov. 25 to occupy new quarters at No. 1 Brighton Avenue. Much-needed office space, parts and stock department and a good service station equipment will make it possible for the interests of all Philadelphia battery lines to be cared for much more efficiently than at any time in the past. George W. Holden is district representative.

A. C. Holden, formerly sales manager of the household appliance division of the General Railway Signal Company, Rochester, N. Y., has been appointed resident manager of the Pacific Coast territory, with headquarters at San Francisco, Cal. Mr. Holden's connection with the General Railway Signal Company began in 1910. Since then he has made a special study of installation and construction work and, in the capacity of field engineer, he had charge of the company's field office at St. Paul, and later was connected with the Chicago, Montreal, New York and Rochester offices. From June, 1916, to January, 1919, his entire attention was devoted to construction work in the eastern district, special attention being given to the signaling of the subway, tube and elevated construction of the New York Municipal Railway lines in New York and Brooklyn. Mr. Holden was born at Waterloo, Iowa. He was graduated from the electrical engineering department of Iowa State College. His first signal experience began in the summer of 1902, with the Hall Signal Company. During portions of 1904 and 1905 he was employed as laborer by the Taylor Signal Company, as paymaster by the Hall Signal Company and draftsman in the signal department of the Union Pacific.

Hyman-Michaels Company, Chicago, due to expansion in the railway equipment field, has engaged the services of F. W. Glauser, formerly associated with the Mid-Continent Equipment & Machinery Company, St. Louis, to assume the management of the equipment department for the Southern territory. Mr. Glauser has a wide and valued experience in railroad work. He will be located at St. Louis.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has published "Pendant and Bracket Novalux," bulletin No. 43525, which describes and illustrates in 24 pages the different types of Novalux lighting units of the bracket and pendant types.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued a new 40-page publication containing transportation hints. The subjects treated are: One-man operation, multiple-unit operation, articulated and permanently coupled cars, double-deck cars, the trolley bus, the internal combustion engine, schedule speeds, methods of fare collection, safety zones, multiple berthing, routing, the selective stop, queue loading, the traffic problem and the elimination of non-productive mileage. The purpose of the book is to summarize results that have been obtained on various railways throughout the United States, using equipment of various types, and to suggest ways of improving the operation by the use of special equipment and methods. It is well written and is in effect a textbook on the subject of improving city transportation methods.

New York, Saturday, December 13, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 24

Time to Tighten Up Toward Wage Increases

THE rising trend of wages in the electric railway field is causing uneasiness. There has been accumulating some doubt as to the fairness of the outcome of arbitrations, and the question is raised whether this method of settling wage disputes is falling down. Another question is whether fares, if further increased to meet higher labor costs, will produce the necessary increase in revenue. These are pertinent, vital questions.

Taking the long view of wage arbitrations, as seen in the data presented on page 992 covering the last five years, there does not seem to be justification for the fear that arbitration proceedings cannot be relied upon to produce on the average a fair decision. In this period practically as many cases have been decided for the companies as for the men. The disturbing thing perhaps is that nearly all arbitrations in the last two years have resulted in increased wages, despite the fact that the general trend of wages in all industry is not upward and that there has been no increase in the general cost of living. One or two recent arbitrations have notably disregarded the basic considerations and have no doubt given impetus to the questioning of the wisdom of submitting wages to arbitration.

However, the JOURNAL is inclined to feel that this five-year view of arbitration awards probably shows the matter up in about its true light, and that this need be discounted only to the extent that expertness on the part of the labor side in presenting its case may have come to have a bearing on the decisions of more recent years. This expertness results from an organized, experienced handling of the case on labor's part, as against the individual, largely inexperienced treatment on the part of the railway.

As to the question of fares, the present average for the street railways of the country is 7.17 cents. This compares with 6.95 cents a year ago, but with 7.24 cents in May, 1921, which was the high mark. In other words, the industry has already had an average fare 0.07 cent higher than that at present, which did bring increased revenue over previous rates. Hence, it is at least practical to say that fares could be increased some from the present level if wages necessitated. How much increase in fares would be productive of increase in revenue is problematical. For the individual companies whose fares are already up to about 10 cents, this question becomes extremely serious. If wages for these companies increase more, and the fare cannot be raised to advantage, then these railways have their backs to the wall, so to speak. They are without relief from fare adjustment and have only two courses open. They must be able to make other operating economies to offset the increased labor costs, or they must successfully withstand higher wage demands.

These situations at present are not numerous, but they do point to the necessity of a very determined resistance against further increases, especially where wages are already on such a level that average earnings are equal to or in excess of those in other industries.

Abandonments Are Not Always Justified

SOME replacements of non-paying trolley lines by bus lines have taken place and figures have been presented to show how economies have been effected and sometimes additional traffic developed by the new service. Such facts are established beyond dispute in many cases. But now and then one familiar with the history of the case may well wonder whether, had the situation been handled differently, the trolley line could not have been made to pay, and perhaps to earn a return even greater than that possible by the new service.

A case may be cited to show the situation as it sometimes exists. An interurban electric line some 30 miles long connected two cities, the smaller of which has about 100,000 inhabitants. The railway was equipped with cars suitable for city service, geared for a maximum speed of only about 30 m.p.h. The power supply was poor. The d.c. power plant was nearly 20 miles away from one end of the line with feeders far too small for economical operation. In fact, the voltage drop was so great that on days of heavy traffic, when extra cars were run to handle the peaks, the cars would scarcely crawl up the steeper hills. The writer has in mind one section of the line where he observed the motorman throw his controller handle all the way around—and the car stood still. Not until an inspector issued orders for one car at a time to start did the car move.

The railway location was alongside the highway, but was separated from it, and the opportunity existed for fairly high speed running. But with stops every few hundred feet, it was not surprising that the cars took nearly three hours to go from terminal to terminal, the schedule speed being barely 12 m.p.h. With all these handicaps the road did a good business in the old days, when there was no other means of travel save a steam road that operated indifferently.

Naturally, when the automobile came, traffic fell off until it was deemed wise to abandon through service, and even to tear up portions of the track. As there was a need for through service, a bus line was started, making a limited schedule of less than two hours from the center of one city to the center of the other. Patronage was attracted at once, and the line has been quite successful.

The disappointing part is that it would have been possible to overcome most of the defects of the old rail service. Purchased power with automatic substations properly located would have provided adequate power for a high-speed service without interruption and delay. Many local stops could have been eliminated and schedules as good as or better than those of the buses maintained. Light-weight, one-man interurban cars would have made possible ample service at much less cost than did the old cars. The new investment necessary would not have been excessive. The old investment in track and line, too, could have been preserved.

The case cited is one where inefficiency and indifference to the public's wants spelled the doom of the old line. It was not the failure of one kind of vehicle and the success of another; it was a failure of the management of the electric line. Such failures are too common, especially on the weaker properties. A bus line run the same way as the trolley line was run would have failed just as dismally.

Before deciding to abandon all service on non-paying rail lines, or to change the kind of system, it might be well to examine the defects of the present system. A correction of the faults in operation and the adoption of modern equipment and modern methods will perhaps save the property and make it profitable.

New Car Proposed to Increase Subway Capacity

MUCH publicity is being given in one of the New York picture newspapers to a method "for increasing the capacity of the subways 100 per cent," according to the announcements. The plan is, briefly, to substitute double-deck cars for the present single-deck cars. While it is easy to publish freehand sketches showing how such cars would look, it is quite another matter to build and operate them with the restrictions imposed by the present structures. The headroom in the older subways is only some 12 ft. 6 in., although it might be possible to drop the track 6 in.

It must be realized that the introduction of double-deck cars would not increase the carrying capacity anything like 100 per cent. In the first place, with the floor dropped as low as possible and clear of the rail, space would have to be provided at the ends for the trucks, wheels and motors. The control and braking equipment also take space, and become a real problem in a low-floor vehicle. As the present station platforms are approximately 3 ft. 6 in. above the rail level, the necessary stairways in the cars up to the upper deck and down to the lower deck would take considerable room. Making allowance for all these points, a double-deck car could scarcely carry more than 50 per cent passenger capacity in excess of the present cars. There is also an element of danger in the stairways.

A better type of double-deck car was proposed by John P. Fox, a New York transit expert, over 20 years ago and described in the Boston *Herald* for Oct. 16, 1903. This was a two-level car, with separate doors for each deck and without stairways other than for emergency. Entrance and exit were to be made by means of two-story station platforms. Such an arrangement would simplify the car design materially, and would double the door space, so that the double-deck cars would load and unload perhaps even more quickly than the ordinary single-deck cars. The headroom needed for such a car would be 14 to 15 ft., or greater than that available in the New York subways. The use of such special cars would be practicable now, were new and independent subways constructed for the purpose.

Even if there were sufficient clearance, there are several drawbacks to the use of such cars as are now proposed. If the station platforms were modified for double-deck cars, the existing single-deck cars could not stop at them. As there are several thousand of the latter type of cars in use, such a modification of the platforms would not be feasible. The routing is so complex, and so many different lines operate over the same tracks, that it is improbable that any important routes could be selected for this proposed type of car.

Another Way of Getting Subway Relief

ONE of the simplest methods of increasing the capacity of New York subways would be to use all tracks for express service. The principal rapid transit lines have four-track trunks through the heart of Manhattan, some of them continuing well out into the other boroughs before they divide into double-track branches. Express service is given on one pair of the tracks and local service on the other pair.

It has been demonstrated on practically all the lines that the local trains carry much smaller loads than the expresses. From the very nature of the service this must be so. The function of the locals is to pick up and distribute passengers who make one or both ends of the journey to local stations, but who combine it with a ride on an express. Even the plan which has been adopted in recent years of extending the local tracks into the suburbs has not served to fill the local cars, for all the riders who can, use the expresses until they are forced to transfer to the locals.

The local stations are patronized less than in proportion to the areas served by them. Where the walk is equal, the express station naturally is chosen. Patrons will sometimes walk past a local station to an express stop to avoid changing cars and the double wait.

Practically every rapid transit line in the city has directly above or below it a surface car line, many of which are not being used to capacity. By using such surface car lines as feeders and distributors for the rapid transit lines all or a large share of the local stations could be eliminated entirely so that the four-track subways could be converted into all-express lines. This would permit the present capacity to be nearly doubled, and without any additional expense whatever. In fact, there should be a saving on the rapid transit lines, as the schedule speed on the present local tracks would be increased materially, raising the car-miles to be obtained from a car-hour. Even some of the double-track elevateds and subways could be made express.

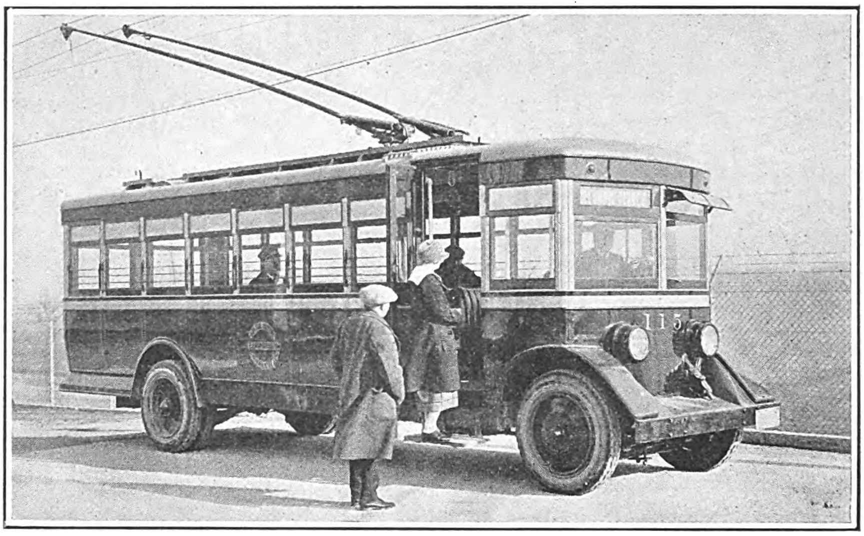
With the present state of chaos in which the surface lines have been thrown through receiverships and disintegration, the working out of such a plan would be beset by great difficulties. Then, too, traffic congestion is today at a point where drastic measures would have to be taken to speed up these surface cars. But with the rapid transit situation as desperate as it has become in New York City, a radical remedy must be resorted to if any kind of relief is to be obtained. Even though a comprehensive program of new construction is adopted, it will be years before the new lines can be made ready for service. Meanwhile anything that will aid in relieving the present intolerable conditions might well be given serious consideration, particularly when it involves no new construction or radical change in equipment or methods of operation.

Trackless Trolleys Give Improved Service to Cohoes, N. Y.

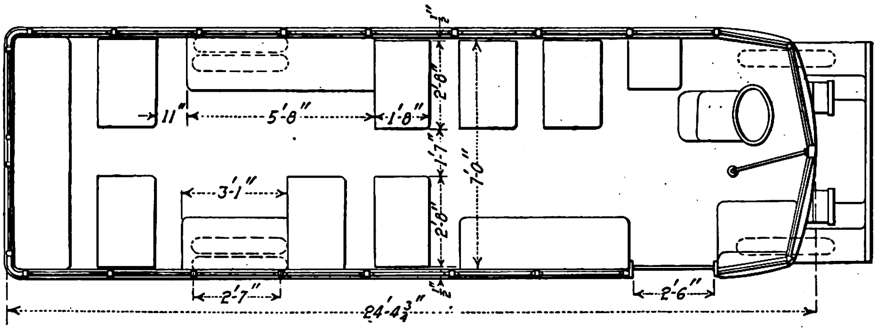
The New Route Passes Through the Main Business Section, Replacing a Railway Belt Line—Residents in a Large Area Now Can Reach the Central Section in 4 Minutes, as Against 15 Minutes Previously

OPERATION of trackless trolleys by the Capital District Transportation Company, a subsidiary of the United Traction Company of Albany, began in Cohoes, N. Y., on Nov. 1, as was announced in the Nov. 8 issue of the ELECTRIC RAILWAY JOURNAL. Four trolley buses are used in the initial service. The routes over which the trackless trolleys are operated and the electric car lines which they replaced are shown on on accompanying map of the district.

Electric car service was previously operated over a belt line which extended north as far as Manor Avenue, south along Columbia Street, west as far as Simmons Avenue and east along Main and North Mohawk Streets. The business section of Cohoes lies along Main and Remsen Streets and residents along the westerly part of the belt line had to follow a roundabout route if they took the electric cars downtown. In fact, residents along a large part of this route could walk across to the business section in less time than by taking the electric cars. The company was anxious to give improved service to this section and believed that this could best be taken care of through a change in route so as to operate west from the business center and give a quick service to the residents along the westerly part of the old belt line. This could be done more economically with the trackless trolley than by building new track.



Receiving Passengers at the Manor Avenue Terminus of the Cohoes Trackless Trolley Line



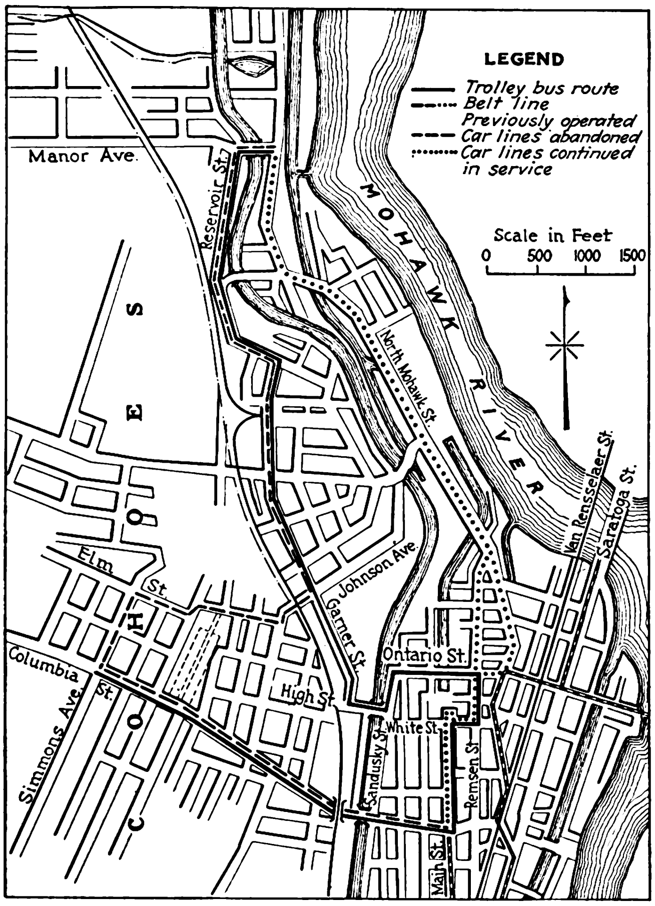
Plan by Which Cohoes Trackless Trolley Seats 31 Passengers

That the company was correct in its diagnosis of the routing is shown by the increased riding which has resulted. On Nov. 3, two days after the trackless trolleys started, they carried 804 passengers. Riding increased steadily and on Nov. 15 1,735 passengers were carried. Transportation figures of passengers carried by the belt line show that Nov. 14 a year ago, which was an average day, 940 passengers were carried. The riding on the new trackless trolley is now well above that of the old belt line, and the steady increase shows that additional vehicles soon will be required.

REASONS FOR DECIDING ON TRACKLESS TROLLEY

The use of trackless trolleys in place of electric cars has enabled the operating company to reduce its track and paving expenses. The city of Cohoes decided to reconstruct and repave streets on a considerable portion of the old belt line route. The revenue obtained from operation of railway service was insufficient for the company to assume this additional cost, but by the use of trackless trolleys this item of expense was eliminated, so that the company is in position to give greatly improved service. The fare charged is 7 cents, the same as on the cars of the United Traction Company. Free transfers are exchanged with connecting car lines.

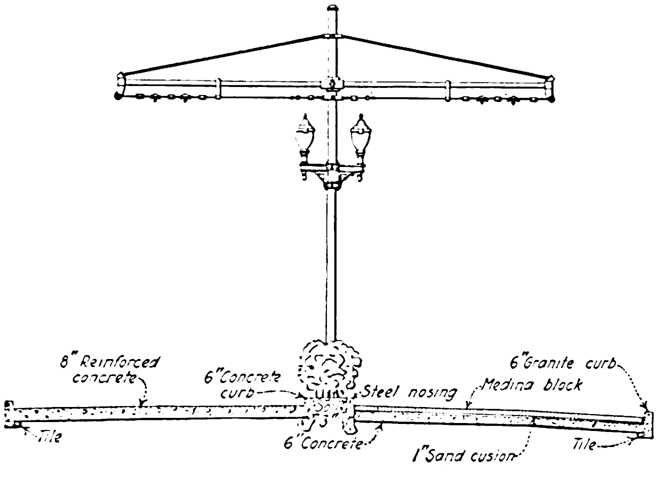
The length of the trackless trolley route from Simmons Avenue on the west to Manor Avenue on the north is 2½ miles. The running time in one direction is 18 minutes, with a 2-minute layover at each terminal. The original belt line mileage was 3.6 for northbound cars and 3.7 for southbound cars. The running time was 30 minutes. The trackless trolleys are thus making a schedule speed of 8.4 m.p.h., as against 7.3 m.p.h. for the belt line cars. More than 40 per cent of the trackless trolley route is over grades of from 5 to 8 per cent. This is another factor in favor of trackless trolley operation as compared with electric cars, since



Route of New Trackless Trolley Line and Belt Line on Which Service Has Been Discontinued

the 8 per cent grade is around a curve and trackless trolleys can negotiate the grade on a larger curve than would be possible with tracks. This is the first trackless trolley route through a business section that has been operated in the United States.

The car tracks along the westerly and southerly part of the old belt line route will be abandoned. Tracks on Columbia Street from Simmons Avenue to the railroad have already been removed and the street has been reconstructed and repaved. The tracks along Main, Remsen and North Mohawk Streets will be retained and electric service operated over these lines. The section along North Mohawk Street as far as Manor Avenue now has cars from Waterford, which previously operated around the downtown loop.



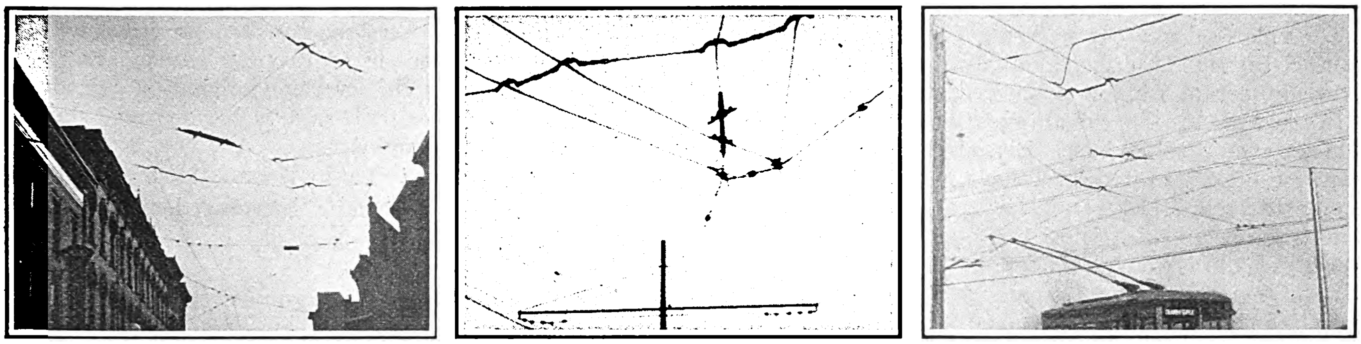
Center Pole Arrangement and Overhead Construction Used on Columbia Street

A considerable part of the route of the trackless trolleys is paved with granite block on a concrete base with cement grout, but brick, concrete, wood block and resurfaced granite block pavements are also found along the route.

The overhead construction for the trackless trolley is entirely independent of that for the railway. Two No. 00 copper trolley wires, spaced 24 in. apart, are suspended by ordinary ears and hangers to $\frac{5}{16}$-in. span wires. The section of the route along Main, White and Remsen Streets also has double-track electric car lines. Here the additional overhead lines for the trolley buses are run at the side of the street and no attempt has been made to use the trolley wire of the car lines. In all cases the negative wires are laid outside, and in order to decrease the drop in potential the two positive wires and two negative wires are tied together about every 1,000 ft. Approximately ½ mile of the entire route is new construction, the other part of the route being over what was previously the belt line track. The poles previously used for the railway are used for the overhead of the trackless trolleys except where the operation is through new territory and along Columbia Street from Simmons Avenue to the railroad, which has been entirely reconstructed and repaved. This part of Columbia Street is 40 ft. wide and the new construction has provided a boulevard arrangement with poles down the center in a reservation 3 ft. wide inclosed by concrete curbs. The city intends to plant flowers and a hedge in this section, so as to beautify the street. The poles also support lighting fixtures, resulting in a decrease in the total number of poles from 11 to 4 in a single 400-ft. block. The sides of the street are thus relieved of pole construction, and a very attractive arrangement has resulted, as is shown in an accompanying illustration. As land was not available for con-

DETAILS OF TRACKLESS TROLLEY BUSES OPERATED IN COHOES, N. Y.

Operating company	Capital District Transportation Company
Number of trackless trolleys operated	4
Chassis	Model J, Brockway Corporation with Clark axles
Wheelbase	197 in.
Tires	General pneumatic cords 36 x 6, dual rears
Front tread	5 ft. 6 in.
Rear tread	5 ft. 11 in.
Turning radius inside wheels	35 ft.
Body manufacturer	Wason Manufacturing Company
Length over all	26 ft. $1\frac{1}{8}$ in.
Heignt, pavement to top of roof	9 ft. $\frac{1}{2}$ in.
Height inside	6 ft. $6\frac{1}{16}$ in.
Floor height above pavement	2 ft. $4\frac{1}{2}$ in.
First step above pavement	15 in.
Second step height	13 in.
Width inside	7 ft.
Weight, total	12,500 lb.
Seating capacity	31
Seats	Hale-Kilburn 208 de luxe
Seating material	Spanish leather
Interior trim	Mahogany
Headlining	Haskelite
Sides	Plymetl
Roof	Canvas
Window sash	Wood lined with brass, arranged to be raised
Window guards	Stationary
Ventilators	Nichols-Lintern
Car trimmings	Brass
Signal system	Faraday
Curtains	None
Destination signs	Hunter, roller
Doors and steps	Folding, hand operated
Heaters (with thermostatic control)	Consolidated
Headlights	Ohio Brass
Lamps, interior	12 frosted, 36-watt
Lamp sockets	Lock type
Fare registers	Ohmer
Grab handles and rails	Porcelain
Hand straps	Sanitary
Gong	Consolidated, electric
Trolley equipment	Nuttall
Trolley catchers	Earll
Operator's curtain	Company's standard draw type
Motors	2 GE-264
Control	GE C-154-B
Painting	Red body, cream trimmings, buff roof



Overhead Construction Used with Trackless Trolleys. At Left, on Remsen Street, Where Trolley Buses Parallel Existing Electric Line. Center, Y Construction at Columbia Street Terminal. At Right, Overhead at Manor Avenue Terminal

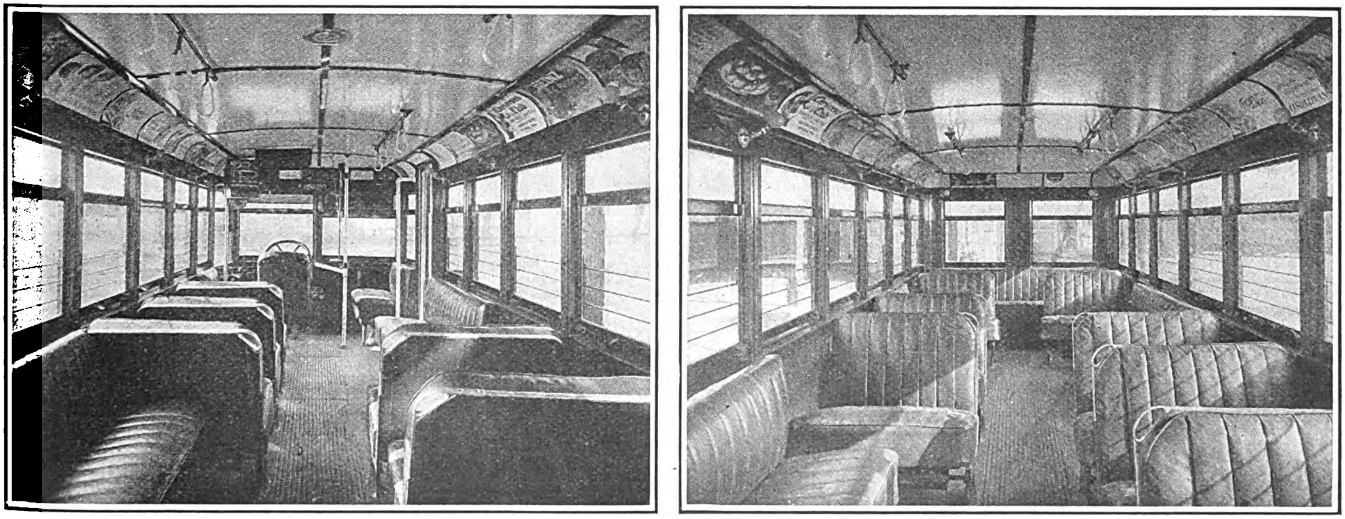
structing loops at the ends of the line a Y construction is used for reversing the vehicles.

In the design of the vehicles themselves, particular attention has been given to attractiveness and comfort. The bodies were built by the Wason Manufacturing Company, Springfield, Mass., and are mounted on Brockway chassis. The important details of construction and equipment are given in the accompanying table.

The over-all length of 26 ft. 1½ in. is the same as that of a standard 29-passenger gasoline bus. By extending the front part of the body, so as to utilize the space taken by the hood of a gasoline bus, a seating capacity of 31 has been obtained. An accompanying illustration shows the seating plan. Seats are comfortable, being of the de luxe type upholstered in Spanish leather. The longitudinal seat at the front end provides additional space for entrance and exit and is also convenient for standing passengers. The two longitudinal seats in the rear part of the body were necessary in order to utilize advantageously the space over the wheel housings. A clear height of 6 ft. 6$\frac{1}{16}$ in. inside is a convenience for standing passengers. Porcelain hand rails with sanitary hand straps are provided. The folding entrance doors provide a clear passageway of 2 ft. 6 in. Window posts are spaced 2 ft. 7 in. between centers, which gives eight large windows on the entrance side. Stationary window guards are installed, as the windows are arranged to be raised. The upper sash are stationary and glazed with white opaque glass. Interior illumination at night is provided by ten 36-watt lamps which have frosted globes and locking receptacles. The two rear lamps are located in front of openings in the rear wall fitted with colored lenses so as to serve as marker lights. While the lamps are along the side of the car over the windows, the type of fixture used brings them out for a distance of approximately 12 in.

The wiring for the signal system also runs in the same section with the light wiring. A push button is located over the center of each window. This location simplifies the wiring considerably, as splices are not needed at each window post, as would be necessary if the signal buttons were installed on the window posts. Electric heaters, equipped with thermostatic control, provide a comfortable interior temperature at all times. An emergency door in the rear right-hand side swings outward together with the window which occupies the panel. The latch for releasing the door is installed in a glass case within the body, so that it must be broken to open the door.

The power for propulsion is provided by two tandem-connected General Electric type 264 motors, which have a rating of 25 hp. each. The control equipment is General Electric type C-154-B contactor type. The operating company is now conducting tests of a control equipment with automatic acceleration and also of regenerative braking for this type of vehicle. The present motor control equipment is actuated by the left-hand pedal, while the right-hand pedal is for braking. A signal lamp of the Consolidated Car Heating Company's type is connected in the control circuit so as to show when the full series position of the control has been reached. Each bus is also equipped with a Consolidated electric gong, which is controlled by a push botton.



Comfortable Interior Attracts Riders to the Trolley Bus. At Left, Looking Toward Operating End. At Right, From Operating End

The color scheme for painting is the standard used by the United Traction Company and consists of a red body, cream window posts and a buff roof.

In regard to the advantages of trackless trolley vehicles over gasoline buses, Ernest M. Murphy, general manager of the United Traction Company, stated that due to the many curves and severe grades which this line contains and provision for rapid acceleration, the power demand is heavy. The motor equipment provided has a higher rating and a greater overload capacity than is ordinarily furnished for the corresponding gasoline-driven bus. There is also an advantage in that the motors used are of a type standard on some of the electric cars of the United Traction Company.

The trackless trolley vehicles have a low center of gravity, which permits an increased height, and thus gives increased comfort to standing passengers. The body has also been extended the full length of the chassis, so as to provide an increased number of seats with greater comfort to seated passengers. The present maintenance forces are familiar with the inspection and repair of electric car equipment and so the addition of the trackless trolleys required no addition to the company's maintenance forces. As power is supplied by a central station instead of from individual engines, as is necessary with gasoline-driven units, the trackless trolleys are cheaper to operate and to maintain. In addition, they are in the shop a considerably smaller portion of the time. There are many other conveniences, such as better lighting and heating, and convenience for control of the various operating devices that present a much simpler arrangement on the trackless trolley.

Determining the Average Length of Ride*

Method Proposed in Connection with Mail Pay Reduces the Number of Observers Needed to Take Field Data—Load Factor Can Be Quickly Determined

IN THE brief submitted by the railway mail pay committee of the American Electric Railway Association, which was presented in the railway mail pay case before the post office department at Washington, a new method of determining the average length of ride on urban railways was proposed. The plan was the work of W. H. Maltbie, special counsel of the United Railways & Electric Company, Baltimore, Md., as attorney for the railway mail pay committee.

Comparatively few accurate determinations of load factor have been made in the past for member companies, so that the amount of evidence which could be presented to the Interstate Commerce Commission as to direct determinations of load factor was relatively limited. A number of other companies, however, have made direct studies as to the average length of ride, and it was possible by a consideration of the configuration and area of American cities, supplemented by the experience of specialists who have worked in traffic surveys, to reach a maximum figure for the average length of ride for the average municipal area. Moreover, the figures furnished by the member companies in the mail pay study made it possible to determine the average seating capacity of the cars used by member companies; while the average number of revenue passengers per car-mile, representing the average number of persons who board each car per mile, is a well-known and daily constant figure for the industry.

These figures are connected by the relation:

$$\frac{\text{Revenue passengers per car-mile} \times \text{Average length of ride}}{\text{Average seating capacity of car}} = \text{Load factor}$$

This formula was used in the argument on the mail pay case.

It is evident at once, however, that the product of the average number of revenue passengers per car-mile by the average length of the ride is the average number of riders upon the car. This fact suggests at once a new method of determining the average length of ride and the load factor for the entire system, for any definite portion of the system, for any day of the week, for any definite hour of the day or even for a single trip.

This new method is extremely simple. It consists merely in placing a single observer on each car on a given line, in a position from which he can command a view of the interior of the car, and directing him to count the number of passengers actually on board the car at definite intervals on the system, that is, for each mile, half mile, or quarter mile. The sum total of his observations divided by the number of counts yields the average number of passengers riding upon the car. This number divided by the seating capacity of the car furnishes the load factor, or divided by the number of revenue passengers per car-mile gives the average length of ride upon that certain line.

The simplicity of this method and its relative inexpensiveness are evident when it is contrasted with the methods formerly in use. The original method, using an origin-to-destination check, involves not only a tremendous amount of clerical work, but also the full co-operation of the riding public. A later method, using on-and-off studies, involves two men upon each car studied and a large amount of clerical work in the determination of the total passenger-miles.

The new method involves only one man upon each car studied and no computation other than the addition of his counts and the division of the total by the number of counts made.

Striped Dasher of Little Advantage

THE method of painting car dashers with stripes to make the car appear wider as practiced at Schenectady, N.Y., and described in ELECTRIC RAILWAY JOURNAL for Nov. 1, page 760, has not given as good results as were anticipated. After keeping statistics of accidents for three or four months the practice was discontinued. Since that time there has been a steady reduction in the number of accidents and also in their cost, although there has been an increase in number of automobiles over two years ago, amounting to nearly 70 per cent. The improved accident record, however, may have come from the added experience of the newer automobile drivers as the summer season advanced.

The Berlin Street Railway is erecting apartment houses near its shops and depots for the housing of its personnel. On Oct. 17 one apartment block, containing 272 apartments, was officially opened. Altogether about 1,000 such apartments will be provided.

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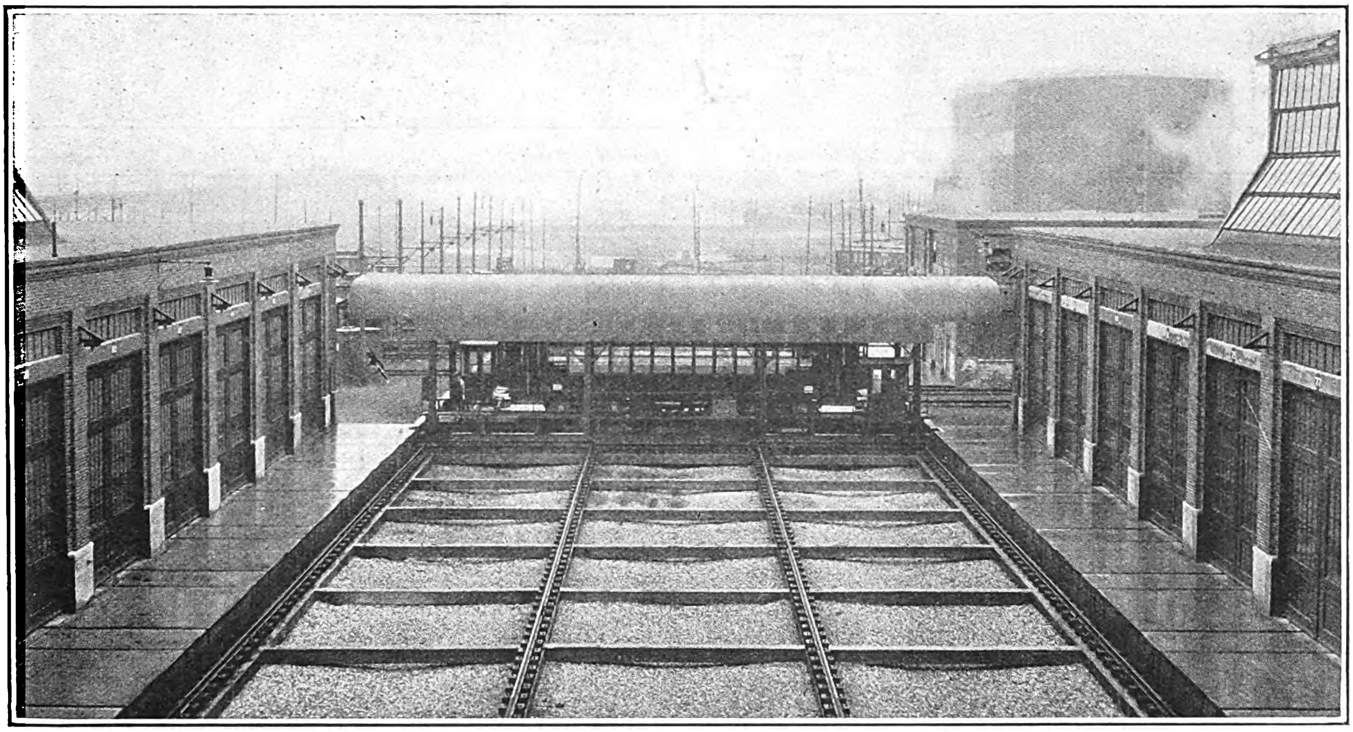
*This article is based on material included in the briefs submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

New Boston "L" Lumber Storage and Kiln

Second Article

The Lumber Storage Building, Outside Lumber Storage and Dry Kiln for the New Everett Shops, Boston, Illustrate Advanced Design and Practice—For Efficient Handling of Materials Improved Equipment Is Used



The Transferway Constitutes the Main Axis for the New Boston Shop—The Paint Shop Is on the Left and the Kiln Building and Wood Mill on the Right

IN THE present article on the new Everett car repair shops of the Boston Elevated Railway the improved facilities for handling and treating lumber are described. An outline of the reasons for the construction of the new shops, with a description of the boiler plant, heating installation and power supply, was published in the ELECTRIC RAILWAY JOURNAL for Nov. 22, page 871.

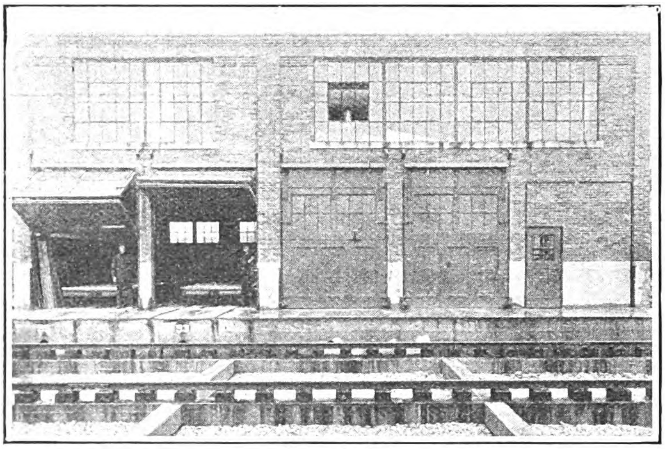
The main axis of the shops is a transferway 80 ft. wide, extending from the southerly end of the yard northerly to the site of the future wheel and axle shop. This may be seen by reference to the general plan on page 872 of the Nov. 22 article. On the west side of the transferway are already built the wood shop, dry kiln and lumber storage building, and in the upper southwest corner of the property is a section of the yard devoted to the outdoor storage of lumber. The lumber storage building and dry kiln building are each 80 ft. square, and are located between the wood mill and the lumber yard. Each is two stories high and the wood mill, about 364 x 158 ft., is one story in height with the exception of a balcony on the west side used as a carpenter shop.

THE HOT-BLAST DRY KILN HAS TWO TRACKS

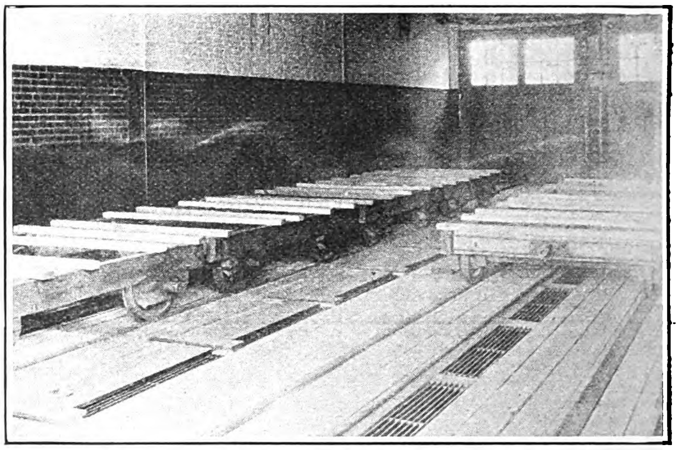
The kiln building, also containing storage space, contains a modern two-track Sturtevant hot-blast lumber kiln with humidity feature, fully equipped, and has bi-folding doors of the jack-knife type set flush with steel-frame openings. Half the first floor is used in kiln work and has two tracks which extend from end to end and thence to the transferway. The remainder of the first story is used for heavy metal storage and the second floor for the storage of light parts and miscellaneous equipment. Details of the ducts for the heated air are shown in the accompanying line drawing.

The first floor of the lumber storage building is utilized for the storage of heavy lumber under cover, the second floor being employed in the storage of lumber under heat. In the northwest corner is a baling room for sawdust and shavings which are piped over from the millroom.

Most of the lumber used at the Everett shops arrives by the steam railroad connections on the west side of the property and is unloaded by hand from cars on spur tracks serving the yard on the west side of the transferway and south of the kiln building. The yard will hold about 350,000 ft. of lumber, or 7 months supply. From this yard a passageway about 15 ft. wide runs between the kiln and lumber storage buildings, terminating at the wood mill, and three tracks laid at right angles to the transferway axis facilitate shifting of cars along the sides of the kiln and storage buildings and parallel to the millroom doors. The lumber is piled as needed on four-wheeled hand trucks carrying



Exterior of Dry Kiln with Entrance to Provide Service from the Transferway



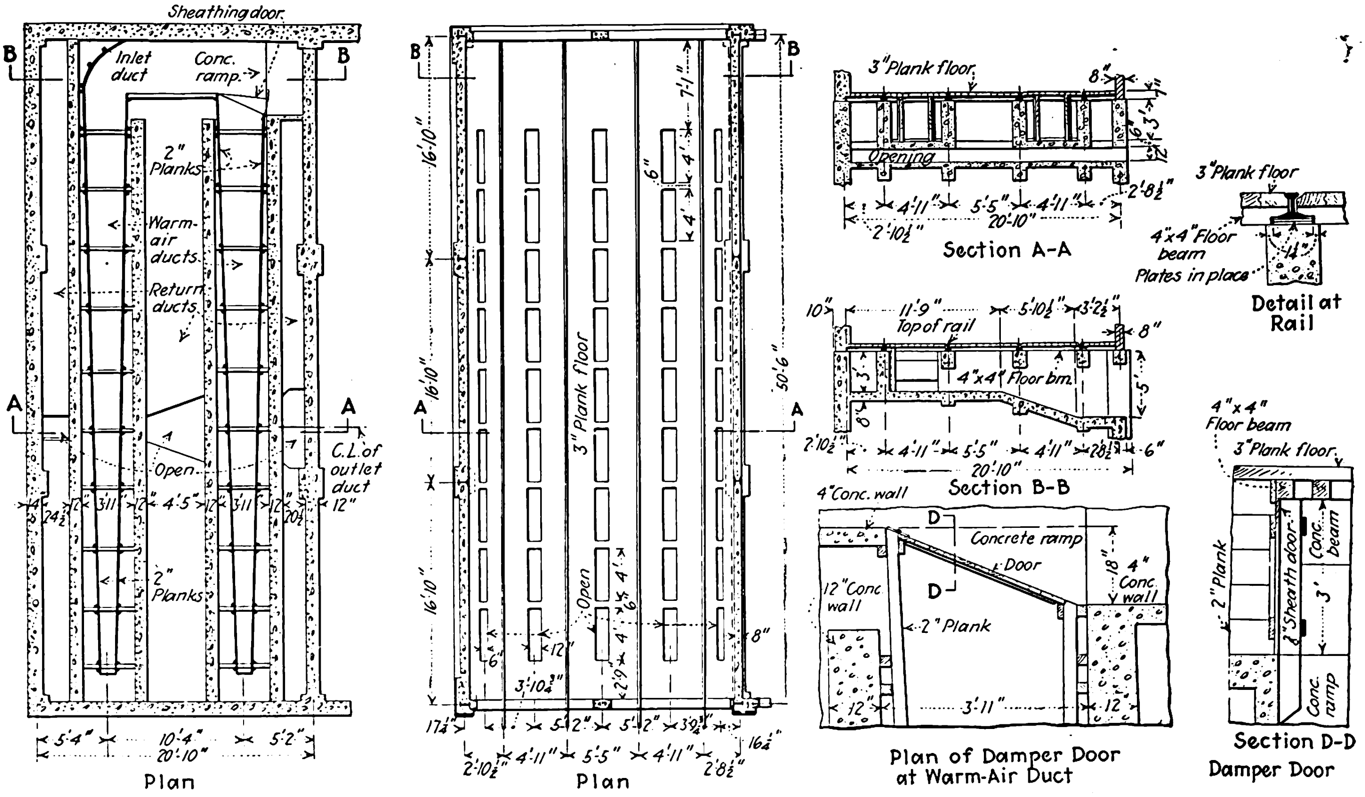
Interior of Dry Lumber Kiln Showing the Trucks, Gratings and Ventilating Arrangement

about 1,000 board-feet each for convenient distribution about the millroom or lumber storage building. For kiln drying it is stacked on special kiln cars or is moved on flat cars by the aid of the transfer table and a service car to any desired point served by the yard and building trackage. If desired, motor truck loads of lumber can easily be delivered into this group of buildings. It is also readily possible to unload lumber directly from the flat cars into the storage building by shifting them through the yard to the transferway and thence to the appropriate track paralleling the side doors of the building.

The kiln proper consists of a single heating compartment containing two parallel tracks, each capable of accommodating two special flat cars and giving a total capacity of 24,000 board-feet of lumber for simultaneous treatment. The kiln proper is about 50 ft. long by 21 ft. wide. The rails are laid to standard gage on reinforced concrete beams, and a 3-in. plank flooring is provided with the wearing surface flush with the rail top. Under each track between the rails a row of ducts supplies hot air to the charges of lumber. The return ducts are in the floor outside of the kiln tracks, with a single large return duct running through the center of the kiln. These ducts are covered with gratings assembled from iron bars of ¼-in. x 1¼-in. section, spaced 1 in. apart. In general these cover louvered openings 4 ft. long by 12 in. wide below the floor level and average 9 in. wide at the outlet. Forty-five gratings are provided for the complete kiln, of which 27 are used as returns to the duct system. The louvers are operated by a stick from the floor.

CIRCULATING THE HOT AIR

Heated air for kiln service is supplied by a 5-hp. motor-driven fan mounted in the basement of the kiln building and arranged to draw air through a chamber containing steam coils before it enters the supply ducts. This heating chamber, a sheet-iron box adjoining the fan housing, is also equipped with a steam



Sheathing door
B
Inlet duct
Conc. ramp
2" Planks
Warm-air ducts
Return ducts
A
Open
C.L. of outlet duct 12"
2" Planks
5'4"
10'4"
5'2"
20'10"
Plan
16'10"
7'1"
4'
3" Plank floor
50'6"
Open
3'10¼"
4'11"
5'5"
Plan
3" Plank floor
Opening
20'10"
Section A-A
3" Plank floor
4"x4" Floor beam
Plates in place
Detail at Rail
11'9"
Top of rail
4"x4" Floor bm.
Section B-B
4" Conc. wall
Concrete ramp
Door
12" Conc. wall
2" Plank
4" Conc. wall
3'11"
Plan of Damper Door at Warm-Air Duct
4"x4" Floor beam
3" Plank floor
2" Plank
Sheath door
Conc. beam
Conc. ramp
Section D-D
Damper Door

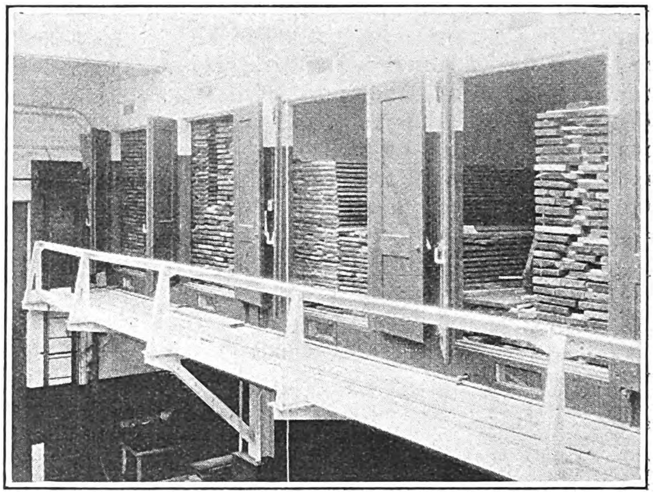
Plan of Kiln Building with Sections of Duct Construction inlet by which the degree of humidity in the entering air can be controlled. The kiln room proper contains two lines of 1½-in. pipe laid between the rails and having a large number of ¼-in. outlets for the discharge of live steam directly into the kiln. The return ducts extend the entire length of the two sides of the kiln and under its center, the three being merged together at the west end and carried back to the fan room for reheating of the air. The ducts thus provide a continuous recirculation of air from the supply ducts up into the center of each load of lumber and outward through the return ducts to the rear of the heating unit. The maximum steam pressure required is 10 lb.

The fan is designed to supply five changes of air per minute through the lumber pile at approximately 1 in. static pressure. The kiln will maintain temperatures up to 150 deg. F. Thermostatic controls of temperature and humidity are installed on the wall of the kiln room and also in the fan room. A Powers regulating valve controls the steam supplied to the coils in the heating chamber, and the installation includes a recording psychrometer (registering continuous wet and dry bulb temperatures) with tubing directly connected to a point in the supply duct system where the maximum drying conditions prevail in the kiln; indicating hygrometers and testing instruments to determine the moisture content of the lumber. A 660-watt, 110-volt electric oven supplied by E. H. Sargent & Company, Chicago, is provided to test the moisture content of lumber samples. The kiln-drying system was furnished by the B. F. Sturtevant Company, Boston, and the recording instruments by the Foxboro Company.

LUMBER STACKED TO GIVE FREE AIR CIRCULATION

Lumber to be kiln-dried is stacked on special trucks, with air spaces between the boards, and is hauled by a service car to the transferway. The spacers are 1½ x 1⅜ in. cross-section. From the transfer table the lumber trucks are pushed into the kiln. The kiln treatment varies somewhat according to the kind of lumber in hand and its condition. Whitewood of all sizes is first live-steamed for four hours at about 10 lb. per square inch, in order to saturate the fibers thoroughly. The stock is then soaking wet to the heart of the wood. Steam is shut off and the blower started, a small amount of steam being let into the hot-air chamber of the air-duct system as air is admitted. The supply of hot air is continued for 5 to 6 days, the lumber being inspected daily to see if the sap is coming off at the proper rate and if the drying is proceeding normally. Should the temperature run too high the lumber tends to curl and if the heating is allowed to continue at an excessive rate warping and honeycombing may follow. The automatic control is valuable in preventing fluctuations of temperature and humidity after the proper values have been determined. On the last day in drying whitewood the moisture is cut off and the work finished with hot air alone. Mahogany is given about the same treatment as whitewood. The same is true of oak, except that in handling green wet-sawed stock it is steam-heated at 100 to 120 deg., followed by 6 to 8 days of kiln drying up to a maximum of 140 deg. Three-inch maple is steamed from 3 to 5 hours at 100 to 120 deg., followed by 10 to 12 days of kiln drying at 140 to 150 deg. Eight days drying generally suffices for 1-in. and 1½-in. maple. About 24,000 ft. of lumber was kiln-dried here in a recent 3-weeks period.

The lumber storage building is equipped with six dry rooms on the second floor, each having double-sheathed wooden partitions and doors; and heated by coils supported on the floor over which the lumber is piled. The central portion of the building is open and skylighted to provide for convenient handling of lumber to and from the lower floor. The lumber is either transported to the south door of the storage building on a kiln car or brought in on a hand truck. The compartments on the second floor are capable of holding 17,000 ft. of lumber each, packed 9 ft. high, and are each 16 ft. square inside. One is utilized in the hot storage of soft pine of 1½-in. size, the next for hot storage of 1-in. pine and the next for dry storage of mahogany and 1-in. whitewood. The bins on the opposite side are assigned to the dry storage of 1½-in. whitewood, oak, ash and cherry. The kiln-drying process is used on sizes of pine above 1½ in. thick, the smaller sizes being hot-dried in the storage house for about 2 weeks at temperatures of from 100 to 150 deg.


The Dry Lumber Storage Has Six Rooms, Each 16 Ft. Square, and Heated by Steam Coils

Air-dried stock is stored under the second floor compartments. These are provided with balconies 3 ft. wide reached by short ladders at the end of the building. They are electrically lighted and equipped with automatic sprinklers and ventilating openings near the top and bottom of the doors.

To facilitate handling lumber from the first floor to the bins above, a detachable wooden roller 4 ft. long and of 4 in. diameter is placed in sockets in front of the required bin at the walkway edge, this taking a considerable portion of the weight of the board from the handlers on the floor and balcony. On the ground floor another convenience in holding boards on the diagonal when passing them up or down is a metal pin inserted in a portable stanchion about 4 ft. high, the handler allowing the board to rest in part against this pin when pausing in the work. In general the steam valves controlling the heating coils in the storage compartments are near the second floor level and close to the doorways.

The kiln building cost $9.51 per square foot of floor space, including equipment, and the lumber storage building cost $7.89 per square foot.

The lumber storage building is connected with the wood mill by a bridge which provides access to the sawdust and shavings separating hopper above the baling room and helps support the dust discharge piping and a steam line feeding the hot storage compartment coils.

English Locomotives for Montreal

FOUR locomotives for use on the new electrified harbor railway at Montreal will be delivered in the near future. They are equipped for operation at 2,400 volts d.c. and have been built by the English Electric Company, Ltd., at a total cost of $478,650. The total weight on the drivers is 200,000 lb. Each locomotive will have a nominal 1-hour tractive effort of 40,000 lb. at a speed of 15 m.p.h. and a maximum tractive effort of 60,000 lb. for 5 minutes.

The locomotives are of the box-cab, double-truck, articulated running-gear type and are provided with twin-gear drive. All the weight is carried on the four driving axles. Each truck is side-equalized and one truck is cross-equalized. Total length inside the knuckles is 39 ft. The diameter of the driving wheels is 50 in.

The cab is divided into three compartments, the central of which contains the control gear and auxiliary machinery. On one end the driving compartment is wider than the main body of the locomotive and has windows in the rear so that a better view of the track can be obtained during shunting operations. This wider compartment is equipped with two driving positions, one facing the front and the other facing the rear. The interior of the cab is lined with heat-insulating material to prevent condensation which might occur on account of temperature changes.

Current collection is accomplished by two pantographs. Control is of the camshaft type. Two Dick-Kerr motors are mounted on each truck.

Arbitrations Have Favored Neither Party

A FIVE-YEAR view of the results of arbitrations of wage disputes between electric railways and their employees shows that one side has won about as often as the other. The results of a study made by the JOURNAL are summarized and detailed in the accompanying two tables. Of a total of 82 cases during the years 1920–1924, the boards of arbitration found for the men in 42, while in 37 cases they found for the company. In 1920, practically all decisions were for the men. In 1921 and 1922 practically all were for the companies. In 1923 and 1924, the tables reversed again, as practically all decisions favored the men.

SUMMARY OF ARBITRATION RESULTS

	Number of Arbitrations	Won by Men	Won by Company
1920	21	19	2
1921	24	2	22
1922	12	1	11
1923	11	11	0
1924	14	12	2
Totals	82	42	37

DETAIL RESULTS OF WAGE ARBITRATIONS DURING LAST FIVE YEARS

Company	Awards; Cents or Per Cent increase in Maximum Rate Per Hour	Reference in *Journal*
	1920	
Key Route, Oakland, Calif.	12½%	Jan. 24, p. 210
Georgia Ry. & Pr. Co., Atlanta	15%	Mar. 27, p. 663
Denver Tramway	10c.	April 3, p. 720
Des Moines City Railway	13c.(2)	May 29, p. 1112
Boston Elevated	10c.	June 19, p. 1276
Ottawa Electric Railway	10c.	June 19, p. 1276
Colo. Springs & Cripple Creek Ry.	48c.*	June 26, p. 1321
N. Y. State Railways, Rochester, Syracuse & Utica Lines	33⅓%	July 3, p. 30
Toronto Railway	No change (3)	July 3, p. 33
Tri-City Railway & Light Co., Davenport, Iowa	10c.	July 10, p. 89
Scranton Railway	20%	July 10, p. 91
E. St. Louis & Suburban Railway	40 to 52%	July 24, p. 186
Twin City Rapid Transit Co.	10c.	July 31, p. 238
Montreal Tramways	25 to 30%	Aug. 21, p. 377
Cincinnati Traction Company	9c.	Aug. 21, p. 378
Winnipeg Electric Railway	10%	Aug. 21, p. 381
Omaha & Council Bluffs St. Ry.	No change (3)	Aug. 28, p. 428
Eastern Massachusetts St. Ry.	11c.	Sept. 18, p. 562
Kentucky Traction & Term. Co.	7c.	....
New Orleans Railway & Lt. Co.	30%	Sept. 25, p. 612
Cincinnati, Newport & Covington Railway	20%	Oct. 16, p. 841
	1921	
Kentucky Traction & Term. Co.	— 5½c.	May 7, p. 869
Eastern Massachusetts St. Ry.	—12½%	May 21, p. 963
Utah Light & Traction Company	—12½%	June 18, p. 1143
Wheeling Traction Company	No change (4)	June 18, p. 1139
Cleveland, Southwestern & Columbus Traction Co.	—12c.	June 18, p. 1139
Cleveland, Painesville & Eastern Traction Co.		
New York State Railways	—11.7%	....
Cincinnati & Dayton Trac. Co.	— 7c.	June 25, p. 1178
Des Moines City Railway	—11c.	July 16, p. 108
Youngstown & Ohio River R.R.	— 5c.	July 30, p. 177
Rochester & Syracuse Railway	—16⅔%	July 30, p. 179
Northern Ohio Traction & Lt. Co.	(—15c.)—1 to 2c. lower than company asked	Aug. 6, p. 217
Mass. Northeastern Elec. Railway	—12%	Aug. 20, p. 293
Memphis Street Railway	— 4c.	Aug. 27, p. 332
Middlesex & Boston Street Ry.	—15%	Sept. 10, p. 414
Topeka Railway	— 7½ to 10%	Sept. 17, p. 453
Auburn & Syracuse Electric R.R.	—14½c. freight —14c. interburban —12c. city	Sept. 24, p. 531
Schenectady Railway	No change (4)	Oct. 1, p. 562
Montreal Tramways	—12½%(1)	Oct. 1, p. 566
Connecticut Company	— 8⅓%	Oct. 22, p. 751
East St. Louis & Suburban Ry.	— 3c.	Dec. 10, p. 1042
British Columbia Electric Ry.	—10%	Dec. 24, p. 1125
Boston & Worcester Street Ry.	—10%	Dec. 31, p. 1155
	1922	
British Columbia Electric Railway, Vancouver, B.C.	—10%	Jan. 14, p. 87
Cincinnati Traction	—20%	Jan. 21, p. 131
Hull Electric Railway	.....	Feb. 11, p. 249
Attleboro Branch Railroad	—10c.	Mar. 4, p. 377
Interstate Consolidated St. Ry.		
Milford, Attleboro & Woonsocket Street Railway		
Springfield, Worcester Con. St. Ry.		
Columbus, Newark & Zanesville Railway	— 2c.	May 6, p. 764
Indiana, Columbus & Eastern Ry.		
Cleveland Railway	—10%	May 20, p. 841
Georgia Ry. & Pr. Co., Atlanta	—12½%	June 3, p. 911
Connecticut Company	— 5.45%	June 17, p. 979
Tri-City Railway	No change (3)	June 17, p. 980
Chicago Elevated Railways	—10%	Aug. 19, p. 273
Chicago Surface Lines	—10%	Aug. 19, p. 273
Cincinnati Street Railway	— 4%	July 29, p. 174
Berkshire Street Railway	No change (4)	Oct. 7, p. 611
	1923	
Cleveland Railway	5c.	May 26, p. 899
Scranton Railway	3 to 5c.	July 7, p. 32
Youngstown & Ohio River R.R.	6c.	July 21, p. 112
Chicago Surface Lines	3c. for first year of contract; 2c. more for second.	July 28, p. 151
Chicago Rapid Transit Co.	3c. for first year of contract; 2c. more for second.	Aug. 4, p. 187
Cincinnati Traction Co.	5c.	Aug. 18, p. 270
Grand Rapids Railway	3c.	Aug. 18, p. 272
Detroit Department of St. Rys.	5¾ to 7¼c.	Aug. 25, p. 305
British Columbia Electric Railway, Vancouver, B.C.	3½c.	Oct. 6, p. 572
E. St. Louis & Suburban Railway	3c.	Sept. 29, p. 542
Boston Elevated Railway	9c.	Oct. 20, p. 713
	1924	
Middlesex & Boston Street Ry.	4c.	Feb. 16, p. 269
Augusta-Aiken Ry. & Elec. Co.	2½c.	Mar. 15, p. 427
Georgia Ry. & Pr. Co., Atlanta	3c.	April 5, p. 557
Capital Traction Co., Wash., D.C.	2c.	April 18, p. 632
Memphis Street Railway	3c.	May 10, p. 751
Des Moines City Railway	5c.	May 24, p. 823
Springfield, Massachusetts Street Railway, Worcester	10c.	June 14, p. 945
Cleveland Railway	12c.	June 7, p. 905
Manchester & Nashua St. Ry.	7c. for one-man cars	July 5, p. 29
Manchester & Derry Street Ry.	5c. for two-man cars	
Trenton & Mercer Co. Trac. Co.	10%	Aug. 19, p. 260
Arkansas Valley Interurban Ry.	— 3c.	Aug. 30, p. 334
Peoria Railway—Trainmen only	— 7c.	Sept. 20, p. 461
Scranton Railway	1c.	Oct. 4, p. 567
Boston Elevated Railway	2½c.	Oct. 18, p. 710

* Hourly rate increased to 48c.; increase itself not known.

(1) Cut by company sustained.

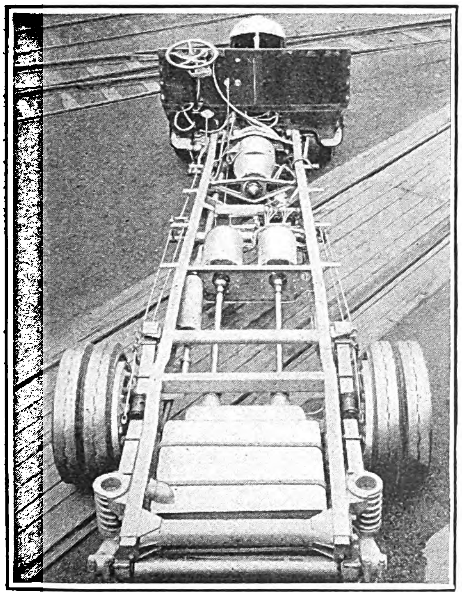
(2) Set aside by court as excessive and reduced 10 cents.

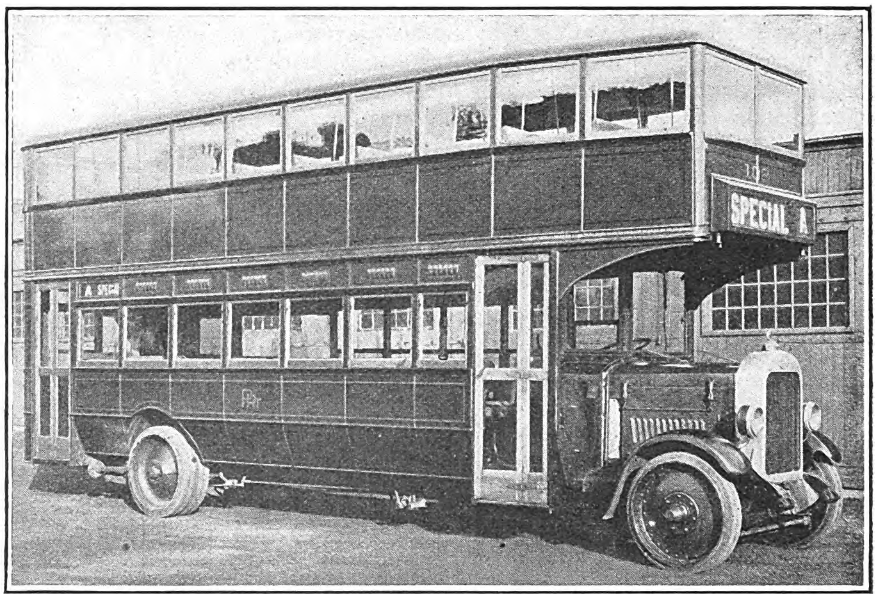
(3) Men asked increase.

(4) Company asked reduction.

P. R. T. to Operate 225 Gas-Electric Buses

New Design Departs Materially from Previous Gas-Electric Drives — Entire Control Is by Throttle of Gasoline Engine Which Drives Generator—Motors Are Permanently Connected Direct to the Generator and Power Is Transmitted to Wheels by Bevel Gears—Elimination of Differential Is Expected to Lower Maintenance Costs





At Left, Chassis of Experimental Gas-Electric Bus, Showing Power Plant and Individual Motor Drive for Each Rear Wheel Eliminating Differential. At Right, the Gas-Electric Bus Is in General Appearance Similar to the Standard Yellow Coach Gasoline Bus

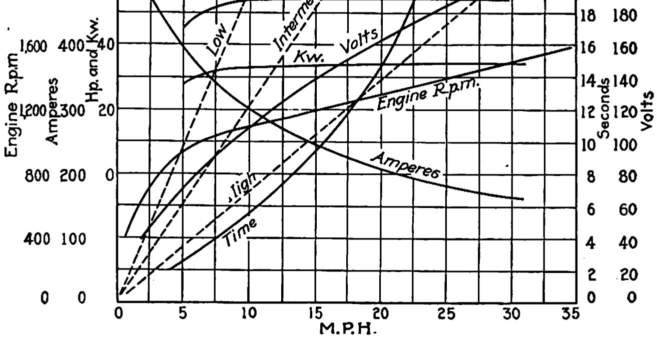
AFTER a series of exhaustive tests, the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, has ordered 225 gas-electric buses which will differ in several important respects from earlier designs. The placing of the order was mentioned briefly in this paper, issue of Dec. 6. Engines, chassis, and bodies will be built by the Yellow Coach Manufacturing Company, while the electrical equipment will be supplied by the General Electric Company. Mitten Management has ordered 25 additional buses for use in Buffalo. The total cost will be about $3,000,000.

Power will be supplied by a standard six-cylinder engine of 4¼-in. bore and 5½-in. stroke, rated at 108 hp. at 2,200 r.p.m. This engine will drive a generator permanently connected electrically to two 20-hp. electric motors mounted side by side on the chassis frame. These in turn will be mechanically connected to the rear wheels by drive shafts and bevel gears.

The speed of the bus will be controlled by movement of the throttle of the gasoline engine. Clutch, transmission, and mechanical differential have been eliminated. Because of that and also because of the constant torque of the electric motors, the wear and tear on all moving parts, as well as the chassis and body, is expected to be much reduced, insuring a greater length of life for all equipment.

The generator, known as the GE-1098, is compound wound with a differential series field, the shunt winding being excited by a small generator which forms a part of the main generating unit. The exciter obtains its field current from a 12-volt storage battery. This arrangement of windings provides high current and low voltage at starting. Due to the inherent characteristics of the generator, as the vehicle accelerates the voltage increases and the current decreases automatically until normal running speed is reached. For a given throttle opening the output of the generator is substantially constant under all road conditions. In this manner the necessary torque for acceleration or hill climbing is provided without overloading the engine, and with a smooth change of speed. The generator is designed to transmit the output of the gas engine within practical limits of operation. The bus is designed for a normal maximum speed of 26 m.p.h. on a level roadway.

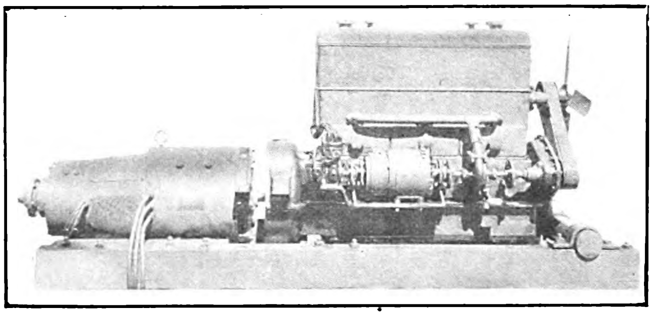
Both the generator and the motors, which are known as GE-1079, are designed on the basis of 125-volt operation, and are self-ventilated. The motor frames are long and of small diameter, permitting assembly on the chassis without sacrifice of road clearance.



Acceleration Curves of the Philadelphia Gas-Electric Bus. The Corresponding Speed Curves for the Gas-Mechanical Bus Are Given in Dotted Lines

Acceleration and all speed changes are obtained solely by variation of the engine throttle, which is controlled by the usual accelerator pedal. As the engine speed increases, the generator voltage rises. The operator need not remove his hands from the steering wheel except to apply the emergency brake. There is no electrical controller for the motors, nor are any electrical adjustments made by the driver when running the bus. A small switch is provided having an off position and reverse for backing. This is connected with a single hand lever to the left of the steering post.

Before this design was definitely selected, competitive tests were run with the experimental gas-electric bus and a bus having the usual gear drive, with clutch, transmission and differential. The accompanying illustrations show the chassis and exterior appearance of this experimental bus. Several minor changes in design will be made when the new buses are built. The gas-electric bus has been in regular service from Aug. 1 up to the present time and has covered more than 13,000 miles.



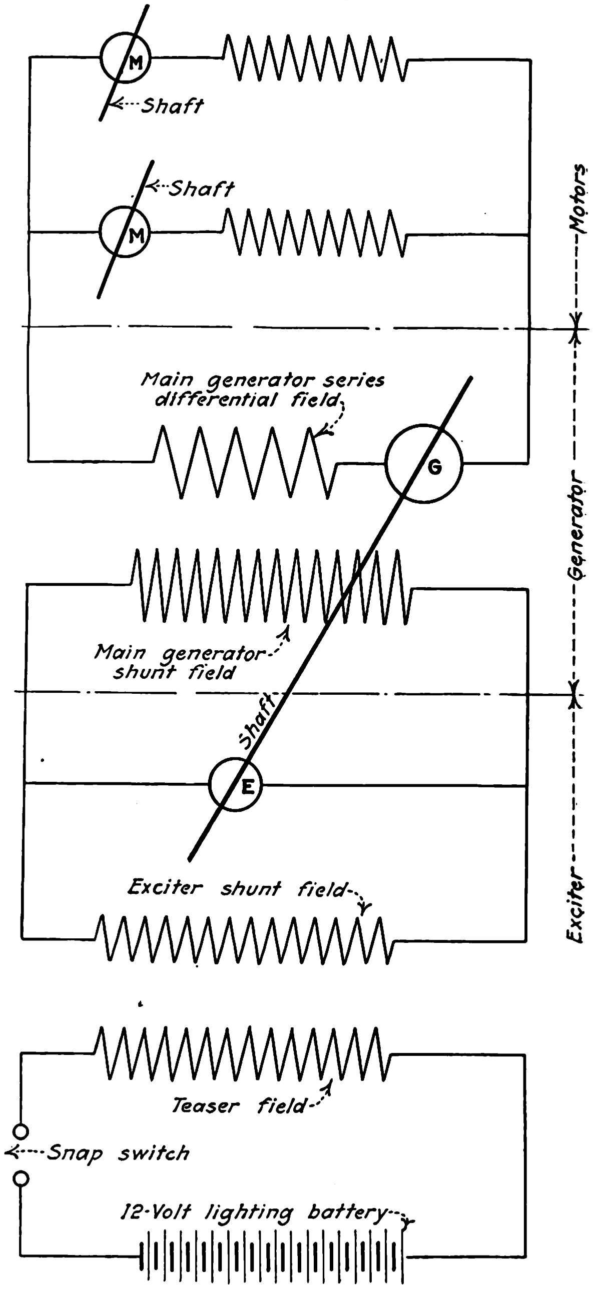
Power Plant of the Gas-Electric Bus Includes a Variable Voltage Generator and a Separate Exciter Driven from the Engine Shaft

It is said that the tests made show somewhat lower fuel consumption for the gas-electric bus for a given service, and at the same time a higher rate of acceleration and schedule speeds. These are important factors in city bus operation. An important point which was developed was the fact that the engine of the gas-electric bus actually makes 20 per cent fewer revolutions when running under city conditions than does the engine of the bus equipped with mechanical drive. This is because with gas-electric transmission it is impossible for the driver to race the engine, and it is also difficult for him to stall it.

The great advantage claimed for the new design, however, is its simplicity. There is comparatively little electric wiring and no controller. The various parts are easily got at for inspection and repair. Elimination of more than 2,000 movements of the gear shift per bus per day is expected to reduce maintenance costs and prolong the life of the chassis and body. Moreover, the electric drive is silent and the customary noise and jerk of changing gears at the time of starting will be absent.

The two-motor drive permits a better distribution of power to the rear wheels when going around a curve. In the event of the failure of one motor, the bus can be brought back to the garage on the one remaining motor. The fact that the bus cannot be put in gear when going down hill is not considered a drawback because there are no steep grades on the routes where the buses will be operated.

The buses are of the double-deck type and have a seating capacity of 66. The weight of the completely equipped gas electric bus will probably be several hundred pounds greater than that of a mechanical drive bus, but exact figures are not yet available. The first of the buses will be operated on the Broad Street route for which a franchise was recently obtained. Additional routes, however, have been planned.



Schematic Wiring Diagram, Showing How Motors Are Permanently Connected to the Generator

Purchasing Agents Aid Traffic Survey

AT A TIME when the time-table division of the Department of Street Railways, City of Detroit, was having trouble to keep pace with lay-offs at the factories, it occurred to the management to seek the aid of the purchasing agent. It was thought that as a member of the Purchasing Agents' Association of Detroit, the latter could readily get in touch with some 500 fellow agents in local manufacturing plants. This was in fact accomplished through the courtesy of the executive secretary of the association, who devoted most of the space in a circular letter to a statement on "Improving Your Street Railway Service."

He pointed out that the railway is a business operated for profit. A shortage of cars hurts traffic. A surplus of cars means excessive operating expense. The problem is to keep the service adjusted to variations in demand. In view of these facts he requested the members to fill out and mail to him prepared postcards giving information concerning the number of men employed. It was particularly requested that large employers refrain from over-statement because the theory of securing "plenty of cars for every one" soon defeats its own purpose. It is one thing to say that a thousand men are employed and another to find that these men are on a three-day week and that only 500 are on the job at one time.

Replies received to this card covered some 200 plants employing from 300,000 to 400,000 men. During the two or three weeks following many facts of value to the traffic division came to the purchasing agent.

The Readers' Forum

Best Results in Energy Saving Made with Instruments

ECONOMY ELECTRIC DEVICES COMPANY
CHICAGO, ILL., Nov. 26, 1924.

To the Editors:

I have read with interest the abstract, on page 776 in the Nov. 1 issue, of the paper read by Wilhelm Pforr, manager Berlin Street Railways, before the International Electric Railway Association meeting at Homburg von der Höhe.

A hurried examination of this abstract would indicate that the author's findings were contrary to practices very widely adopted in the United States; but a more careful reading shows that Mr. Pforr's conclusions are based on his personal experience and are more or less contrary to the answers received to the questionnaire which he circulated with a view to summarizing opinions on the results obtained from all forms of energy-checking devices.

It is certain that the experiences of users of energy-checking devices in North America do not confirm Mr. Pforr's conclusions. Mr. Pforr finds that 30 per cent of the properties addressed were using instruments of some sort. In the United States approximately 25 per cent of the active motor cars are equipped with watt-hour meters and a substantial number are equipped with coasting time recorders or power-on time recorders. A large mass of data is therefore available in this country on which to base answers to the four points set forth by Mr. Pforr, who argues that it is better for his property and some others of similar size to encourage the saving of car propulsion energy by having additional power supervisors rather than by the joint use of energy-checking devices and power supervisors. He summarizes his objections as follows: (1) The appreciable expense of record-keeping personnel; (2) the maintenance cost of the instruments; (3) overloads occur oftener because the instruments tend to encourage high rates of acceleration and to discourage the series running, which is so valuable in congested areas; (4) false comparisons, which are drawn frequently, cause dissatisfaction among the motormen.

Our statements which follow are based on findings obtained over a period of 12 years use of Sangamo-Economy mercury type watt-hour meters with and without car inspection dials:

1. The average expense for clerical record keeping is less than $10 per meter year and this expense is made up largely of the accurate determination of all revenue car mileage. The results therefore are of value to the property in addition to simply that of checking the energy consumption. On some properties it has been found that a large part of this $10 was already being spent in obtaining car mileage.

2. The average expense for thoroughly maintaining—that is, cleaning and recalibrating—Economy watt-hour meters is less than $2 per meter per year, and the average cost for repair parts is less than 10 cents per meter per year.

3. Regarding the encouragement of high rates of acceleration and retardation through the use of a so-called "power-saving" device, the discussion of this point borders on competitive arguments between the devices which check a man through the use of the time element or by actual measurement of the energy. We argue that under the latter plan the watt-hour meter encourages rather than discourages series running and proper feeding of the controller in accordance with car and street traffic conditions. It does not put a premium on accelerating rates higher than those for which the electrical equipment of the car was originally designed.

I believe that the widespread experience in the United States has shown that not only with watt-hour meters but also with time-checking devices, the peaks at the substation bus are actually decreased. On one large property that made a special study of this, the 24-hour energy saving indicated through the use of meters at an average of 14 per cent, was accompanied by a reduction in the rush-hour peak of a little less than 10 per cent.

4. Under the system of rating the relative operating efficiencies of motormen through the use of the kilowatt-hour per car-mile, the meter does most of the engineering, and the question of false comparisions between men is hardly possible of justification when the usual operating constants are applied to the situation. With the kilowatt-hour as a unit the man is judged by what he does to avoid unnecessary losses and is measured by the actual expense he entails in the energy cost for operating his car.

We believe firmly in personal instruction, as Mr. Pforr recommends; but we have found that the best results cannot be obtained without the use of some checking device whereby a constant measure may be had on each motorman showing whether he is or is not following the instructions given. We have found that even where intensive instruction has been given, the use of the Economy watt-hour meter has increased the efficiency of operation from 10 to 20 per cent.

To summarize: Experience in this country, where more than 200 roads are using watt-hour meters as car energy checking devices, has shown that substantial savings result over and above those that can be obtained by the use of any number of instructors. This saving is far in excess of the overhead and operating costs. In fact, numerous roads have wiped off all operating and capital charges for the meters with the savings obtained during the first year. L. E. GOULD.

Association News & Discussions

Public Utility Problems Discussed in Pennsylvania

Relief from Paving Burdens, Quantity Production of Renewal Parts, Bus Operation, and Relations with Other Utilities Were Subjects at the Twentieth Annual Convention of the Pennsylvania Street Railway Association

DEPARTING somewhat from custom, the Pennsylvania Street Railway Association invited representatives of various municipalities to be present with the electric railway men of the state at their twentieth annual meeting at the Penn-Harris Hotel, Harrisburg, on Dec. 5. A lively interest in the proceedings was manifested by a number of the city officials who took part in the discussion which followed the presentation of papers.

An outstanding feature of the meeting was a paper on relief from paving burdens by A. T. Davison, general counsel Third Avenue Railway, New York City. An abstract appears elsewhere in this issue. In discussing Mr. Davison's paper, D. L. Starr, a member of the Traction Conference Board of Pennsylvania, urged a more complete presentation of facts to the public. He said that many points in Mr. Davison's paper were new to him and that he believed greater efforts should be made to give such information to the public. William LaFountaine, Director of Public Works, Scranton, Pa., said that the question of relief from paving burdens deserves careful consideration. The compromise suggested by Mr. Davison, whereby the city would construct the original paving between the tracks and the railway would maintain it, might be effected, he thought. The secretary of the Pennsylvania Chamber of Commerce said that the subject was one of great importance, and he would be glad to have all the available facts for presentation to the chamber.

Speaking of the relation of electric railways to other public utilities, P. H. Lantz, financial assistant to the president Philadelphia Company, Pittsburgh, said that in common with the other utilities the railways possess a huge investment and a relatively large number of employees coming in constant contact with the public. Their influence is tremendous in engendering and maintaining a friendly regard for their companies. The first step toward a better understanding of the motives of the railways and a better comprehension of their problems can well be taken by approaching those engaged in other public service occupations. They offer the distinct advantage of a sympathetic audience.

When new methods affecting customers are introduced, when schedules or routes are changed, when the rates are increased, nearly all human beings experience the same feeling. There is a natural disposition to criticise a change, and if not to resent it at least to question it. How does it sound, Mr. Lantz asked, to the man in the street, to hear an electric light man say that he "wonders what those fellows are up to now," when a street car schedule is changed? Or if a railway man is quite upset at the prospect of an advance in gas rates, it creates a bad impression. To some extent, people regard all those engaged in public utility service as pretty much in one class. They are supposed to have common characteristics. If those engaged in these services, therefore, are to be classed together, they should realize the advantages of standing together. In conclusion, Mr. Lantz told of the success which had attended the presentation of several short skits written with a view to showing the public some of the problems encountered by utility companies.

After mentioning the good results which were being obtained through the sale of securities to customers, Major J. S. S. Richardson, chairman of the Pennsylvania Public Service Information Committee, gave some good suggestions concerning publicity methods. He said that railway men should avoid the use of the phrase "educating the public." The public believes that it already is sufficiently educated and is not anxious for any more education handed out by the railway companies. In his opinion, the use of the phrase "informing the public" would avoid this difficulty.

Traffic problems were briefly discussed by Police Lieutenant Marshall, in charge of the traffic department in Pittsburgh. In his opinion, it is not feasible entirely to eliminate automobile parking. This, he considers, would interfere too greatly with the conduct of business. In Pittsburgh, by the establishment of a commercial unloading zone in the center of the block, it has been possible to prevent vehicles loading and unloading merchandise from standing alongside automobiles already parked and thus completely blocking the street.

A somewhat different point of view was expressed by C. F. Crane, assistant to the president Harrisburg Railways, who said that in Harrisburg the problem of traffic congestion is almost altogether a question of automobile parking. He thought that it was a matter of all or none, and that all automobile parking in downtown streets should be eliminated, just as all railway passes were eliminated some years ago when this abuse had grown intolerable. In the same way, the total elimination of parking would remedy the situation without discriminating against individuals.

The morning session was opened by an address from F. R. Phillips, president of the association. After dwelling briefly on the scope of the industry in Pennsylvania, he said: "There have been some who, because of the automobile and the bus, have felt that the electric railway has practically reached the limit of its usefulness. But when we consider that, in the year of the greatest expansion of the automobile and bus, the electric railways of this state increased their usefulness at the same or even at a greater rate than before, this should controvert any idea that they are going backward."

Mr. Phillips spoke also of the work of the various committees. The committee on legislative matters represented the interest of the association in hearings before the State Tax Commission. The committee on constitution and by-laws submitted a report clarifying certain portions of the constitution and by-laws. A committee on the joint use of poles was organized at the suggestion of the chief of the bureau of engineering of the Public Service Commission. The enthusiasm with which the committees have attacked their work has removed any doubt, Mr. Phillips said, as to the possibilities which exist for the association to be of real service to its members.

Reports were read by the secretary and treasurer and committees were appointed. A recommendation of the committee on constitution and by-laws suggesting that only one meeting a year be held instead of two, and that some minor changes be made in the matter of the dues, was approved. H. M. Stine, secretary of the association, warned of the difficulties that may ensue as a result of the attempt of the Pennsylvania Giant Power Survey to link together companies that are well situated geographically for this purpose but not equally well situated economically.

Commencing his remarks with the observation that maintenance is like the poor—with us always—Harry R. Meyer, development and supply division, Westinghouse Electric & Manufacturing Company, presented a paper on the advantage of buying renewal parts from the manufacturer most interested in their performance.

An abstract of this paper will appear in a future issue.

Bus operations of the United Electric Railways of Baltimore were outlined by L. H. Palmer, vice-president and general manager. He gave it as his opinion that buses are now a necessity and that their future utility lies in furnishing feeder and connecting line service. The possibilities of de luxe service he considers problematical. Special service and chartered buses may be a source of revenue to the operating company. Mr. Palmer spoke of the satisfactory results which have been obtained in Baltimore with inclosed double-deck buses. In conclusion, he emphasized the impossibility of buses handling mass transportation, in which connection the fact that the bus fare must be higher than the railway fare is an important consideration tending to limit the field of usefulness of the bus.

A telegram was received from Labert St. Clair, American Electric Railway Association, who was to have spoken on the subject "How Best to Sell Street Car Rides to Automobile Owners." The telegram summarized briefly the tenor of the remarks which Mr. St. Clair would have made, as follows: "Make comfort of street car riding rather than cost of running an automobile the basis of appeal to automobile owners. They resent being told that they cannot afford to run cars, the same as they resent being told they cannot afford fur coats for their wives. Stick to the comfort text. Say it briefly but often, and you will sell rides."

The meeting ended with a banquet, at which a number of prominent men of Pennsylvania spoke. Major Richardson added to his remarks made earlier in the day and stressed particularly the fact that information given out by the railways to the press must have real news value or it will not be published. As an example of the way that the time element affects news value, he told of a number of sensational stories that were running on the front pages of the newspapers in the summer of 1914 and how they were dropped overnight when Austria declared war on Serbia and Russia mobilized 14 army corps on the Austrian border.

John L. Stewart, member Pennsylvania Public Service Commission, spoke briefly concerning the efforts of the commission to promote at the same time the interests of the utility companies and of the public. A few reminiscences of the early days of the street railway industry were related by P. G. Wells, deputy attorney-general of Pennsylvania. The financial condition of the state was outlined in an address by Auditor-General Samuel Lewis. Mrs. C. M. Hughes, assistant to the vice-president of the Pennsylvania Section of the National Safety Council, spoke on the subject of safety. The concluding speaker was former Lieut.-Gov. E. E. Beidleman, who emphasized the need for more business sense in the conduct of every-day affairs.

The officers re-elected for the coming year included F. R. Phillips, president; W. F. Bell, vice-president, and Henry M. Stine, secretary and treasurer. On the executive committee F. R. Phillips, W. F. Bell, C. L. S. Tingley, Thomas Cooper and C. F. Crane were re-elected. New members of the executive committee will be H. L. Mitchell, West Penn Railways; J. L. Adams, Philadelphia & Western Railway; W. A. Woolford, General Electric Company, and Joseph Wayne, York Railways.

Let the City Pave and the Railway Maintain the Pavement*

By A. T. Davison

General Counsel Third Avenue Railway, New York City

IT WOULD be a waste of time to point out to street railway representatives the gross injustice of the archaic paving burdens under which the railways of the entire country, except in a few enlightened states, are literally staggering. The real question before us is, "What are we going to do about it."

At the outset, we should all realize that the real source from which our relief must come is public opinion. That is the strongest influence in the life of any community, state or nation. No legislature or set of officials can, in the final analysis, act counter to public opinion. Once we can convince the public of the gross injustice of this burden and of how vitally it is affected by it the relief will follow as a matter of course.

First, then, as to the form of relief which we should ask for. The best way to drive out a bad idea is to put a good idea in its place, and similarly, the best way to get rid of this iniquitous paving burden is to substitute for it a plan which is so fair and reasonable that no one can possibly object to it.

I believe that we cannot convince, at this time, a majority of the people that we should be relieved of all paving burdens. It may come in time, but it will only come after we have obtained a modification of the present drastic obligation.

Coming, then, to the specific form of relief which we should now ask for: The obligation on street railways to do any original paving should unquestionably be entirely eliminated. The justice and fairness of this is self-evident. It has been judicially recognized that street railway companies derive no special or peculiar benefit from the construction of the paving, and, as stated by the Street Railway Investigation Commission of Connecticut:

"The trolley car can run satisfactorily and give service to its patrons regardless of whether a street is paved or not."

Obviously, the only purpose of paving the railway area is to make it more convenient for purposes of travel by vehicles other than street cars.

The only reason ever advanced why street railways should do any paving has been that the operation of their cars caused a deterioration of the pavement. This might be an argument for an obligation to maintain a pavement after it has been laid, but certainly is no justification for requiring the street railway company to pay for the original pavement. The obligation to do original paving cannot be justified on any theory.

The idea, then, to instill into the minds of the public is this: that street railway companies should be required to restore to its former condition so much of the pavement of the street as shall have become in need of repair in consequence of the existence and use of their track.

The absolute fairness of such an obligation becomes the more apparent the more it is considered. It means that regardless of any specified railway area, if by any chance the companies because of the existence and use of their tracks in the streets, cause damage to the pavement anywhere between the curbs, they are to pay for that damage. Nothing could be fairer than this.

It may be that in numerous instances this form of relief will be given voluntarily by the municipalities, but it is important to bear in mind that in all the states of the Union this form of relief can be given by appropriate laws passed by the legislatures. There is no legal obstacle in the way of altering present paving obligations notwithstanding that such paving obligations are embodied in the franchise contracts themselves. The United States Supreme Court has upheld the authority of the state to alter the obligations contained in franchises granted by municipalities and accepted by street railroad companies, notwithstanding the argument that these franchise obligations were in the nature of contracts between the municipalities and the street railway companies.

Our approach to the public should be along the lines that the street car riders are the ones who are in reality bearing this paving burden, either directly by way of increased fares or indirectly by being deprived of service which otherwise they would have. We ought to make the people see that street railway corporations do not and cannot, under our regulatory and public service commission laws, use the streets for private profit. All moneys paid by street railways for paving obligations must be charged to operating expenses and paid out of the fares collected. Therefore, if the operating expenses of street railways must include paving obligations, the public is required to pay just that much more on its rate of fare.

Furthermore, we ought to tell the public how many passengers we are carrying on our lines each year and show them that if those persons were not carried on street cars they would necessarily be carried in other vehicles which would use the streets in greatly increased numbers and thus increase the wear on and deterioration of the pavement.

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*Abstract of a paper presented at the convention of the Pennsylvania Street Railway Association, Harrisburg, Pa., Dec. 5.

Also, we should show that the tracks in the street are an asset to every community. These tracks are a guarantee to every business man and to prospective buyers of property that there is a permanent method of transportation in that locality, whereas if these tracks were removed and some other form of vehicular transportation were substituted, there is no guarantee that such other means of transportation will continue on that street. The street railways should explain how much of their income is paid to defray these paving obligations, and then compare these amounts with the taxes paid by other public utility corporations. We should also show that the amounts paid by street railway companies for paving do not render to the riders, who in reality pay these amounts, any more service than to the general public. Those who are really benefiting are the automobile users. We should make the car riders realize that they are paying the paving burden of the automobilist whose car they have just dodged at a street intersection or whose car is blocking their progress at the peak hour in congested territory.

We should show the public, and particularly the legislature, how absolutely fair the remedy we are asking for is, namely, that we should be required to restore to its former condition so much of the pavement as shall have become in need of repair in consequence of the existence and use of the track. In this connection, we should explain that if there is any damage caused by the weight of modern electric cars or vibration or flattened wheels or defective rolling stock, then the more that damage is, the more the company would be required to pay.

Furthermore, the obligation to maintain the pavement meets any claim that it is weakened at the points just adjacent to the tracks by reason of the lines of cleavage existing at such points, thus allowing considerable surface water to percolate through into the sub-surface and weaken the foundation of the roadbed. The remedy we propose fully meets this condition. The plan places a penalty on poor track construction and a premium on good track construction. Wherever we remove the pavement for track repairs we, of course, would be required to restore the pavement to its former condition.

And then, too, we should tell the public that in eleven states and one province in Canada a paving obligation has been adopted substantially in the form which we are now asking. In three of these states, Massachusetts, Rhode Island and Connecticut, the relief is statutory and state-wide. In the other eight states, Wisconsin, Washington, Kentucky, Indiana, California, Michigan, Illinois and Minnesota, and in the Province of Quebec, Canada, this form of relief has been adopted by one or more cities.

In the city of New York the Transit Commission has provided that the rate of fare on one of the lines in an outlying section shall be increased one cent for every $100,000 of paving which the company is required to pay. As a result, the paving program in that section has been very materially altered by the city authorities.

Of course the most important class of persons to be convinced are the members of the legislature. This, however, will follow of its own accord when public opinion has been sufficiently awakened. But until that time we should should improve all opportunities of getting information directly to the members of the legislature. One method of doing this and also of getting the matter before the public is to introduce in the legislature each year a bill which will give the relief which we are asking for. The introduction of this bill should be followed by hearings, and at all these hearings we have demonstrated in New York City that the only reason why relief has been withheld is the desire of the city authorities to levy and collect from street railways a large share of the municipal paving expenses even though it be iniquitous, unjust and an imposition on the car riders. This only emphasizes the point that public opinion must be so molded that this arbitrary retention of an unfair burden can be ended.

Operating Experience with Buses*

Various Sources of Trouble Are Pointed Out—Better Brakes, Provision for Overloads, Six-Cylinder Engines for Smoother Starting, More Dependable Tires, Larger Capacity Generators and High Maintenance Standards Needed

By B. Hilburn
General Manager Tulsa Street Railway,
Tulsa, Okla.

PERHAPS there is no more interesting subject relating to the transportation industry today than that of co-ordinating bus and street car service. The announcement in the October issue of *Bus Transportation* that 155 electric railways of the United States and Canada are operating 1,914 buses over 2,405 miles of route is conclusive evidence of the growing use of the bus by electric railway operators. It is also significant that more railways are operating buses in city service than in any other field.

Upon the advent of the unsightly jitney, without any semblance of regulation or responsibility, many of us unfortunately followed the practice of the ostrich and proceeded to cover our heads, in an attempt to ward off the danger of the approaching destructive competition. With our heads buried in the sand, we were unable to observe the rapid strides being made in the development of automotive equipment.

Before we realized it, many outsiders had begun to take advantage of the insistent demand for the newer mode of transportation. Where we have failed to supply this demand others have done it. It matters not that operation of the motor bus in city transportation has in most cases proved unprofitable; there are always those who are willing to take a chance. It is almost certain that ultimately a type of equipment will be designed that will prove practicable, and as operators get more experience many of the present operating problems will be solved. Therefore, it is absolutely essential that electric railways adopt the motor bus and proceed to find its place in the scheme of transportation. If this is not done there is grave danger of the business passing into other and more progressive hands.

Like many other street railways throughout the country, our city became infested with the "jitney" in 1914. The operation of this unsightly vehicle in competition with our lines has continued down to this day. There have been many attempts to eliminate them, but without any degree of success. We have had, and now have, a city administration that is willing to eliminate them, but the state laws have been such that any ordinance passed with that end in view has always been voided by the courts.

In 1922, in an effort to eliminate the jitneys from the streets, the city passed an ordinance requiring all auto buses, or automobiles being used in transportation service, to be of not less than 16-passenger seating capacity. This was done upon our agreement to operate motor buses on some of the lines where jitneys were operating and which reached territory not served by car lines. For the most part, the jitneys were covering routes that came in direct competition with the street cars. We purchased 15 Garford buses and one White Model 50. Six of the Garford buses were of 16-passenger capacity and the other nine Garfords, and the White had a seating capacity for 25 passengers.

We operated the buses on two routes. One was 2.7 miles long. An eight-minute headway was maintained throughout the day, with sufficient extra buses to give a 6-minute headway in the peak hours. On the other route, which was 2.5 miles long, we maintained a 6-minute headway throughout the day and added additional buses to give a 3½-minute headway in the peak hours. The operating results were satisfactory, until the jitney operators, after about three months, went into court and succeeded in having the ordinance voided. Then they went back onto the line with their buses. When the Supreme Court finally affirmed the decision of the lower court, we withdrew our buses and placed them on a route which was just half way between the jitney line and the street car line. However, this operation was unprofitable, and at the present time we are only operating buses as short extensions of two car lines. We are at present directing our efforts toward securing a new franchise, which, if the city grants, we think will take care of the jitney situation. Then we will probably be required to place in operation more buses to supplement our street car service.

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*Abstract of paper presented before meeting of Midwest Electric Railway Association, St. Louis, Nov. 24, 25, 1924.

There seems to be no need to discuss the proposition as to whether buses are going to be used, because, in my opinion, that question is already settled. If the electric railway doesn't operate them, some other agency will. It means that losses are going to be incurred and that the electric railways are going to have to carry the burden, while the bus manufacturers do their experimenting and development. But it will be much better for the railways to get in on the ground floor than to let other agencies get the start, which would mean that the electric railways would suffer more than from the losses incurred during the development stage.

Therefore, it is apparent that we should put our shoulder to the wheel and exert our efforts toward solving the problems that are connected with the operation of the motor bus. And the Lord only knows, they are many. From the things I have read and the things that I have heard I have formed the impression that there are some operators of intercity or interurban buses who are making money. However, I have addressed letters of inquiry to many operators of buses in city transportation and have failed to find one who is actually making money on them. It is, I think, a favorable characteristic that most of them are optimistic. I may say that I have not included in my list the large independent operators, such as the Fifth Avenue Coach Company or the Chicago Motor Coach Company.

One of the most serious problems confronting the bus operator is the braking problem. While, no doubt, the automotive engineers have within the past year given this problem more consideration than in the past, I do not believe they yet realize the vast difference in the strain on the brakes on the bus compared with that on the ordinary service truck. The continued starting and stopping to take on and discharge passengers necessitates the use of the brakes many hundred times more per day than on a truck. And, too, if rapid schedules are to be maintained the use of the brake must be much more severe. I mean by that, the operator must run at a fast rate of speed up to the point where he is to stop, and then stop quickly. Some method of giving more braking surface must be developed, and material more durable than that now in use must be found. It is not the exception, but the general rule, that brakes in perfect condition when a bus goes out on its run will in a very short time be in such condition as to make the bus unsafe for operation. Much of this could be taken care of by proper adjustment provisions. When you are in the market for bus equipment, it will be wise for you to investigate thoroughly the braking apparatus.

Right along with the braking problem, I want to touch on the load capacity provisions. There has been no more serious mistake made by the bus manufacturers than that of underestimating the load capacity requirements. In most instances they have placed on the chassis a body which seats the entire number of passengers which the chassis is capable of carrying. It may be that under certain conditions loads can be limited to the seating capacity. It is most definite and certain that we cannot do that in our city, and I think the same condition holds true in most places. When you take into consideration the fact that more than 50 per cent of the traffic is handled in the peak hours, say from 6:30 to 8:30 in the morning, and from 4:30 to 6:30 in the afternoon, it can readily be seen that the equipment must carry overloads. If we should attempt to place in service sufficient additional equipment to provide seats for everybody in the rush hours, then the equipment could not possibly earn sufficient at current rates of fare to pay the operating expenses, because of the light traffic in the off-peak hours. So the bus manufacturers must so design their equipment that it will carry the overloads, just as the street cars have always done. And that is another thing you should go into carefully when purchasing bus equipment.

The constant starting and stopping of buses in city service is, perhaps, the cause of most of the mechanical troubles that occur. Therefore, automotive engineers should strive to achieve the utmost in flexibility of the driving mechanism of the equipment. I have discussed this feature with many of the engineers in the industry. It is my theory that a six-cylinder motor is preferable to the four-cylinder motor, in that it will afford a greater degree of smoothness in starting. We have never had much trouble with our motors, even though they have been greatly overloaded. But we have had much trouble from the clutch back to the rear end. It is my opinion that most all of this is due to rough starting. I have not always had the engineers agree with me that a six-cylinder motor would afford any relief. However, I note that some of them are now coming out with that type of motor. It will be exceedingly interesting to see how it works out. It may be that some sort of hydraulic clutch could be worked out to give greater flexibility.

When a bus gets so it does not start smoothly, and all buses will get that way as they grow older, then the process of battering at the transmission, universal joints and finally and probably most seriously the rear, or differential gears, begins. These shocks soon have an effect on hubs and wheel bearings.

Tires are also a serious matter. There is no doubt of the desirability of pneumatic tires from a resiliency standpoint. They are more comfortable to ride on and they are less destructive to the equipment. However, from the standpoint of regularity of service and dependability of service they are not so satisfactory. A flat tire is certain to lay the bus out for a trip, and this causes an interruption of the schedule. I think that in time a satisfactory type of solid cushion tire will be developed that will make the use of the pneumatic unnecessary, and when it is, that will do away with a lot of trouble.

Another important item is the electric generator. The current necessary to light up the interior agreeably, and at the same time keep the outside lights going, has proved such a drain on the batteries and generators on our equipment that they could not carry the load. That, no doubt, is being taken care of, but don't overlook that feature in your specifications. And let me remind you that while the manufacturers of bus equipment are earnestly striving to overcome all the difficulties, they are less familiar with transportation requirements than you are. They have for several years been engaged in the manufacture of equipment for use in other lines of business, in which the requirements cannot be compared with those of passenger transportation.

It seems entirely out of place to suggest to a body of street railway men the necessity for rigid inspection of equipment. Yet our experience has taught us that the maintenance problems of buses are so much greater than those of street cars that it has been difficult for our maintenance department to inspect frequently and thoroughly enough. There are so many more working parts in a motor bus, and so many more adjustments that the average mechanic is prone to release his job before all final adjustments are made. The work does not stand up, as does the mechanical work done on the street car. We have found that our bus maintenance requires much attention. Greatest effort should be made to keep complete harmony between the shopmen and the operators on the road. Friction between these two groups can cause much trouble.

C.E.R.A. Annual Meeting Jan. 8 and 9

THE annual meeting of the Central Electric Railway Association will be held Jan. 8 and 9, 1925, at the Miami Hotel, Dayton, Ohio. Following a meeting of the executive committee at 9 a.m. the sessions will be opened by the presidential address of Harry Reid, president of the association and president Interstate Public Service Company, Indianapolis.

After the presidential address, A. E. Magee, president Ohio Association for Prevention of Grade Crossing and Highway Accidents, will present a paper, "Elimination of Grade Crossing and Highway Accidents." The discussion on this paper will be led by Wallace Muir, Charles L. Henry and J. B. Dugan.

The report of a special committee appointed to review recommendations of state committees on elimination of grade crossing and highway accidents will be presented and followed by a general discussion.

In the afternoon the delegates will visit the McCook experimental flying field of the United States government.

The annual dinner will be held at 6:30 p.m. at the hotel.

The Friday session, which will be called to order at 9:30 a.m., will be devoted to the subject "Super-Power and the Railways," by E. H. Sniffin, manager power department Westinghouse Electric & Manufacturing Company. Following the discussion there will be an election of officers, and immediately after adjournment the new executive committee will meet.

Spheres of Motor and Railway Transport Discussed at New England Conference

Use of Buses and Trucks to Handle Traffic Formerly Carried at a Loss Described—Some Bus-Mile Costs Questioned—Co-ordination of All Transportation Agencies Urged

TO DEFINE better the fields of service of the steam railroad, the electric railway, the motor truck and the motor bus, a conference under the auspices of the National Automobile Chamber of Commerce was held at Boston, Mass., on Monday and Tuesday of this week. About 300 transportation men and public officials attended, among the speakers being a number of prominent electric railway executives.

At the opening session Frederic S. Snyder of Boston presided, and the first speaker was Alfred H. Swayne, president General Motors Corporation, who discussed "The Relation of Highway Transport to Other Transportation Facilities." He pointed out that New England is demanding better transportation facilities and at lower cost. Either the railroads, the electric railways and the existing independents will develop motor routes to meet present and future needs or outside groups will come in and build up a profitable business by giving this service. Road conditions in Massachusetts, Rhode Island and Connecticut are unusually well adapted to motor transport, which is largely confined to manufactured products of high value. More than two-thirds of the total motor truck movement is in distances of from 1 to 30 miles. Motor vehicle transport should be subject to the regulation of rates and service given other carriers. In taxation, the common carrier motor vehicle should be granted no favors which give it an undue advantage over the other agencies. The best interests of the public and the rail, waterway and motor interests lie in co-operation between them rather than in wasteful competition, and the greatest opportunity for co-operation is in the terminal areas of great cities.

C. L. Bardo, general manager of the New York, New Haven & Hartford Railroad, read a paper picturing the magnitude of the railroad industry in this country, the investment involved and the necessity of co-ordinating transportation by highway and rail to eliminate wasteful competition. He stated that the New Haven road stands ready to co-operate in the co-ordination of agencies for the better distribution of local traffic from the rail heads—particularly in the industrial centers and cities.

ELECTRIC RAILWAYS AND HIGHWAY TRANSPORT

A masterly résumé of the development of the electric railway and its economic place in modern life was presented by L. S. Storrs, president of the Connecticut Company, New Haven, Conn. An abstract of this paper is printed elsewhere in this issue.

"Independent Highway Transport" was discussed by James M. Swift of Boston, president Interstate Limited Motor Coach Company and counsel for the Motor Coach Association of New England. Mr. Swift outlined the demand of the public for bus transportation, declaring that it has come to stay, as it fills a new place in transport service.

A warm discussion of the place of the motor bus in New England occupied an afternoon session under the chairmanship of A. J. Brosseau, president Mack Trucks, Inc.

R. H. Newcomb, assistant to the vice-president New York, New Haven & Hartford Railroad, said that all steam railroad employees realize that the motor coach is here to stay. The railroads have consistently advocated the reduction of economically unsound competition and the real problem is one of co-ordination. It is unfair, said the speaker, that the bus should have no regulation whatever in Massachusetts, when the steam and electric roads have it. All forms of transportation should have the same general regulation. Taxation should also be levied on motor buses on a fair basis.

R. M. Sparks, vice-president Interstate Limited Motor Coach Company, sketched the development of highway transport up to the present day of bus application. He affirmed his belief in the special service rendered by the motor coach to the public and vigorously declared that this service will be maintained and expanded as fast as the traffic demands.

H. F. Fritch, Boston & Maine Railroad, said that his company is studying its unprofitable branch mileage with the possibility of doing away with train service and substituting the motor vehicle. The private automobile is a primary factor in the lack of patronage on these branches. He commended the firm stand of the electric railways of the country in 1919-1920 against the jitney, which led to success in the battle against these invaders. It is no proof, the speaker declared, that the bus is economically sound because the public patronizes it in particular localities. When equitable tax adjustments are made in relation to the motor bus, the allurements of this new form of transportation will diminish somewhat. A broad study of the entire passenger and freight carrying problem is essential to a solution of the motor bus situation.

A. R. Williams, counsel of the United Electric Railways, Providence, R. I., maintained that the field traversed by the motor bus is already served by steam or street railways. If these two agencies cannot afford to lose to the motor bus they will have to go out of business where the bus has taken the patronage. If the public has reached the period of non-regulation of any such transport agency as the motor bus, Sovietism once removed has arrived. It is impossible for the rail carrier economically to handle mass transportation unless it also handles the middle-of-the-day business. If the public really demands the privilege of riding on rubber the service should be properly regulated and rendered by existing carriers. The speaker charged that a motor bus line has taken one-third of the income of the New Haven road between Providence and Fall River.

Mr. Sparks said that New England is from 3 to 5 years behind the times in motor coach service. George H. Gariepy, Pawtucket (R. I.) Chamber of Commerce, bemoaned the increased cost of bus and trolley riding. In reply to an inquiry, Mr. Sparks said that his motor coach company proposes to develop the Providence-Fall River traffic to the utmost and to handle it the year round. T. H. Benton, of the Springfield, Mass., city transportation board, said that the city authorities approve granting the existing transport agencies the fullest opportunity to develop the forms of service required by the public before turning over such rights to others.

Clark V. Wood, president Springfield Street Railway, pointed out his willingness to supply any form of service acceptable to the public and for which the latter will pay a reasonable price. Fred A. Cummings, assistant to the chairman of the board of trustees, Eastern Massachusetts Street Railway, agreed that the motor coach has come to stay and said that his company is willing to operate any bus line so long as it yields 6 per cent on the investment and provides the required service. Bus operation will be put on wherever it proves more economical, but the company will not parallel a bus line where the latter is not under regulation.

H. B. Freeman, receiver Hartford & Springfield Street Railway, pointed out that buses on that road have superseded electric cars and are giving an improved service. The running time is now but 1 hour 20 minutes between the terminal cities against a former time of 2 hours 15 minutes by trolley. De luxe buses are operated on a fare of $1 each way. A new class of traffic is being developed, including business men formerly driving private automobiles over the route and women who refrained from boarding trolley cars in the center of the highways because of traffic density.

Mr. Freeman pointed out that the substitution of motor buses on the Asylum Avenue line in Hartford by the Connecticut Company has apparently reduced street congestion, partly as a result of the stopping of the buses at the curb. George E. Pellissier, Holyoke Street Railway, emphasized the need of more studies of costs, bearing in mind, however, that cost alone does not indicate the public's willingness to pay for a service. P. G. Carleton, counsel Eastern Massachusetts Street Railway, contended that the Massachusetts law should require independent buses to secure licenses from the Department of Public Utilities, as is required of electric railways before the latter can operate motor vehicles.

Mr. Williams pointed out that many communities would be in a serious transportation plight if the electric railways should take up certain local trackage, install bus service and then find the bus service inadequate. One cannot say how permanent the motor bus will be, at this time.

In closing the session, Chairman Brosseau said that a large majority of the motor vehicle manufacturers favor the state regulation of buses.

Edward Dana, general manager Boston Elevated Railway, presented the opening paper on Tuesday morning at the motor bus session on "The Economics of Motor Bus Operation." The author recounted the development of motor bus service on the Boston system and gave some significant data on the financial aspects of motor bus service on sparsely patronized trolley lines where the handling of mass transportation is not a feature of the day's work. An abstract of Mr. Dana's address is published elsewhere in this week's paper.

W. J. Flickinger, assistant to the president the Connecticut Company, New Haven, read a paper on the development and experience of his company in the motor bus field. This is abstracted elsewhere in this issue.

C. V. Wood, Springfield, Mass., said that the motor bus has been "sold" to the public and that the electric railways have been appointed the collectors, but some question exists as to the willingness of the public to pay the cost of such service in addition to street cars. H. W. Johnston of the New England Motor Tours Company, Arlington, Mass., said that his operating cost per mile, including taxes and all charges, is from 23 to 26 cents. These figures were vigorously questioned by several speakers, the consensus of opinion being that the cost of motor bus operation would run well over this amount in average practice. R. M. Sparks, Boston, supported the range of costs presented by Mr. Johnston. Mr. Dana again urged his hearers to beware of motor vehicle mileage cost statistics, on account of the immense range of conditions encountered. There is no more hazy subject in the electric railway field, he said, than undigested data on costs per vehicle or car-mile. Mr. Flickinger concurred, and after the statement that taxes and return on the investment were not included, said that the rough approximate cost per motor-vehicle-mile of the Connecticut Company's bus service is about 28 cents. F. A. Dean, Commerce Motor Truck Company, cited a cost per mile on one system for single-deck buses of 31 cents, and 38 to 39 cents for double-deckers. He cautioned his audience not to take "fly-by-night" estimates as their probable operation costs.

F. A. Cummings of the Eastern Massachusetts Street Railway said that no competition exists between his company and the Boston Elevated Railway over the Park Square-Arlington Heights bus route toward Lowell of the Eastern Massachusetts, as no local traffic is handled. It was maintained that little or no competition exists between the electric railway bus service in the eastern New England district and the steam railroad service.

A plan for uniting automobile motor truck and bus owners under the banner of the American Automobile Association was discussed by Ernest N. Smith, general manager of the A.A.A. Under the plan of organization two new departments will be created, a truck department and a motor bus department, with the necessary trained personnel. There will be no effort to compete with existing state organizations of truck and bus owners, but efforts will be directed toward co-operation with such organizations with a view toward solving national problems which continue to be a stumbling block to the freer use of commercial vehicles. There is at present considerable variation in truck tonnage laws, handicapping truck freight seriously in many quarters. Smoothing out matters of this sort will be among the many aims of the truck division of the A.A.A.

In its activities along legislative lines the new division will function through representation in the Motor Vehicle Conference Committee. At present the bus and truck owners of the country are not entitled to representation and cannot function in co-ordination with the committee because they are not represented by a national organization.

RESOLUTIONS SUM UP MEETING

Resolutions were adopted by the conference looking toward co-operation of rail, motor and water carriers rather than unregulated and wasteful competition. Other resolutions indorsed regulation of motor vehicle common carriers similar to that for other utilities, the requirement of certificates of public convenience and necessity and the requirement of adequate liability insurance.

It was resolved that taxes should consist of (a) state motor vehicle taxes, the proceeds of which should apply to highway maintenance; (b) taxes in exchange for franchise rights, providing an amount equivalent to that paid under the preceding item be deducted.

Uniform common carrier regulatory statutes throughout New England, and uniform regulation of highway traffic were recommended. Enabling legislation was recommended to permit steam railroads, trolleys and other public utilities to acquire, own and operate motor vehicles.

It was the sense of the conference that to promote co-operation of the various parties and co-ordinate railroad and truck service, a permanent committee should be created to be known as the New England Transportation Council. This should consist of equal representation from each of the several agencies represented in the conference, together with representatives of the general public.

The traffic program of the conference was summed up as follows:

Resolved: That it is the sense of the session that the approach to the problem of traffic congestion should be broadened to comprehend all the agencies contributing to or affected by transport traffic; that the traffic policy should develop the basic physical plan of the city; encourage higher efficiency and organization in traffic and transport operation and administration; that all large traffic centers should promptly organize for thorough study of their complete traffic-transport plan, in a manner best suited to the community, to the end that a broad co-operative effort of all groups of our city population may be secured to provide for both present relief and future needs.

Railway Operation of Buses in Connecticut*

Increasing Traffic Has Necessitated the Use of Larger Vehicles, but the Bus Has Been Found Unsuited for Mass Transportation—Maintenance Methods Are Described

BY W. J. FLICKINGER

Assistant to the President the Connecticut Company

WITH the policy of the state in regard to bus operation clearly defined, the management of this company was in a position to take advantage of the bus as an auxiliary. The first bus route was established in July, 1921, additional routes having been added, until at the present time we operate 15 bus routes in New Haven, Hartford, Stamford, Bridgeport, Westport, Waterbury, Meriden and New Britain. These are divided into three classes:

1. Extensions into unserved territory which had developed some distance from the rail facilities.
2. Replacement of trolley service on routes where the revenue was low and which were faced with the necessity of making large expenditures for track and overhead rehabilitation.
3. Between terminals where the highway offers a shorter route than the rail line which was built along a circuitous route to serve the greatest amount of intervening territory.

There is one other instance where it was necessary for passengers to travel from the north to the south part of the city over the main business street and numerous requests were made for an alternate route to avoid delays incident to the heavy traffic on the main street. This would have necessitated the construction of track at a cost of at least $125,000. A bus line about one-half mile in length, connecting with the rail lines, has satisfactorily met this situation at a much lower cost.

In the first two classes the rate of fare on the bus is the same as on the trolley, with free interchange of transfers. In the third class, the expedited service by the bus is recognized by a slightly higher rate.

Our original bus equipment included 3 27-Passenger Packards, 2 21-passenger Whites, 2 18-passenger Whites, 1 Duplex, 1 Mack and 19 Reo Speed

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*Abstract of a paper presented at the New England Motor Transport Conference, Boston, Mass., Dec. 9.

Wagons, all on truck chassis with cheaply constructed bodies. By that time the motor truck industry and the body manufacturers became actively engaged in developing equipment which would be more suitable for the transportation of passengers than the truck and the lightly constructed, inconvenient and uncomfortable body. The first buses of improved type were purchased in November, 1921, to which new equipment has been added from time to time as required until at the present time we own 4 Pierce-Arrows, 2 Fageols, 8 Yellow Coaches, 2 Macks and 2 Whites with a seating capacity of 29, 10 Macks, 13 Whites and 5 Republics with a seating capacity of 25, 2 Whites with a seating capacity of 21, 1 White and 2 Brockways with a seating capacity of 18, 1 Duplex with a seating capacity of 20 and 8 Reos with a seating capacity of from 12 to 14, a total of 60 buses. This equipment, together with garage facilities, represents an investment of approximately $500,000.

At the close of 1922 we were operating 79,000 bus-miles per month; at the close of 1923, 92,000 bus-miles per month, and at the present time we are operating 134,000 bus-miles per month, an increase of nearly 70 per cent over 1922.

With the increase in traffic, we have found it necessary to discontinue nearly all of our 12 to 14-seat buses, substituting buses of larger capacity. We have also discontinued from passenger service all but three of the original buses which were on truck chassis. This investment was not, however, a total loss as we had for several years been working on a budget to motorize the line department, and the completion of this budget was made possible by converting this equipment into tower and signal maintenance trucks, in which service they will have some further years of usefulness. The amount which it was necessary to charge against bus equipment, therefore, was more a matter of obsolescence than depreciation.

In an industrial community such as we serve there is a very heavy peak load demand, which adds materially to the cost of the service because of the necessity for stand-by equipment. Under the law in Connecticut the maximum number of passengers allowed on a 25-passenger bus is 27 and on a 29-passenger bus 31, which makes the ratio between bus and trolley on the basis of carrying capacity 1 to 3. As an illustration of how this works in actual practice, we have one route serving a highly developed industrial community on which the traffic demands are such as to require 2 buses for 18 hours, 3 buses for 12 hours, 4 buses for 4 hours and 9 buses for one hour, so that we have 5 buses which operate only one hour out of 18, carrying only a one-way load; 1 which operates only 4 hours and one 12 hours, the 7 part-time buses operating only a total of 21 bus-hours per day. In the same city it requires 40 trolley cars to operate the base schedule, while during the peak-load period of about 2 hours 90 cars are required. Due to the lighter traffic in the off-peak hours, it would probably require a very few more buses than trolley cars to handle the traffic, but during the peak-load period of 2 hours it would require three times as many buses as trolley cars, or about 370 buses. This would result in an investment in over 200 buses for rush-hour service as against 50 trolley cars.

Going a little further and taking a concrete example, there is one industry located on the outskirts of the city at which 1,150 employees finish their day's work at the same time in the afternoon. These men are carried to the city in 14 trolley cars. To perform this same service would require 40 buses. I offer this as food for thought to any who may have conceived the idea that the time is not far away when buses will be the sole means of mass transportation, as it must be recognized, of course, that the transportation agency is under obligation to meet the full transportation requirements at all hours of the day and under all conditions.

I believe it is necessary to study the traffic situation very carefully on individual routes, as where the number of passengers on a bus at any one time is limited an increase in the size of the bus may produce a very desirable effect on the net revenue. I have one case in mind where the substitution of 29-passenger buses for 25-passenger increased the net several cents per bus-mile because additional business was there and all that was needed was the increased capacity for handling it without a corresponding increase in the bus mileage. There was practically no difference in the operating cost between the 25 and 29-passenger vehicles.

When we commenced to operate buses we felt that complete cost records would be necessary to guide us in making decisions from time to time, particularly as we were inexperienced and would have to watch results very carefully. Accordingly, we immediately established a classification of accounts along lines similar to those used in our railway accounting and gave detailed instructions as to the distribution of expenses to all of our employees having anything to do with bus operation. We have a detailed record of the maintenance and operating cost, gasoline and oil mileage of each individual bus, also the mileage of each individual tire. Having found the speedometer unreliable for the purpose of computing bus mileage, we have equipped each bus with a hubodometer, and the odometer readings are, from time to time, checked against the route mileage, to see that the odometers are in proper working order. As all of our costs are analyzed on a bus-mile basis, it is very important that we get the mileage as nearly accurate as possible. A failure to credit a bus with all mileage operated would give it an unfair disadvantage in making comparisons.

Each driver is provided with a card on which any defect developing is noted. The card is turned in with the bus at the end of the run and the defect is taken care of before the bus again goes on the road. In so far as possible, buses are assigned to the drivers. By this method, a driver is more careful in handling his bus and will give it a great many small attentions owing to his personal interest in it.

The scheduling and operation is under the supervision of the same subordinate official who has charge of the trolley operation, although where conditions require it street supervisors are assigned to bus operation exclusively. By this method the bus and trolley schedules are more readily co-ordinated to make a unified transportation system. I might say, incidentally, that between Dec. 1, 1923, and March 31, 1924, out of 37,700 scheduled bus-hours, our buses lost, due to mechanical troubles or bad road conditions, a total of only 92 hours.

The bus maintenance organization, so far as the chassis is concerned, is entirely separate from the organization which maintains the trolley cars. We believe this to be essential as the bus work requires an entirely different line of experience. The bodies, however, are practically the same as our trolley car bodies and they are maintained by the regular car shop organization.

We have a central garage in New Haven, which not only takes care of the maintenance of the New Haven buses but also has an overhauling shop where the buses from the entire system are taken for general overhauling, the bodies, however, being removed and overhauled in the local shop while the chassis is being overhauled in the central garage. The work on both is usually completed at about the same time and when the chassis goes back to its division the body is placed on it and it is then ready to return to service. So far, this arrangement seems to be working satisfactorily.

It is our practice thoroughly to inspect each bus every 7 days, at which time it is thoroughly greased and the crank case oil changed if necessary. We change the crank case oil every 1,500 miles.

While we have adopted no definite general overhauling schedule, we find that after a bus has operated between 50,000 and 60,000 miles it is to our advantage to take it down and renew all worn parts. In this connection we depend very largely on the judgment of our foreman as to the necessity for general overhauling as he is fairly familiar with the physical condition of each unit.

One item of expense which we have had to adopt more or less blindly is that of depreciation. We originally adopted the straight line depreciation basis over a period of three years. With the improvement in the type of equipment and the discovery that our buses would average from 35,000 to 40,000 miles per annum, we felt that our charge was too high, as with careful maintenance and periodical overhaul we felt we should get at least 200,000 miles per bus. Most manufacturers with whom I have discussed the matter claim that a greater mileage can be expected. We preferred, however, to be conservative and therefore adopted the mileage basis of depreciation on a life of 200,000 miles. If experience shows us that we will get a greater life, it will, of course, be a pleasure to change our depreciation basis.

It seems to me that the experience gained, not only in Connecticut but in nearly all of the other states where bus operation has for the past few years been a live issue, leads to the following conclusions:

1. That the bus is an established transportation facility, useful as an auxiliary to existing rail transportation in serving new territory where there is not sufficient revenue in sight to warrant the investment necessary to construct rail facilities, or to substitute for trolleys where rail facilities can no longer be maintained except with the expenditure of money out of all proportion to the earning capacity.
2. To permit competition between any forms of public transportation is an economic waste.
3. In territory where there is a chartered transportation agency, such agency, by reason of the training of its officers and employees, is equipped to meet best all of the transportation requirements and the people will receive at the hands of that agency a regular and dependable service.
4. Whether it be a street railway company operating rail cars or buses, or a legally established bus company, it is only by protection from competition and regulation by the constituted state authority that the investment in these enterprises can be safeguarded and the public receive the best transportation service at reasonable rates.

Economics of Motor Bus Operation*

On the Boston Elevated System Motor Buses Have Been Used Advantageously to Solve Difficult Situations—Overenthusiasm Warned Against

BY EDWARD DANA
General Manager Boston Elevated Railway

YOU have heard it said that the transportation of a modern city is necessarily a monopoly. I think the word in unfortunate, for it is a monopoly only in the same sense that our fire department, our police department or water department are necessary monopolies. Nevertheless, this is a well-established basic fact and because of its soundness there came into existence the regulating bodies clothed with the authority to insure fair treatment of the agency rendering transportation as well as to prevent those agencies practising upon those it served the evils of unregulated monopoly.

I am referring to these facts advisedly before attempting specifically to take up the motor bus itself because if the advocates of the motor bus are under the impression that this vehicle can change this basic principle they advocate a destructive transportation agency, and like most destructive agencies they usually contain the seeds of their own destruction within themselves.

Many motor bus advocates really believed that it would be possible to run counter to the basic principles which had been developed during the last quarter of a century in this country. They put lines in operation and ran them only when the greatest opportunity to get traffic existed. With such a load factor, the elements were in existence to assure a low fare and they gave low fares and usurped the street railway business and at the same time created new business.

Let us examine this condition and apply it under our basic principles. A street railway system functions for the entire area served. It has to maintain a readiness to serve over the entire district and cars are operated 18 to 20 hours a day, 365 days a year, regardless of the amount of traffic, for the good of the district as a whole. For instance, the Boston Elevated carries 1,100,000 passengers on a week day and runs 161,000 car-miles. On a Sunday it carries only 600,000 but runs 108,000 car-miles. The receipts on Sunday are 14 cents per car-mile less than on weekdays. That is what I mean by readiness to serve.

Suppose, for instance, that the street railway was not affected by the basic principles I have referred to, but instead functioned according to the underlying principle which is characterized by the jitney line I referred to, what would result? Some lines would have a low fare of 5 cents and other lines would have a fare of possibly 25 cents if they were to have any service at all.

Now let us turn to the constructive aspect of the motor bus. The economics of the motor bus comes down to the management of a new tool to do work which has been done in some instances with an improper tool and to do work for which we were not equipped with any tool before.

The motor bus, it would seem, has established its place as a part of a unified transportation system. It has its proper place, just as does a one-man car or a two-man car or a multiple-unit train. In 1923, 95 railways operated 925 buses. I understand today 168 railways operate 2,633 or more buses. Progressive railway officials apparently see that in the motor bus there exists a very useful ally to the electrically operated units. A combination of facilities is therefore afforded which can give the traveling public the service which can best serve its needs.

The story of the motor bus as it has unfolded in the territory served by the Boston Elevated Railway may be of interest generally.

Under the 1918 act, the Elevated was required to be operated on a service-at-cost basis and fares were increased. On July 10, 1919, a flat 10-cent fare had been reached. This flat fare was accompanied by a substantial decrease in revenue passengers, even though the fare was sufficient to prevent deficits and cover the full cost of service.

Naturally, there has been some discussion and advocacy of competitive buses, but the assessment against the taxpayers of $3,980,151.67 for the first year's deficit under public operation and the fact that this amount had to be repaid before fares could be decreased had a very real effect upon those in authority by whose action motor buses could be permitted.

The consequences of the act were understood by most municipal officers, and it was realized that if competitive motor buses were permitted and the revenue of this great system diminished one of three things must occur under the laws:

1. An increase in fare above 10 cents to offset the loss, or
2. Additional deficits against the taxpayers, or
3. Loss of service in the district affected, in an effort by the state trustees to localize the competition and place no burden upon the system as a whole which might result in a higher fare or a tax assessment.

The result was that the cities and towns refused licenses to competitive jitneys with a single exception, where the city later revoked the competitive jitney license.

The Boston Elevated Railway began the operation of motor buses on Feb. 24, 1922, between Union Square, Brighton, and the Boston-Watertown line on North Beacon Street. Bus service has increased from that time and we are now operating bus lines requiring for regular schedules 46 buses and for extra service a total of 66 buses. During the month of October we operated 97,680 bus-miles and carried 676,005 passengers in buses.

As an instance of the use of this new ally on the Boston Elevated Railway the so-called Cottage Farm line may be cited. This line was 2.219 miles long, operated through narrow streets and served 3,600 people in both directions daily. The rebuilding of the Cottage Farm Bridge was up for consideration. Following established custom the car rider was to be assessed approximately $60,000 of the cost. The rebuilding of the tracks over which the line operated would cost $180,000. The 8 cars on the line represented a capital outlay for both car and power plant capacity of approximately $200,000. To serve 3,600 people by cars a plant investment was called for of $440,000. The plant investment if buses were to be substituted would not exceed $100,000, a fixed charge saving of no inconsiderable proportion.

Referring again to the use of a tool, why use a sledgehammer if a tack-hammer will get results? Or in railway vernacular, why put the Twentieth Century on the Skowhegan branch?

But let not the pendulum swing on the strength of such a performance and bus enthusiasts rush in where angels fear to tread and proclaim its ability to supplant, replace and relegate to the Dark Ages the mass transportation agency—the street railway—than which no more economical agency exists today to perform its task. Ridiculous and absurb. We might as well urge that a Ford was all that is necessary in the form of an automobile, so why have so many other makes.

I referred to the hope of new territory in the use of the motor vehicle. The Boston Elevated has several lines of this very character where no previous trolley service existed but where today the district is served as an integral part of the Elevated system.

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*Abstract of a paper before the New England Motor Transport Conference, Boston, Mass., Dec. 9, 1924.

There is still another use, the ultimate development of which by street railways has not been appreciated, and that is chartered bus service. Street railway service of this sort was limited by the proximity of the terminal points of the trip to car lines. The bus removes this limitation and permits the street railway to utilize its personnel and its equipment when not otherwise engaged, except for the very peak hour.

Summarized, therefore, the bus in some instances can replace trolley lines; in others, reach out into new territory, and in a third way become a business getter in the way of special parties.

As regards the vehicle itself, its mechanical efficiency and its appointments for the service to be rendered opens up a fascinating field for a multitude of detailed discussion. Suffice it to say that I have unlimited confidence in the enthusiasm and the ability of the motor vehicle builders to co-operate, study and improve almost from day to day this agency once the underlying basic principles of its regulation, control and field have been definitely indicated.

But there is one thought which comes to my mind in this connection, and that is that over the doors of most Roman villas there usually was an inscription, *Cave Canum*, which, translated, means "Beware of the dog," and I offer for the consideration of the bus men an inscription over the door of the electric railway, "Beware of bus-mile statistics."

Providing Complete Transportation Service*

There Are Many Uses of the Bus in Connection with the Electric Railway and the Two Should Be Used Together Where Best Suited

By L. S. Storrs
President the Connecticut Company,
New Haven, Conn.

One often hears the statement that the electric railways are in a transition period. To a certain extent this is true, but this utility has constantly undergone change. From the days of the horse car, one modification after another has been adopted in the effort to keep ahead of the reasonable requirements of the communities.

In an effort to supply necessary public service and in order that full transportation facilities may be offered, railways are rapidly adopting the motor bus as an auxiliary. At the present time there are at least 3,000 motor buses operated by electric railways in the United States, 300 of which are in New England.

The task confronting the transportation utility is not that of providing regular service to the people of the cities during the 18 to 24 hours of the day, for that would only mean running cars over the tracks on even schedules, a relatively simple matter. The real job of this servant of the people is providing sufficient service to take care of their needs in going to work in the morning and returning home in the afternoon.

This mass transportation period is but four hours in duration, or at the most four and one-half hours, during which approximately one-half of the total daily passengers must be taken care of. That is, of the 44,000,000 passengers per day in the United States, at least 20,000,000 must be transported in 4 hours, or at the rate of 5,000,000 per hour.

This mass movement is the real problem, and one that large-capacity cars, or trains, running along the streets of our cities or through subways or upon elevated structures in the metropolitan areas, alone can cope with. The requirement for added facilities to take care of this mass movement in the growing American cities is ever confronting the transportation executives.

We are so familiar with the inconvenience in travel, during the peak hours, in street cars or subway, that the common impulse is to complain of the service or criticise the management when as a fact the most efficient service is being rendered. Either the subway facility is taxed way beyond the capacity which it was expected to care for when planned; or the number of street cars, operated through streets already congested to the point of saturation, will not permit any further addition. But try to visualize the results with bus operation. I have in mind one of the bus routes in Connecticut on which the travel requires the following service:

For 18 hours, two buses; for 12 hours, three buses; for 4 hours, four buses, and for 1 hour, nine buses. So we have five buses which operate only 1 hour out of 18 carrying a one-way load; one which operates only 4 hours and one 12 hours, the seven part-time buses operating only a total of 21 hours per day. This is mass transportation with a vengeance—and it is a nice question as to whether rail transportation to serve this route would not be more efficient and economical.

The great growth of American cities has been made possible solely through a thoroughly efficient and dependable system of transportation. Dependable service, not only that of today, but throughout the days to come, cannot be obtained unless supplied by a responsible organization depending upon its patronage for its own financial success. If the service is rendered by groups of individuals jointly, or by each in his own interest there can be no assurance of continued service. It will depend upon the personal whims or ability to carry on, and that solely during periods of prosperous operation.

In any city there are lean areas from the transportation standpoint through which dependable service is as much of a necessity as it is in the districts that make possible profitable operations. Complete service through all portions of a city is needed for the growth of the city.

The development of the motor bus has placed in the control of the electric railways a very efficient aid in providing improved service in the cities and surrounding districts. The greater flexibility of a transportation unit which is not confined to fixed routes, makes it possible to extend service into areas that have been developed since the electric railway trackage was constructed, and, by co-ordinating that service with street railway service, give a more adequate facility to the community.

It must be apparent that the need for a well-planned system of transportation within any community must include all types of service that the present stage of the art has developed; that each type of service must be utilized in that particular work which it is best designed to perform; that both types must be placed under the same obligations and restrictions; and that both must be under the identical regulatory body in order that the ultimate end of a perfect transportation system may be attained.

By far the best results are possible when both types of service are operated under the control of one transportation organization with the obligation to make the most efficient use of each. Only under such a policy can a thoroughly co-ordinated service be produced and the maximum benefits obtained.

A great deal has been said of the probable substitution of the motor bus for the electric cars, but it is apparent that the bus is not capable of efficiently serving mass transportation in the large cities. It is equally apparent that there are many uses to which this unit can be put in providing essential service, and the electric railways must be prepared to adopt the motor bus as an integral part of their plant, and by adopting a broad view of their obligations abandon the idea of being merely electric railways and take on their real function, that of being the agents of the public in supplying all of the transportation requirements of the communities.

The time has come for the use of the bus by the experts. It can be made to be of great service, but its full utility cannot be determined until serious efforts have been made thoroughly to co-ordinate the two types of service. This new facility is as yet too recent a development for anyone to predict with any degree of certainty the particular instances of its actual value in the general transportation needs of any city. The efforts that have thus far been made to co-ordinate the bus service with existing trolley service are of too recent date to have more than pointed the way to possible other uses.

Without question the first obligation of the railway is to fill the unserved areas, after which there is the gradual opportunity to economize by substitution of the motor bus for electric cars in thin traffic areas, when confronted with excessive track reconstruction expenditures. There are opportunities to develop new business by a combination of the above two bus operations. The possession of a sufficient fleet of bus units will develop the incentive to find new uses for these units. While it is unlikely that there will ever be a large amount of supersession of the street cars by the bus in city areas of dense riding, experience in the actual cost of bus operation as compared with the cost of operation and upkeep of electric railway plants will serve as a guide to direct the gradual expansion of bus operations.

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*Abstract of a paper read at the New England Motor Transport Conference, Boston, Mass., Dec. 9, 1924.

There is a field for the development of a higher grade of service than that possible in mass transportation, or what has come to be termed de luxe service, at rates considerably higher than traction fares, as well as high grade special service along non-served routes, such as that performed by the Fifth Avenue Coach Company, at slightly higher rates. These are all matters that the transportation experts should determine, but it is certain that they will be determined by someone.

It has been said that the good will of the community is the greatest single asset of a public utility and no steps can possibly be taken that will be productive of so large a measure of this good will as the adoption by the railway of the bus and the active development of such service necessities as exist within the various communities.

There is one phase of the matter that warrants serious consideration, the result upon the securities of the electric railway, provided there is any large amount of substitution. The superseded physical property has a definite value which is represented by issues of stock or bonds. It will be necessary to permit the new service to earn a net in excess of the allowed "fair return" sufficient to amortize the physical value so superseded over a term of years. This is but one of the problems that will be presented during the period of readjustment.

The experience of electric railway companies in New England with bus operation has encouraged some of us to believe that we shall be operating many more buses in the near future. At the same time, we have no reason to believe that the bus will supersede the electric railway in its most important function—the carrying of the millions of persons to and from work during the rush hours of the day.

New Englanders Discuss Maintenance and Employee Relations

SO MUCH interest was aroused in the subject of rolling stock maintenance at the November meeting of the New England Street Railway Club that at the meeting on Dec. 4 another paper was presented on this topic by H. S. Day, Westinghouse Electric & Manufacturing Company, Boston, Mass. President T. H. Kendrigan occupied the chair. Mr. Day's paper will be published next week.

In opening the discussion President Kendrigan pointed out that a sleet storm is hardest on railway motors and that where snow is dry much less difficulty is encountered in maintaining service. Mr. Day admitted the influence of weather effect on motors, but declared if the insulation of motor coils is well varnished and if the snow-fighting equipment is in good shape, much less trouble will occur than where poorer maintenance holds sway. Good maintenance implies that field coils are properly dipped and baked, that insulation is "live," motors are tight and that the roads are open. It is a pity to diminish service during storms for on these occasions many opportunities arise to carry patrons who ordinarily use private automobiles.

W. C. Bolt, Eastern Massachusetts Street Railway, Boston, said that he is studying the problem of when to replace old with new equipment and Mr. Day stated that he is making a similar investigation.

John Lindall, Boston Elevated Railway, concurred in the value of systematic inspection and overhauling, but declared that local service conditions are often controlling. In the same city a single storm will sometimes tie up the cars on one division and leave those on another free from interrupted service. Poor track is responsible for a multitude of car failures, and after track is relaid it often happens that the pull-ins in a district begin to diminish after a few months' service over the new rails. "Two years ago," said Mr. Lindall, "we had 300 motors that gave us a good deal of trouble and I recommended their replacement but could get only money enough to replace 100. We took out the worst motors and put the new ones into the hardest service. This step has reduced maintenance costs on these 75 cars so much that I question whether I could now make out a case for replacing the other 200 motors."

Mr. Bolt emphasized the generally good condition of tracks on the Eastern Massachusetts system as a factor in lowered car repairs. Special attention has been given to drainage to prevent water accumulating on the tracks. Nothing is more damaging to a motor than salt water. Passenger car equipment is not built for snow fighting, and an adequate snow-fighting equipment is important as a factor in relation to car maintenance. In a typical storm eight to twelve motors were burned out on one car line in 2 or 3 hours where the snow had not been properly removed, and yet there were no motor failures on the rest of the system where similar cars were operating.

F. B. Walker, chief engineer of maintenance Eastern Massachusetts system, pointed out the importance of keeping up the voltage in reducing car pull-ins from motor burnouts. Of 180,000 joints on the system about 125,000 have been replaced and many bonds test 100 per cent in conductivity. "We credit our department," said he, "with about $100,000 in motor repair savings as a result of joint and bond maintenance." R. D. Hood, Haverhill, Mass., said that much good has been effected by the use of negative feeders. In hard winds it is the practice on the Massachusetts Northeastern to put up the voltage to 650 and fewer motor failures result.

Following the usual dinner, S. F. Fannon, director division of public service, Sherman Service, Inc., Boston, addressed the club on "A New Conception of the Job," and Prof. T. N. Carver of the department of economics, Harvard University, gave a talk on "Economic Tendencies." Mr. Fannon's paper appears elsewhere in this issue.

Professor Carver depicted the causes of many modern economic wastes and emphasized the trend toward their reduction resulting from the diffusion of wealth, employee and customer ownership. He predicted further advances in the cost of labor in this country, but drew the conclusion that as relations improve and as the investing class increases in numbers many present causes of conflict will disappear.

Kentucky Association Meets Jan. 15-16

THE annual meeting of the Kentucky Association of Public Utilities will meet at the Seelbach Hotel, Louisville, on Jan. 15 and 16. There will be a get-together dinner for members on the night of Jan. 15, with an all-day business conference on Jan. 16.

American Association News

Special Reports Available

THE following special reports have been prepared by the Bureau of Information and Service and are available to member companies in good standing upon request:

Motor Bus Operations in the United States.—List of motor bus lines showing name and address of the operators and where the information is available, statistical data on the character of their operations. Part I, motor bus lines in Arizona, Colorado, Connecticut, Delaware (Wilmington), Indiana, District of Columbia, Maine, Maryland, Michigan, New Hampshire, North Dakota, Rhode Island, Utah, Vermont, Wisconsin, Wyoming.

Accident Statistics of Electric Railways for 1923.—Analysis and summary of the statistical data on accidents reported by more than 150 companies on association questionnaire. The information covers the number of accidents, ratio of cost to gross earnings and comparison of accident records on unit bases, all of which is also compared with the record for the year 1922. A summary of safety work carried on by electric railways is also included.

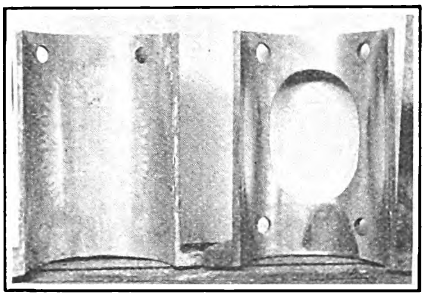
In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared, bringing them up to date.

Maintenance of Equipment

Utilizing Worn Axle Brasses

OBTAINING double life out of split axle brasses by replacing the worn top half of the lining with the bottom half is accomplished in the Wheaton shops of the Chicago, Aurora & Elgin Railroad. Finding that an excess supply of lower halves of axle lining were accumulating, an investigation was made to see if they could not be used for some other purpose. By filling in the bearing window with babbitt, and building up the flange by welding, it was possible to utilize the bottom half as a top half. The accompanying illustration shows a babbitt lined split bearing before and after closing the window with babbitt.

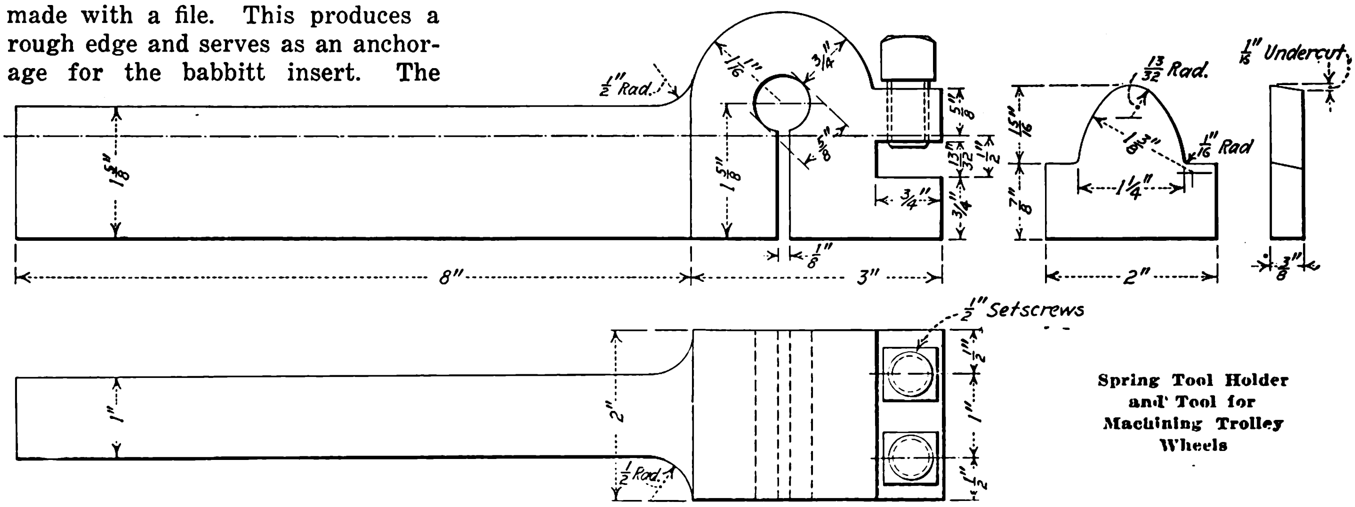
The edges of the window are serrated by means of indentations made with a file. This produces a rough edge and serves as an anchorage for the babbitt insert. The bearing is then placed around a mandrel and the window poured full of babbitt. It is machined inside and out, and is suitable for use as an upper half of an axle bearing. This practice has resulted in the use of material which heretofore had been considered scrap.



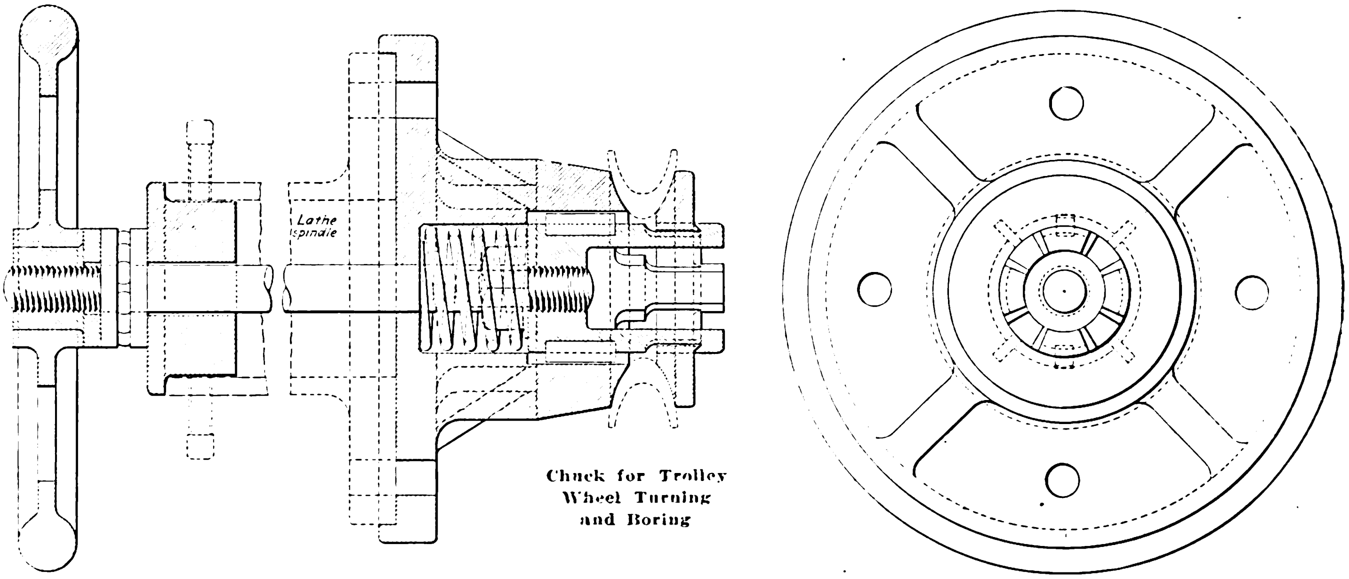
Bottom Half Axle-Lining Brass with Window Babbitted for Use as a Top Half

Chuck for Machining Trolley Wheels

IN THE new Hillcrest shops of the Toronto Transportation Commission, Toronto, Canada, a new form of chuck has been developed that makes it possible to bore and turn trolley wheels at one operation. The main casting of the chuck is attached to the lathe, and the outer end is turned to fit the inside contour of the trolley wheel. An arbor fits inside the main casting which is arranged with arms which project through the spokes of the wheel, and these in turn are provided with projections to act as chuck jaws. A locking ring with slots to fit over the chuck jaws is shaped to fit inside the contour of the trolley wheel and hold it firmly



Spring Tool Holder and Tool for Machining Trolley Wheels



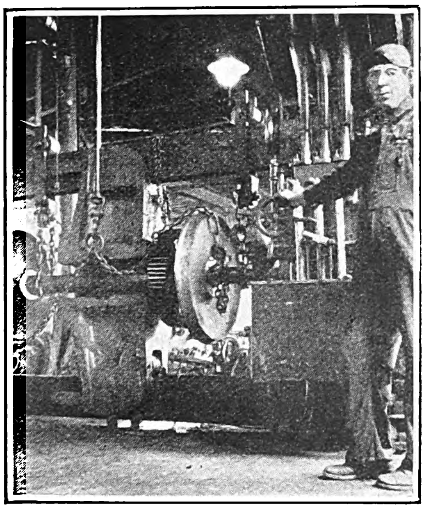
Chuck for Trolley Wheel Turning and Boring

when in position. After the trolley wheel is inserted, the retaining ring can be shoved over the chuck jaw and then with a 45-deg. turn the retaining ring is locked so as to hold the wheel tight. With this design of chuck, both the hub of the wheel and the grooved portion are left free for machining.

The groove is turned in the wheel by a special tool, as shown in the accompanying illustration. This gives the correct shape in one operation. The tool holder is arranged with a slot so as to provide a spring action. Use of this chuck, together with the special tool, has made it possible to maintain trolley wheels at a much reduced cost, and in addition, they are uniform in size and shape. The chuck was designed under the supervision of W. R. McRae, superintendent of rolling stock.

Wheel and Gear Pressed Off Together

IT IS the practice in the Albany Street shops of the Boston Elevated Railway to press wheels and gears on and off together. This is done on a Wood hydraulic press, which is arranged as shown in an accompanying illustration. An axle with wheels and gear attached is swung into position in the machine. The gear rests against the large block in the center, while pressure is applied to the end of the axle at the right. For 33-in. wheels a force of about 130 tons is required for pressing off.



Gears and Wheels Are Pressed Off Together by a Hydraulic Machine in the Boston "L" Shops

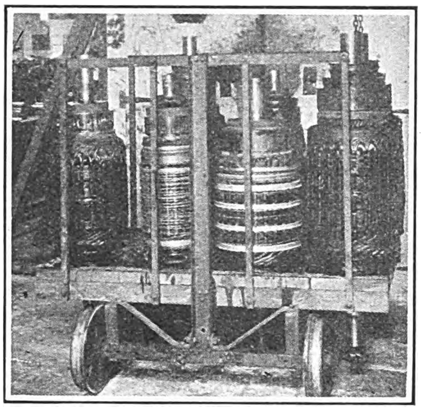
When it is desired to press off a wheel without removing the gear also, the force is applied at the rim. This procedure destroys the shape of the wheel, but inasmuch as the wheel is to be scrapped anyhow this is no drawback. No pressing is ever done by means of rods placed through holes in the web of the gear.

Special Truck for Baking Armatures on End

By F. C. Lynch

Shop Supervisor Kansas City Railways

THE accompanying illustration shows a small truck used by the Kansas City Railways for moving armatures in and out of the baking oven, and for storing them while they are in the oven. Two trucks of the same design are used for this work.



This Simple Truck Enables Armatures to Be Conveniently Handled on End in Connection with Dipping and Baking Work

Armatures are dipped with the pinion end down, and are stored in this same position on the baking truck. The truck itself is made up of angle-iron framing, mounted on cast-iron flanged wheels. A wood floor is bored out so that the pinion and that end of the shaft protrudes through. It has a capacity for eight of the larger sized armatures.

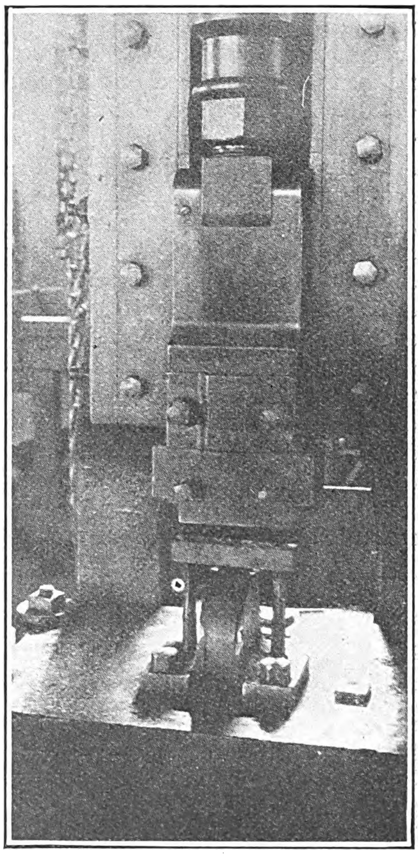
Burning Insulation Off Flat Conductors

WHERE strap-wound field coils are to be rewound or repaired the removal of the old insulation presents quite a problem. In the shops of the United Traction Company, Albany, N. Y., this is accomplished by passing the insulated conductor through a gas flame and then drawing it through a pair of rotating wire brushes. In order that the gas flame may extend along a section of the insulated conductor the flame is fed into a cylinder and the insulated conductor is pulled through this. Immediately after it comes out of the gas flame it passes between the motor-driven wire brushes, which remove any remnants of insulation and clean the conductor. A galvanized iron housing around the brushes prevents the dust and refuse from flying about.

Salvaging Controller Segments

WHEN the ends of the longer controller segments become burned from arcing, it is the practice of the mechanical department of the Twin City Rapid Transit Company to shear off the burned ends and utilize the pieces thus salvaged for replacement of some of the smaller segments on the controller cylinder.

Due to the curved contour of the segments this is a rather awkward shearing job. A simple shearing jig shown in the accompanying illustration speeds up this work materially. It consists of a small curved block of the proper shape to fit the segment which is to be cut off, and has a guard under which the segment fits. The outfit is set up in a punch press.



The Burned Ends of Long Controller Contact Segments Are Sheared Off in a Simple Jig, Set Up in a Punch Press in the Twin City Rapid Transit Company's Shop

New Equipment Available

Improved Door Operator

MANY improvements in design and refinements in manufacture have been incorporated in its latest type of door operator for folding doors and steps by the Consolidated Car Heating Company, Albany, N. Y. By providing for installation of the door engine so that its shaft will be vertical, the levers that operate the door are brought into a horizontal position. This insures a tight fit at all joints and minimizes wear. On installations with doors of the usual size but two ¼-in. air pipes are needed to serve the door engine. Phosphor-bronze bearing liners are provided for the operating shaft, and a honed finish is given the inside of the cylinder in which the piston slides.

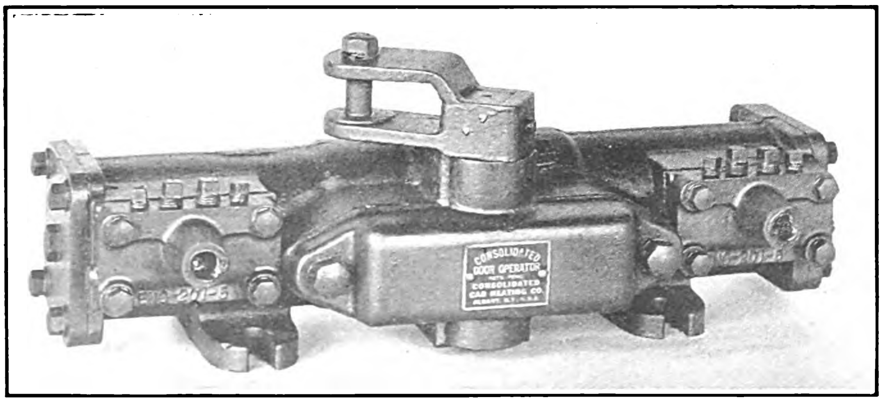
The connection between the operating shaft and the piston is through a quadrant gear and rack, which constitutes the spindle for the pistons. A hexagonal fit between the gear and shaft insures an accurate fit without likelihood of wear. By removing the cover, which is held in place by two cap screws, the gear and shaft can be lifted out for inspection. In operation, the chamber about the gear is kept filled with a light grease. This can be replenished from a grease gun through a hole with filling plug without disturbing other parts of the door engine. The gear and rack have machine-cut teeth, which insure smooth operation and long life.

The piston leathers and phosphor-bronze expanders at the ends of the rack are held in place by nuts. The exhaust end of the rack is provided with a by-pass valve which prevents pressure building up in the closing cylinder while the door is being shut.

If closure of the door is stopped by a passenger or some obstruction the air is vented to the atmosphere from the closing cylinder, so that when the obstruction is removed the door continues to close at regular speed with no tendency to slam. The by-pass has a ball valve held against its seat by spring pressure. With the door fully closed this spring pressure is increased to prevent operation of the by-pass. This construction permits the use of separate speed control valves, so that the door-closing speed can be adjusted independently of the cushioning, which slows down movement of the door just as it reaches the end of its stroke. These adjustable speed-control valves provide for regulation of the speed with which the air is exhausted from the cylinder, while there is no check on the speed with which air is admitted.

The door engines are controlled either by a straight pneumatic control valve or electrically by push buttons. On cars provided with Safety Car Devices equipment the engine is controlled from the brake valve. With straight pneumatic control only two connections are used, one for the air supply and the other for exhaust.

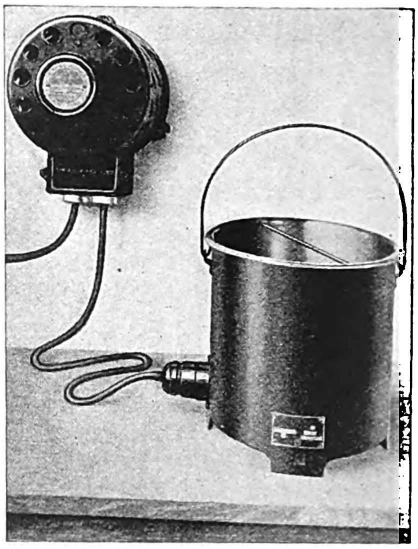
For the electro-pneumatic control, a new magnet valve or duplex valve, as it is termed by the manufacturer, has been designed in which a single valve controls both opening and closing of the door. The valve is energized to open and de-energized to close, so that an open circuit or ground ahead of the valve coil will close all doors. The single unit construction for the master valve simplifies wiring and piping connections and also results in considerable reduction of maintenance cost, as there are fewer parts to be inspected and looked after. For cars which are equipped with single folding doors and steps, or where selective control of doors is desired and where the work of the door engine is light, a smaller differential engine has been developed.



Improved Door Operator for Folding Doors and Steps

Glue Pot with Rheostatic Heat Control

TO RETAIN those qualities that give it maximum adhesiveness, glue must be carefully heated and handled. With the requirements of different temperatures to produce certain results has come a demand for a glue pot with heat control. The Westinghouse Electric & Manufacturing Company has brought out such a pot, which gives a wide range of heat control and at the same time keeps the unit simple and inexpensive. It also permits almost unlimited variation in the power input and in temperature.



Dry-Type Glue Pot with Rheostat for Heat Control

The unit is portable, as the rheostat can be laid on a bench or shelf or hung on a wall, while a flexible cable permits the glue pot being moved over a large radius, so that it may be placed at the best location, saving many steps to a central glue pot.

The dry-type glue pot is used with this new unit because of its many advantages over the wet type. Refilling of the water bath is eliminated and there is no danger of the pot boiling dry and burning out the heating element.

The casing and bottom plate of the pot are made of heavy sheet steel and the glue vessel of heavy spun copper. The glue vessel may be removed easily for cleaning.

The News of the Industry

Higher Fare Upheld

Superior Court Affirms Decision of Commission Authorizing Eight Cents in Philadelphia

Judge William H. Keller of the Superior Court handed down a decision on Dec. 5 affirming the temporary order of the Public Service Commission granting the Philadelphia Rapid Transit Company an increased rate of fare. The increase is from 7 cents, with four tickets for 25 cents, to 8 cents, with two tickets for 15 cents. The court ruled that the company had justified its request for an increased rate by concrete evidence and that the commission was wholly within its rights as defined by law in granting a temporary order. The ruling also upheld the $200,000,000 valuation of the commission, which had been disputed by the Governor and Attorney-General. They had contended that the valuation of $200,000,000 and upward was not an actual valuation and should not be so considered as a basis for rate making. The ruling also stated another principle, namely, that rate making was wholly a legislative function and that the commission acted only as an agent of the legislative branch.

FINAL ACTION AHEAD

The Public Service Commission will now take action toward a final ruling on the company's petition for an 8-cent cash fare. City Solicitor Gaffney has indicated that there were two courses which the city might now adopt—an appeal to the Supreme Court or an appeal to the Public Service Commission for another revaluation. The second proposal is under consideration by Milo R. Maltbie, a public utility expert, recently retained by the Governor to advise the commission on the necessity or wisdom of reopening the valuation of the company. Mr. Maltbie had been engaged after the Governor had sent a letter to the Public Service Commission intimating that it had been guilty of disregarding the public interest in increasing the fare. Following this communication the Attorney-General gave an opinion to the commission to the effect that no valuation of the company had been made in accordance with methods prescribed and along the lines specified by the Supreme Court.

The court asserted the commission was not required by law to fix a definite valuation of a public utility in determining rates. The fact that the commission found the company's property worth upward of $200,000,000 was sufficient, in the opinion of the court, to warrant its order increasing rates.

Applying this principle specifically to the case at issue, the court said:

> The only party hurt by the failure of the commission to fix the sum over and above $200,000,000 is the utility company, and if it does not complain the other party who has suffered no injury by this action cannot be heard to say that it is no finding at all.

The court ruled that the burden of proving that the proposed increase of rates was justified rested on the company, and the evidence was so substantial that no court could declare an order founded upon it to be illegal or grossly unreasonable.

The opinion went on to say that a finding based upon competent evidence sufficiently specific to pass the legal tests, that a company's property is valued at more than $200,000,000, was not to be cast aside as of no weight for any purpose because the commission did not find the exact amount by which the company's property exceeds that sum. It is the duty of the commission at all times to guard the interests of the public, but this is to be done in no spirit of partisanship or hostility to public service corporations. It is required to do justice to the corporation no less than to the public.

Judge Keller in affirming all the contentions of the commission did disagree on the wage-dividend fund. He said that the 10 per cent wage-dividend fund "is not a proper charge against operating expenses, but must be provided for, if at all, out of the company's fair returns on investment."

The statement said in conclusion that it found nothing in the commission's statement to complain of which required a reversion of its order, that the counsel merely emphasized what was inherent in the company's evidence, that is, the growing lack of sufficient revenue under the 7-cent fare and the hardship to the company of having to continue it during a protracted hearing. The assignments of errors were all overruled, the appeals were dismissed and the order of the commission was therefore affirmed.

COMPANY REVIEWS FARE CHANGES

In this connection it is interesting to note that Mitten Management in "Service Talks" for Dec. 4 refers to the "colossal mistake of the 7-cent fare." The company says:

> If the straight 5-cent fare had been granted in 1920, P. R. T. would each year have earned so much more than it did under the 7-cent fare that not only would the increase to 8-cent-cash-two tokens-for-15-cent fare have been unnecessary, but the straight 5-cent fare would still be sufficient for our needs. The folly of overriding the opinion of a successful operating management, as was done in this case. should have been apparent before the colossal mistake of the 7-cent fare was made.
>
> The 7-cent fare, in spite of our efforts, was forced upon this management in November, 1920. In 1921 P. R. T. carried 75,000,000 fewer riders than in the previous year—$3,750,000 worth of nickel fares. P. R. T. has never since reached the record riding of 5-cent fare days. The 7-cent fare results proved the engineers' estimate to have been wrong, while that which Mitten Management prophesied actually came true.

But, says "Service Talks":

> P. R. T. must continue the present fare to meet added operating costs and to support unprofitable extensions now in contemplation. P. R. T. can never re-establish the 5-cent fare with free transfers, since the city must depend upon P. R. T. to earn an ever-increasing sum to support city-built subways.

It is explained that the mounting costs which had everywhere else brought increased fares forced P. R. T. in 1920 to seek a means of increasing its revenue. Mitten Management recommended a straight 5-cent fare, with the elimination of all free transfers and 3-cent exchanges. The statement says:

> P. R. T. Bankers urged an increase to 7 cents, fearing the effect upon their interests elsewhere with P. R. T. proved continuously successful under a 5-cent fare.

Reference is also made to the fact that Mr. Mitten had "publicly declared that the 5-cent fare was 'almost a religion' of his."

Mr. Insull and Mayor Dever of Chicago Discuss Transit Responsibility

Samuel Insull and Mayor Dever of Chicago engaged in an impromptu but spirited debate at the annual dinner of the Chicago Real Estate Board on Dec. 4 over the negotiations and projects for more rapid transit in Chicago. Mr. Insull, who has offered to build a subway to carry his elevated trains under the Loop district, told the Mayor in a public address to "say it with shovels" if the city intends to use its $40,000,000 traction fund to dig a tube. Mr. Insull said that Chicago is being stifled by lack of transportation, because the city does nothing and won't let others do anything.

Mayor Dever retorted that the elevated lines had ignored franchise grants made years ago to give Chicago a rapid transit system and had gone out into a cow pasture with a recently inaugurated extension to the town of Niles Center, west of Evanston, instead of spending the money inside the city.

The Mayor said later that a referendum on using the $40,000,000 for a subway or as the foundation for a $400,000,000 financial structure to coordinate the lines was certain in February.

More Study of Subway Plans Recommended at Boston

A report has been filed for the Massachusetts Legislature by the Boston Transit Commission and Public Utilities Department, which have been sitting jointly as a recess commission to study the problems of the future extensions of the rapid transit system in Boston. The report discusses extension of the East Boston Tunnel from Bowdoin square, under Green Street and Staniford Street, joining the present elevated at Causeway and Lowell Street, near North Station, at a cost of

$1,500,000; also extending the East Boston end of the tunnel about 1 mile at a cost of $4,000,000.

Another proposition outlined in the report is the removal of the subway incline in Cambridge Street, extension of the East Boston tunnel to run under Cambridge and Charles Street, with a station in Charles Street to connect with the present Cambridge subway to Park Street. This work would cost $2,500,000. If it were carried out another important transfer point would be established which would relieve Park Street.

In connection with this report the commission recommends that nothing be done at present, because the two permanent projects referred to have not had sufficient study.

Buffalo Council Against One-Man Cars

Despite the opinion of the city law department that the ordinances are unlawful, the City Council of Buffalo has enacted two measures in its movement to prohibit the operation of one-man cars on all local lines of the International Railway. "Within 24 hours after the ordinances were enacted motorcycle police arrested eight operators of one-man cars on a charge of speeding. The test cases will be tried out in City Court. The car operators, through counsel for the railway, entered pleas of not guilty and their trials will be held late in the month. The basis of the action by the city against the operators who were arrested is that they were running their cars in excess of 6 m.p.h., the speed limit fixed in one of the recently enacted measures.

Interurban Terminal at Akron Being Used by Bus Patrons

Cement has been laid between the first two tracks in the trainshed at the terminal of the Northern Ohio Traction & Light Company in Akron and a union bus terminal established. Bus lines using the terminal are the Cleveland-Akron Bus Company, Northern Transit Company, Akron-Youngstown-P.O. Electric Company, Akron-Canton Trackless Coach Company, Akron-Medina-Elyria Line, and Akron-Wooster Line.

This union terminal is proving a great convenience to passengers who desire to transfer from one line to another or from a bus line to an interurban railway line. The terminal facilities at Akron are unusually complete, the station there being one of the finest of its kind in the United States.

Buses enter the trainshed on the south side of the terminal building, and leave from the north. When the union motor coach station was opened the "tunnel" through which passengers went to interurban cars was temporarily abandoned. It will be used only on special occasions. Walks have been laid across the tracks and passengers go directly through the gates to their cars.

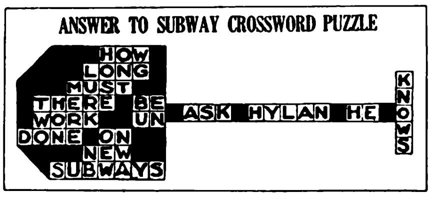
A new union time card has been issued containing the timetables of all lines entering and leaving the terminal.

Hylan's Subway Plan to Cost $400,000,000

Four Boroughs Included in Project—Manhattan to Have Trunk Line—Brooklyn and Queens Also

Mayor Hylan's municipal subway plan was made public by his Board of Transportation today. The principal feature of his project is a new Manhattan trunk subway from the lower end of his island to Mayor Hylan's 193d Street. There are also tentative plans for a Hylan Brooklyn-Queens line and connections under his East River with his new route in his Manhattan. His four boroughs are included in the general plan, which contemplates a subway beneath his Grand Concourse in the Bronx.

This is the lead, slightly amended, which the *Sun* carried on the story published in the issue of Dec. 9 about Mayor Hylan's new proposal. The only part of the plan actually adopted by the Board of Transportation on Dec. 9 dealt with the lower portion of the new Manhattan trunk line, the upper part of this route having long since been approved by the Board of Estimate. The upper portion, from 64th Street and Central Park West to 193d Street and Overlook Terrace, was laid out by the Transit Commission a long time ago and formally adopted by the Estimate Board in August, 1923.



New York "World" Pokes Fun at Hylan

The money to build it has never been appropriated by the city authorities and the plan has marked time since. The plan just announced reveals that a substantial part of the Hylan project in Manhattan is virtually identical with Transit Commission routes.

Together with the lower section which was adopted by the Transportation Board, the new Manhattan trunk line will start either at Fulton or Wall Street and East River running to Church Street, to Greenwich Avenue, to Sixth and Eighth Avenues, to 53d Street, then under Central Park West, St. Nicholas Avenue, to Broadway and Fort Washington Avenue to 193d Street and Overlook Terrace. The line will cost about $167,500,000 to build. The route mileage will be 16.65.

The Brookyln-Queens portion of the new underground system is to have a crosstown route similar to that proposed by the Transit Commission, and in part approved by the Board of Estimate in August, 1923. The new project as tentatively mapped out calls for a crosstown subway, the lower end joining with the Brooklyn Manhattan Transit Company Culver line which the city intends to recapture and the upper end running into Long Island City, connecting with the 53d Street tube and then proceeding far into suburban Queens.

The Brooklyn-Queens part of the system was not formally put before the Estimate Board at this time, but its general layout was indicated by the map made public by the Board of Transportation tracing the project in the three boroughs.

The entire system will cost approximately $400,000,000.

Supreme Court Justice McAvoy, who has been commissioned to inquire into the transit situation, will begin the inquiry on Monday morning, Dec. 15, at 10:30 o'clock in the rooms of the Bar Association, 42 West Forty-fourth Street, New York. Announcement has been made that Henry L. Sherman will be counsel for Judge McAvoy in connection with the inquiry. Mr. Sherman is a member of the law firm of Hirsch, Sherman & Limburg. He was graduated from Yale and is considered a lawyer of rare ability and astuteness.

Max D. Steuer has been retained as special counsel for the city in the transit investigation. Former Supreme Court Justice Clarence J. Shearn, who has been special counsel to the commission, has been advising the members of the commission and will continue to act as special counsel during the progress of the inquiry.

Elaborates Boston Plan

Mayor Curley of Boston on Dec. 4 submitted a brief embodying his views on the desirability of turning over the entire electric railway service of the metropolitan district, within a radius of 15 miles of Boston, to a board to be known as the Metropolitan Transportation District Commission. This supplemented remarks made by him previously before the joint legislative committee investigating the Boston Elevated Railway.

The Mayor said that if adequate street railway transportation was recognized as an absolute essential in the metropolitan district there could be no valid objection to the operation of such system by a Metropolitan Transportation District Commission with authority to fix fares and arrange financing.

Personally, the Mayor believes that a 5-cent fare locally in each city and town of the metropolitan district with a graduated fare on the high-speed lines sufficient to cover fixed charges and higher operating expenses is equitable and should prove profitable. In the event that the Metropolitan Transportation District Commission should in any year encounter a deficit he favors an assessment upon such portions of the metropolitan district as are served by the railroad upon the basis of population and valuation.

As the Mayor sees it, adequate transportation is as essential as water, sewerage and public parks. He says there is a menace not only to the large retail and manufacturing establishments in the cities and towns of the metropolitan district, but there is in addition that which constitutes confiscation of the dividends of a lifetime of toil and thrift on the part of the worker who awakens to find that the railway which transfers him from his home to the place where he earns his livelihood has been abandoned because it did not prove a profitable investment for the owners.

Bus Applications Denied by New York Commission

The Public Service Commission on Dec. 5 denied the application of James W. Dillon and Homer R. Peacock for a certificate for the operation of a bus route between Syracuse and Wolcott. The evidence showed that the proposed bus line would compete with the Empire State Railroad Corporation, the Lehigh Valley, the Rochester & Syracuse Electric Railroad and the New York Central, and with bus lines operated by George T. Wood and Vernon Waterhouse.

The commission also denied a petition by James W. Dillon to operate a bus line between Syracuse and Borodino. It was shown that this proposed line would compete with the Auburn & Syracuse Electric Railroad and that the communities were well served by the electric railway. The Marcellus village and town authorities opposing the granting of a certificate to Mr. Dillon.

Considers Suspension of Service Order for Schenectady

A hearing was held before Public Service Commissioner Van Voorhis at Albany, Dec. 3, on the petition of the Schenectady Railway, Schenectady, N. Y., filed on July 30, to be relieved from complete compliance with the order of the commission of April 4 1923, which directed the purchase of certain additional equipment for local and interurban service. The order of the commission was the result of hearings held on complaint of patrons of the railway and the Mayor of the city of Schenectady.

At the recent hearing, the attorney for the railway stated that the Mayor of Schenectady and the Corporation Counsel were agreeable to a suspension of the order, as practically all of its terms had been complied with. The order of the commission directed the purchase of twelve new city cars, of which ten have been purchased, while the company has provided three of the six new cars directed for interurban use. Other snow removal equipment and increased facilities have been provided and the company is doing everything possible to meet the needs of the public.

An inspection of the property of the company will be made by the engineer of the commission, and if his report is satisfactory the commission will issue an order in accordance with the application of the company.

Arguments Heard on Taxing Seattle-Owned Utilities

Before the Seattle Municipal League members, the proposed plan to require city-owned utilities to pay a 5 per cent gross earnings tax into the general fund was recently debated by Councilman W. T. Campbell, backer of the proposed measure, and Oliver T. Erickson, former Councilman and supporter of municipal ownership. Councilman Campbell argued that city-owned utilities are participating in the benefits of other city departments without contributing to their support. He also argued that requiring the utilities to bear directly part of the cost of government would result in increased business that would more than make up for the tax.

Mr. Erickson replied that handicapping the municipal utilities with a 5 per cent gross earnings tax was a queer way to show belief in public ownership, and characterized the ordinance as a measure to penalize residents of Seattle for their loyalty in supporting the city-owned water and light plants and street railway.

Tunnel Suggested

Combination Tube and Subway Plan to Connect San Francisco and Alameda Shore Advanced by A. J. Rich

A bridge across San Francisco Bay will soon be a reality. Work on the structure is scheduled to start by March 5 next. A permit from the United States War Department for this project is now in the hands of Col. Frank E. Webb, representing a company which is to build the bridge. Colonel Webb also announces that his concern has raised sufficient funds and is ready to start work. The span will cost about $7,000,000 and be 7 miles long, including the approaches. The terminals, according to tentative plans, will be at San Mateo on the San Francisco side and at a point opposite Hayward on the East Bay shore.

The Webb interests have been granted a 50-year franchise by San Mateo County on condition that at the end of that time the property revert to the state of California. So far no franchise has been issued by the Alameda County Board of Supervisors.

There are many plans which it is claimed will improve traffic, but one of those that is given most serious thought is the plan of A. J. Rich of San Francisco for a combination tube and subway to connect San Francisco and the Alameda shore.

The Key System Transit Company, on the other hand, handles local traffic almost entirely. It charges, as does its rival, an 18-cent fare for the ferry trip, with a monthly commutation rate of $4.50.

The project calls for an expenditure of $60,000,000 to be raised privately. Mr. Rich says that he and his associates have been working on the scheme for the past three years.

The Rich plans call for a bridge and underground tube between Hunter's Point on the San Francisco side to a point opposite on the Alameda shore. Here the bay narrows, thus offering an easier engineering problem than the Goat Island plan, which has been the popular one heretofore.

Oakland occupies a position in relation to San Francisco similar to that which Staten Island does to New York. There is no municipal ferry at Oakland, but there are two ferries, one operated by the Southern Pacific Railroad and the other by the Key System Transit. A large portion of the Southern Pacific ferry traffic consists of passengers discharged from overland trains which have their terminus in the Oakland Mole.

Physical Culturist Has Subway Idea

Bernarr Macfadden, physical culturist, newspaper owner and hiker, who is reported to walk from his country home in Nyack, N. Y., to his office in New York City every week day in order to stretch his own legs, has evolved a plan for solving New York's transit problem. He has worked out the idea of a double-deck subway car and has offered to form a company to build a model vehicle of this kind.

This idea he has exploited with a great deal of gusto through his own New York *Evening Graphic*, a picture paper which discusses editorially such a comedy as "Marriage As It Should Be," written and signed by Mr. Macfadden. Mayor Hylan, accommodating soul that he is, says he will commend the project if it proves of practical value. Mr. Dahl of the Brooklyn Manhattan Transit Company says to Mr. Mcfadden that the B.-M.T. has adopted the policy of considering on its merits any suggestion intended to improve transit conditions. As *Graphic* is supposed to live up to its title illustrations drawn by imaginative artists have been used to adorn the story which the paper has been running. One of these depicts riders in one of Mr. Macfadden's cars apparently forgetting their transit troubles while devouring the *Graphic* or *Physical Culture Magazine*, another Macfadden publication.

Court Restrains Kansas City Jitneys

Judge Van Valkenburg in the federal court at Kansas City, Mo., on Dec. 2 issued an injunction against the operation of either interstate or intrastate buses carrying local or other passengers in Kansas City, Mo. This development was of extraordinary interest because the railway receivers had previously filed with Judge Stone a report recommending operation of buses by the railway, contingent for one thing on the elimination of competition. The injunction was filed at 3:40 p.m. The bus company had been operating since Jan. 1 under various managements. It suspended operations at once.

The order was directed specifically against F. B. Miller, R. E. Ahlvin, Hiram H. Moore and P. R. Guthrie, who took over the interstate line between Kansas City, Mo., and Kansas City, Kan., and the crosstown bus lines in Kansas a few months ago. The order is based on the "jitney" ordinances of Kansas City, Mo., passed by Council on March 22, 1921, and July 13, 1921.

A section of the order prohibits operations of buses, which the court says come within the description of jitneys in the ordinance, on any streets unless all the provisions of the ordinance with regard to consent of owners residing in Kansas City of a majority of abutting frontage on designated routes. The order also specifically prohibits operation on streets having street car lines, as being contrary to the ordinances mentioned.

New Ordinance Proposed for Cincinnati System

Elimination of the present service-at-cost street car franchise for the Cincinnati Traction Company is provided in an ordinance initiated by the Citizens' Committee, headed by Eli Frankenstein and William J. Schultz, attorneys. A copy of the ordinance, together with formal notice that the committee proposed to circulate petitions for a referendum election on it, has been filed with the city auditor of Cincinnati.

The outstanding feature of the proposed measure, which would repeal all former ordinances, is that it provides a flat 7-cent rate of fare. It also provides that tickets are to be sold in strips of two. The rate of fare for children is fixed at 3½ cents. A universal transfer system without extra charge is provided. The ordinance gives the director of public service control of service.

The ordinance is a 25-year franchise and provides for revision at the end of each 5 years. The measure almost entirely eliminates the office of director of street railroads, confining his duties to the gathering of data for the information of the service director and City Council. The proposed measure eliminates the $350,000 annual franchise tax.

Mr. Frankenstein says that filing of the petition blocks all further negotiations with the city, the officials of the traction company and the Cincinnati Street Railway leading to a new franchise.

Traction Man a Government Beneficiary

An humble railway servant became a national figure on Dec. 6, when the United States government initiated him *ex cathedra* into the taxpayers' refund fraternity. His associates included financiers, business magnates and even Julia Marlowe, herself. They all received a substantial return for Uncle Sam's gouging practices, but the utility man, as tradition demands, graciously accepted an award of 1 cent. Burr Martin, vice-president and general manager of the Texas Electric Railway, Dallas, Tex., may use this contribution toward his rehabilitation program for 1925. At any rate, he can comfort himself he didn't get the worst of the game —many got nothing.

Bus Lines Compete with Toronto Municipal Railway

Operation of bus lines from the city of Toronto, Ont., to adjacent municipalities is a new problem which is causing executives of the Toronto Transportation Commission considerable trouble. The Toronto *Globe* explains that as the law stands at present, buses operating from one municipality to another cannot be controlled or suppressed by either municipality. Consequently, there is nothing to prevent private companies operating buses in all the outlying sections, thus robbing the T.T.C. of revenue on the parts of its system which at present are the least profitable. If buses are to be allowed to operate on the Weston Road, York Township and Weston will likely give up the idea of taking over the suburban radial, as it would be almost impossible to make the line pay against competing buses operated only at the profitable periods. It is probable that the question will be brought before the Legislature at the next session in order that the act may be so changed as to permit the regulation of interurban bus transportation.

Labor Reiterates the Doctrine of Resistance

Samuel Gompers chose the occasion of his election to the office of president of the American Federation of Labor for the forty-fourth time to announce the following policy:

> An industry that cannot pay a living wage according to our American standards of civilization had best get out of business. The American labor movement has adopted a slogan: "It is better to resist and lose than not to resist at all." Let it be clearly understood, come what may, be the result what it may, the American workers will resist any attempts to cut wages, no matter what the result be to industry.

Another Warning to Careless Motorists

In order to arouse Milwaukee, Wis., motorists to a sense of watchfulness in approaching and crossing street intersections, a local newspaper started a safety campaign in which it has had the full co-operation of the Milwaukee Electric Railway & Light Company. The accompanying picture shows the part taken by the railway company in its efforts successfully to put over this safety drive. It changed one of its work cars to a moving advertisement by mounting on it a badly wrecked automobile with appropriate accident signs. The car traveled through the streets of the city during the campaign as a constant reminder to the motorist in the city and in outlying territories to be more careful on the streets, especially when approaching intersections where electric and steam line tracks are crossed. The compilation of figure by the Safety Commission shows a big increase in the number of accidents at street intersections which involved motor vehicles.

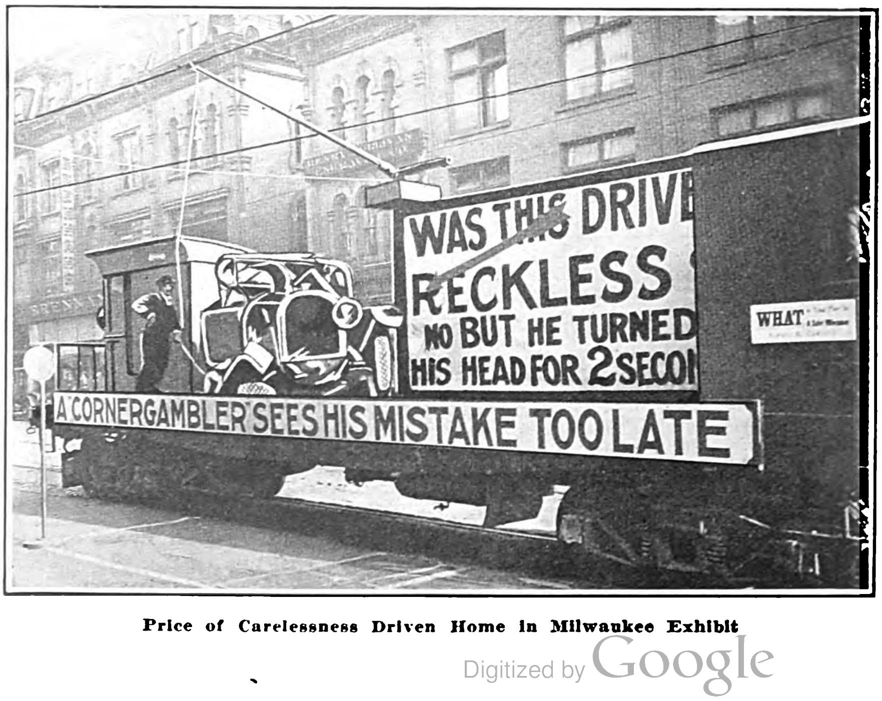
Bus Regulation Taking Form in Massachusetts

Rigid regulations for the operation of buses in Massachusetts are growing out of the joint jurisdiction of the Public Utilities Department and the city and town authorities vested with power to issue or withhold licenses. The latest chapter comes from a settlement of a controversy in Northampton where the Northampton Street Railway appealed from rules that had been promulgated by the City Council. The Public Utilities Department has refused to rule against aliens as owners of bus lines.

The department also rules that motor vehicles used exclusively for sightseeing purposes or for carrying guests to and from hotels are not exempt from regulation by the city authorities. Under the department's ruling also licenses from the Northampton City Council will be required for the operation of motor vehicles in that city.

One important regulation promulgated requires that every licensee shall operate for 9 or more hours daily, unless accident or unavoidable cause prevents such operation, and the minimum period of operation shall be fixed by the City Council in the case of each permit granted. On routes using the same terminals as are used by electric railways, not less than 12 hours daily operation is required by the Council unless avoidable cause prevents.

To Test Regulation of Bus Rates.—In an effort to define the extent of control by municipalities and the Michigan Public Utilities Commission over interurban buses, the Michigan Highway Transportation Association will seek a court ruling on legality of the new Lansing city ordinance regulating rates of interurban buses in that city. A temporary injunction is expected to be asked, as the ordinance takes effect Christmas Day. Bus operators claim the ordinance favors a competing company, the Michigan Electric Railway. They hold that cities do not have such regulatory powers, except to afford protection to the public and that control rests with the state commission.



Price of Carelessness Driven Home in Milwaukee Exhibit

Strike Over

Tentative Agreement Between Company and Men Reached in Southern and Central Illinois

Employees of the Illinois Traction System (McKinley lines), on strike since Dec. 7, were expected to return following a tentative agreement between the men and officials at a conference in Springfield on Dec. 11. The agreement, which was to be submitted to various local unions on Dec. 12, covers the question of the closed shop, overtime pay and arbitration of wages.

The tie-up of passenger and freight service occurred within six hours after officials of the system claimed they were advised the strike would be called. The company is said to have been unwilling to meet the demands of the men for an advance in wages of 10 cents an hour, time and one-half for overtime and closed shop conditions. Under the old wage contract, which expired on Dec. 1, brakemen were getting 50 cents, passenger motormen and conductors 62½ cents and freight crews 65 cents.

More than 100 towns and villages in southern and central Illinois were affected by the strike. Out of the system's total mileage of 500 miles approximately 400 miles were involved. Trains continued to operate between St. Louis and Granite City, Ill., over the St. Louis Electric Terminal Railway, a subsidiary, and on the Joliet-Princeton division, the workers on those divisions having separate wage contracts with the railway.

The strike did not affect local properties in Peoria, Bloomington, Decatur and Danville, where wages were recently decreased by an arbitration board.

D. W. Snyder, vice-president, at Springfield, Ill., issued a statement in which he asserted the strikers' committee of five had dealt unfairly with the company and the public by giving only six hours' notice of the intention to strike. Tildon E. Goddard of St. Louis, a member of the committee, denied this charge. Mr. Goddard stated the workers were polled on the question of striking, the vote being 267 for and 18 against.

Following conferences between officials of the company and the strikers on Dec. 8. A. McGuire, international representative of the union, declared the men were willing to waive their demands for an increase of 10 cents an hour if the company would grant overtime of time and one-half for more than ten hours' work. However, this proposal was not put up to officials of the railway.

Vice-president Snyder said it would be financial suicide for the company to submit to the demands for increased wages, pointing out that since the last wage agreement was reached the income of the system had shown large losses instead of gains as was expected.

No attempt was made by the company on Dec. 8 or 9 to move cars over the system, but much of the inconvenience incident to a strike of this kind was removed by automobile trucks and buses, as many of the towns along the traction system are situated on hard roads. Steam railroads took care of the mail contracts of the system.

The propositions submitted by the company to the men follow:

> "1. That the committee of five should have authority from the rank and file of our men to negotiate a new agreement; that pending such negotiations an agreement should be made continuing the last contract (except as to wages) until a new agreement should be made; that the wages finally agreed to should be retroactive to Dec. 1, 1924.
>
> "2. While this company, in its efforts to continue railway service in its territory, has urgent need for reduced expenses and believes a new contract should carry with it lower costs, we are willing to co-operate to the extent of agreeing to the renewal of the recently expired contract for a period of from three to six months. This was later extended by the company to a full year.
>
> "3. Believing that our position is fair and one that will stand honest examination, we proposed that the committee and the company enter into an agreement to submit the entire matter to arbitration, as arranged for in our last contract."

Maryland Railway Outlines Extensive Bus Program

R. Paul Smith, secretary of the Blue Ridge Transportation Company, has filed a schedule with the Public Service Commission of Maryland covering 18 interstate and intrastate lines utilizing Maryland highways. At the same time Mr. Smith has pointed out that the Maryland roads constitute only a small part of the highway mileage planned for use. The company has already absorbed independently operated lines in the Baltimore-Frederick and Washington-Frederick districts and has signified its intention of acquiring through purchase the permits of other small, independent operators in other districts.

The application is regarded as of particular interest as indicating the first step in a comprehensive plan for the more intensive use of the bus by the Potomac Public Service Company, of which Mr. Smith is general manager. That company, through its various subsidiaries, now controls 91 miles of electric railway, operated mostly from Frederick, Md., as a center.

Final Arguments Heard on Interstate Bus Case

An early decision is expected from the United States Supreme Court in cases involving the degree of authority that States may exercise over interstate traffic over public highways.

The appeal of Buck vs. Kuykendal was argued before the court on Nov. 25. This involves not only the primary question of interstate control, but the added factor of state control over a federal-aid highway connecting two or more States. Buck was refused a permit in Oregon to operate an interstate bus line for through business only between points in Oregon and points in Washington. The lower courts upheld the state commissioner.

The appeal of the Michigan Public Service Commission against the Duke Cartage Company was presented the court two days before the Buck case. This involves state regulation of traffic over an interstate highway not built with the assistance of federal-aid funds.

Counsel were asked a number of questions by the justices in order to bring out points which struck the court as of especial importance in the issues.

News Notes

Baltimore Employees Receive 2 per Cent Increase—Shopmen and trainmen of the United Railways & Electric Company, Baltimore, Md., in the annual conference of various classes of workers with President Emmons, were granted a 2 per cent increase in wages. The advance, affecting 5,000 men, will be effective Jan. 1, 1925. As a result minimum wages of shopmen will be 47 cents instead of 46 cents an hour and trainmen's wages will be 52 cents an hour instead of 51 cents.

Seeks Bus Permit.—The Portland Electric Power Company, Portland, Ore., has applied to the City Council for a franchise to operate a bus line in the St. Johns district, to supplement the present car service. The application provides for a 10-cent initial fare, with such changes as are required by cost of operation determined from time to time. The application also provides that the company shall pay to the city $100 as an annual fee and $1 a seat a quarter for all buses regularly operated. Thirty-minute service will be furnished.

Free Rides Mark Reopening of Road.—As part of its program to make restored service in Kewanee, Ill., a success the Kewanee Public Service Company invited residents of the city to ride free on the cars on Nov. 29, the day service was resumed. In an effort to popularize the service, the $1 weekly pass has been instituted. The restoration of service by the property, at one time under the management of the Galesburg & Kewanee Electric Railway, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 6.

One-Man Cars in Service.—Five one-man cars were in operation, on Dec. 8, on the lines of the Springfield Railway, Springfield, Ohio. Others will be placed in service in the near future.

Bill Would Limit Parking.—A bill is before the Mayor of Louisville, Ky., which will prohibit parking of autos on Fourth Avenue, Louisville, between 6:30 and 9 a.m., and 4:45 and 6 p.m. This plan is expected to speed up traffic materially, especially during the evening rush hours. It will not affect parking during shopping hours to any extent.

Use of Tokens Increased.—Since early in September, 1923, the Johnstown Traction Company, Johnstown, Pa., has been operating at a rate of four tokens for 30 cents and 10 cents cash instead of the former 7-cent cash and ticket rate. As a result of the present differential between the cash and token rates the use of tokens has increased to a point where now about 98 per cent of all revenue passengers use tokens.

"Feeder" Lines Start.—The Indianapolis Street Railway, has begun the operation of "feeder" buses in two districts of Indianapolis, Ind., where the car lines have not been extended as fast as the residence district built up. Preparatory to establishing the service, the company officials entertained 50 city officials making a trial trip in two of the buses. Robert I. Todd, president of the company, presided. It is the company's intention to place buses in operation at the ends of other street car lines.

Bus Measure Proposed for Georgia.—It appears practically certain that the next Legislature of Georgia will be called upon to consider several motor bus franchise bills and it is predicted that some measure of this nature will be passed to equalize the road maintenance taxes.

Hearings on Bus Fares Will Be Resumed.—Hearings will be resumed on Dec. 19 before the Michigan Public Utilities Commission on the petition of the Detroit United Railway to increase its bus fares between Detroit and Mount Clemens and Detroit and Pontiac. The decision in favor of a temporary increase was reached when the hearing was resumed on Nov. 29 and higher fares became effective Dec. 1. This increase to 1½ cents a mile was referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 6. The 2-cents-a-mile rate which was to be put into effect by the Detroit United Railway on Dec. 17 has been suspended pending the commission's investigation. The 1½-cent rate superseded the former 1-cent-a-mile rate.

Subway Movement to Be Pushed.—The Civic Council on Rapid Transit, a citizens' committee to sponsor the movement for a subway and rapid transit for St. Louis, Mo., has been organized by representatives of fifteen civic and business organizations of the city. Orman J. McCawley, chairman of the Rapid Transit Committee of the Civitan Club, which began the subway movement last spring, has been named chairman. A committee of Aldermen has recommended an expenditure of $100,000,000 for a subway system in the downtown district, the bonds to be paid off over a period of 50 years from the revenue from the subway.

Seeks Higher Fare.—The Beloit Traction Company, Beloit, Wis., has petitioned the Wisconsin Railroad Commission to increase its fares from 5 cents to 7 cents and from 4 to 6 cents where tickets are involved. No increase, however, is asked in the present 2-cent fare the school children of the city are obliged to pay. Last year the system was able to earn a return of only 2 per cent on the investment.

Breaks Into Print on Fifth Anniversary.—"Ore Line News," published by the employees of the Northeast Oklahoma Railroad, Miami, Okla., made its first appearance under date of December "as a medium of exchange of ideas of benefit to each other and for distribution to the public of information thought to be of interest." The initial number recounts interesting events in the company's departments, camp and hospital associations, together with some traffic and track statistics of the company during its five years of operation.

Franchise Rights Extended.—The Southwestern Traction Company has retained its franchise rights to operate on the streets of Dallas if it builds an interurban line to Irving by Aug. 31, 1925, the City Commission decided recently. The ordinance renews many of the rights granted in 1906 to J. Mercer Carter and associates when a system not only to Irving, but to Cleburne and other points in Central Texas was contemplated. The franchises have passed to E. P. Turner and associates, now known as the Southwestern Traction Company. Under the franchise granted Dec. 1 the Southwestern Traction Company has the right to lay its own tracks west of Houston Street and to go over the Union Terminal tracks and the Trinity River with a viaduct of its own. The company cannot lay tracks on the Commerce Street bridge. As a bonus for the franchise Mr. Turner and associates are to pay the city $100 a year. The franchise runs for a period of twenty years.

Fare Proposals Submitted.—Negotiations between the Council of Quincy, Ill., and the Illinois Power & Light Corporation, operating the Quincy traction system, are proceeding on two fare proposals recently submitted by Ralph Carley, western division manager. A 10-cent cash fare, 7 checks for 50 cents or a monthly commutation ticket at 50 cents to reduce the fare for frequent users is the first plan, with four checks for 25 cents and a cash fare of 10 cents as the alternative. School children's fares remain at 5 cents in both plans.

Rates Approved.—The Public Service Commission has approved rates for the Syracuse Railway Co-ordinated Bus Lines, Inc., on its new line known as Colvin Street Bus Line, operated in city of Syracuse, N. Y. A fare of 7 cents per capita or valid transfer issued by New York State Railways will apply for transportation of adult passengers between any two points on the bus lines.

Prefers Lower Fare with Loss of Line.—The 5-cent fare with free transfers will remain in effect on the local lines of the International Railway in Niagara Falls, N. Y., under a decision of the Public Service Commission. The company is, however, authorized to abandon its Sugar Street line because receipts do not meet operating expenses. The line is 2 miles long and covers the northeast section of the city. The commission gave the city of Niagara Falls the option of allowing the International to continue the Sugar Street line at an increase in fare on all lines or abondoning this one line and keeping the fare undisturbed. The city accepted the abandonment plan. It is expected that the company will now proceed with the work of removing the tracks and poles.

Foreign News

Royal Commission Inspecting the Tramways in Australia

A Royal commission of experts is investigating the railways and tramways of Australia and New Zealand. The commission consists of Sir Sam Fay and Sir Vincent Raven, with Charles Travis, as secretary, all of London. Sir Sam Fay was for 20 years general manager of the Great Central Railway and during the latter part of the war held the important position of director-general of movements of railways at the War Office. He was president of the Institute of Transport for the year 1922-23 and is a director of the Buenos Aires Western and Buenos Aires Great Southern Railways. Sir Vincent Raven was chief mechanical engineer to the North Eastern Railways for a period of 12 years and during the early part of the war was chief superintendent of the arsenal factories at Woolwich, and later became controller of the armament production at the Admiralty. Mr. Travis is associate editor of the British *Railway Gazette* and editor of the *Railway Engineer*.

Swiss Railway Development Plans for 1925

The budget of the Swiss Federal Railways, Berne, Switzerland, for 1925 provides for the expenditure of 51,433,140 francs for electrification work, 25,060,000 francs for additional electric locomotives and motor coaches and 2,000,000 francs for installation of electric heating appliances in the passenger rolling stock. Included in the proposed work is a new line making direct connection between the Havenstein line and the Aara line, for which 1,190,000 francs was appropriated. New estimates are to be prepared for a new line in the Surbtal district. This line was first proposed in 1920.

There are at present 382 miles of electrified lines of the Swiss Federal Railways and work will soon be completed on the Zurich-Olden line, 40 miles; the Olsten-Berne section, 37½ miles; the Zurich-Winterthur line via Wallisellen and Kloten, 25½ miles; the Zurich-Rapperswill line, 22½ miles; the Lausanne-Vallorbe-Yverdon line, 40 miles, and the Palezieux-Lausanne and Renens-Geneva sections, 45½ miles.

A contract has been made with the Bernische Kraftwerk Gesellschaft for the supply of current for the lines already electrified and those to be electrified. The contract is for 20 years and will mean a saving of 11 per cent over the present cost of current. Plans were approved for the construction of substations at Kersers, Rupperswil and Rudoux, 9,615,000 francs having been appropriated for the work.

The Swiss Federal Railways now has in use 227 single-phase electric locomotives and motor coaches, exclusive of those on the Seethal line. It is thought that 304 will be required by the end of 1926.

L. C. C. to Use Sorbitic Rails.—The London County Council has arranged for 200 tons of tramway rails to be treated by the Sandberg sorbitic process, at a cost not to exceed £360. This process has been extensively used in Great Britain with great success. A description of the use of sorbitic rails in Boston was published in this paper for July 26, 1924.

Financial and Corporate

Final Moves Being Made

Reorganization Plan for St. Louis System Enters Upon the Final Stages Before Court and Commission

The reorganization plan for the United Railways, St. Louis, Mo., will be presented informally to the Missouri Public Service Commission in the near future for approval. The plan has already been submitted to Federal Judge Faris for his information and informal approval. This was disclosed recently when the court denied a group of attorneys representing holders of judgments against the United Railways the right to intervene in the foreclosure action against the railway. The court took this position when counsel gave assurance that all of the judgments against the company were to be in full with interest in the reorganization plan. Judge Faris stated that the move was premature and that when the time came for such action the petition could be filed.

The court will be asked to decide whether the reorganization committee must pay off the $4,100,000 of underlying bonds to cure the default in the $30,300,000 issue of general 4 per cent bonds of the United Railways or extend the underlying bonds. This phase of the reorganization is the only one that has not been finally agreed upon. The tentative plans call for the paying off of the underlying bonds at this time, but if the court holds that the bond can be extended it would furnish the reorganization committee that much more working capital at this time.

$14,195,512 IN CASH

Attorneys for the reorganization committee have advised that the underlying bonds may be extended legally, but attorneys for the bondholders' committee have taken the position that the bonds must be paid off to cure the default in the general bond issue which occurred when the company was unable to take up the underlying bonds at their original maturity dates.

The reorganized company will raise funds through the issuance of $6,000,000 in new bonds to be sold at 90, thus netting $5,400,000, and through the sale of 343,645 shares of common stock to present holders of preferred stock, transit bonds and common stock at $12.50 a share, netting $4,295,562. It is expected that the cash in the hands of Receiver Rolla Wells will be $4,500,000 when the receivership terminates. This would give the new company a total of $14,195,512 cash, which could be used to pay off the $4,200,000 in receiver's certificates, $2,000,000 Suburban bonds and possibly the $4,100,000 of underlying bonds.

It is planned to ask the Missouri Public Service Commission for authority to earn 7 per cent on a valuation of $57,200,000, or $4,004,000. That would enable the company to meet all of its fixed charges and begin immediately to pay dividends on the preferred, with a remainder left over to apply to the common stock.

The plan for the reorganization of the United Railways, St. Louis, Mo., to which reference has been made in recent issues of the ELECTRIC RAILWAY JOURNAL, contemplates the organization of two companies to succeed to all the properties of the system, one of which, for the present, is termed the new company, and the other, the new Suburban subsidiary. The new company is to issue $6,000,000 of new collateral notes or first and refunding mortgage bonds, probably bearing interest at 6½ per cent; 53,845 shares, probably no par value, $7 dividend cumulative preferred stock and 343,645 shares of no par value common stock. The new Suburban company will issue $4,500,000 first mortgage 5 per cent bonds.

NEW BONDS AND STOCKS TO BE SOLD

Of these securities, $6,000,000 new company bonds are to be sold at about 90 and the 343,645 shares of new, common stock are to be disposed of at $12.50 per share. It is estimated that treasury cash will amount to about $4,500,000, so that a total of about $14,195,562 cash will be available for the purposes of the plan. This money is to be used in the payment of the receiver's certificates, for the retirement of $1,640,000 Cass Avenue & Fair Grounds Railway first 5 per cent bonds, $986,000 Compton Heights, Union Depot & Merchants' Terminal Railroad first 6s and $1,474,000 Lindell Railway first 5s, now 8 per cents, all at par. These issues matured by their terms during the receivership.

There will also be funds for the payment at par of $2,000,000 St. Louis & Suburban Railway first mortgage 5s, now 8s, and for payment on account of $2,937,000 in respect to $9,790,000 now outstanding St. Louis Transit Company improvement bonds, due Oct. 1 of this year. After these payments have been provided for it is expected that nearly $900,000 will remain for the expenses of the reorganization and working capital for the new company. The $4.500,000 of bonds of the new Suburban company are to be issued in exchange, par for par, for St. Louis Suburban Company general mortgage 5s, which matured April 17, 1923.

There will still remain outstanding $30,300,000 United Railways first general mortgage 4 per cent bonds, dated July 1, 1889, due July 1, 1934, of which $42,000,000 were originally authorized, $32,231,000 issued and $1,931,000 canceled. These bonds remain as the senior lien of the new system. The only bonds, therefore, materially affected by the plan are the St. Louis Transit improvement 5s, each $1,000 of which is to receive five and one-half shares of new $7 dividend preferred stock and $300 in cash. Both preferred and common stocks of the old company are eliminated except that the owners of the same will have certain rights to subscribe to the common stock of the new company at $12.50 per share.

A letter addressed by the receiver to the reorganization managers states that in about five and one-half years of the receivership a total of $5,125,517 has been expended on the railway, its equipment and power facilities, of which sum $4,498,598 is net addition to the capital plant. In the same time, $20,145,235 was expended for maintenance and replacements.

Under date of Oct. 1 Rolla Wells, receiver of the company, reported to Frank O. Watts, chairman of the reorganization committee, on the earnings of the company for the twelve months ended Dec. 31, 1923, and the eight months Jan. 1, 1924, to Aug. 31, 1924. These figures follow:

	Year Ended Dec.31,1923	Eight Months Jan. 1 to Aug.31,1924
Gross operating revenue....	$20,453,445	$13,124,895
Operating expenses (including reserves and taxes)....	16,955,786	11,362,136
Income from operation......	$3,497,659	$1,762,759
Non-operating income......	225,700	182,641
Gross income..............	$3,723,359	*$1,945,400
Interest and miscellaneous charges..................	2,913,614	1,902,528
Surplus..................	$809,745	$42,872

* It is estimated that for the year 1924, based on 10 months actual results, this gross income will amount to $2,954,850.

The United Railways, then known as Central Traction Company, was formed in 1898 as a consolidation of about thirty existing companies up to that time operating more or less independently. As a result of the assumption of securities then existing, the issuance of additional bonds at about the time of the consolidation and subsequently, this railway system of now approximately 483 track miles has a capitalization of $91,986,000, of which $50,690,000 was interest-bearing indebtedness, represented by bonds of various kinds requiring $2,361,980 yearly for interest alone. In addition, the company borrowed as a short-term accommodation from the War Finance Corporation $3,235,000, the inability to repay which, so it is stated, in 1919 was the direct cause of the appointment of the receiver.

Holders of Chicago Securities Willing

Bankers who represent the holders of approximately $100,000,000 of securities of the various properties comprising the Chicago Surface Lines have promised the city of Chicago to accept the city's notes in exchange for Surface Lines securities in the event of a municipalization of the lines. All they ask is protection in the management of the lines and other safeguards during the life of the notes.

For more than three weeks quiet accumulation of the underlying bonds of the Surface Lines companies has been in progress. Additional activity resulted from the city's acquiescence to the traction bankers' ultimatum for a price based upon capital account value, $162,000,000, or appraisal. Inasmuch as experts declare the appraisal of the Surface Lines will exceed the $162,000,000, it was said that would be the figure paid.

Yonkers Railroad Lost $350,000, Commission Told

Evidence of losses for 1923 and the first six months of 1924 totaling more than $350,760 on the five trolley lines it seeks to abandon in Yonkers was submitted to the Public Service Commission at the second hearing held in Yonkers Nov. 21 on the petition of the Yonkers Railroad, a subsidiary of the Third Avenue Railway of New York, for abandonment. Public Service Commissioner Oliver C. Semple conducted the hearing, which was adjourned until some time in December.

The gross receipts for the fiscal year ended September, 1924, were $1,285,823. In 1918 the gross receipts approximated $824,000. Since that year, moreover, there have been three wage increases. E. M. T. Ryder, civil engineer in charge of the track repairs for the Yonkers Railroad, estimated that the cost of replacing ties and executing general reconstruction on various parts of the five lines under discussion would total approximately $174,200. With no tracks to repair on these routes a saving of $25,000 a month would result.

Definite assurance that the company was willing and prepared to substitute bus service in place of the five trolley routes was given by railway officials, who declared that the operating costs of their roads had increased since 1918 and that the 1919 peak prices for materials had not been reduced.

Successor Officers Named

The personnel of the Winona Service Company, Warsaw, Ind., incorporated several months ago to operate the line formerly known as the Winona Interurban Railway, is as follows: President, Harry Reid; vice-president, Theodore C. Frazer; secretary and treasurer, J. P. Goodrich; auditor, J. R. Steinebach; in charge of operation, F. L. Oppenheimer; roadmaster, C. L. Reese; master mechanic, C. F. Sigler; line foreman, O. R. Ferguson; safety director, James Harmon; purchasing agent, W. S. Campbell; traffic manager, J. O. Motto, and chief electrical engineer, C. C. Argalite.

All Preferred Stock of New Orleans Property Sold

Every car of the New Orleans Public Service, Inc., comprising the entire parish of Orleans, bore the following announcement on Dec. 2:

ALL SOLD

All the preferred stock we have to offer at this time has been sold. Thousands of our customers and employees are now stockholders in this company. We appreciate this expression of confidence. THANKS.

NEW ORLEANS PUBLIC SERVICE, INC.

This announcement concluded the advertising campaign for the sale of preferred stock of the company started some time ago. More than 15,000 shares of stock were sold to 5,200 individuals. The clerical forces of the company, conductors and motormen, the trackmen and other employees of the transportation and maintenance of way departments of the system all enlisted as salesmen.

In referring to the gratifying results and the encouragement given the company by the public of New Orleans H. B. Flowers, president of the company, disclosed that an Eastern investment banking house had purchased for distribution among its investors a substantial block of the stock, absorbing all of the preferred stock now available.

Beaver Valley Company Abandons Two Miles—Coaches Substituted

The Beaver Valley Traction Company, New Brighton, Pa., has abandoned, with the common consent of two different towns, a division of its property 2.5 miles long, replacing the service with motor coaches. The line abandoned connected the towns of New Brighton and Beaver Falls and traversed sections of the towns different from those covered by the trunk line of the company.

The railway line did not pay. Lack of revenue prevented the company from keeping up its maintenance. To rehabilitate the property would have involved an expenditure of $125,000. When the two boroughs decided to improve the streets over which the line operated the question of abandonment arose. The two towns requested the railway to repair its pavement and fulfill the franchise requirements. This proposal was met by the request that the two towns resurface over the tracks of the railway and permit operation of coaches instead.

In obtaining the approval of the Public Service Commission for the abandonment of the railway and the right to operate coaches, C. D. Smith, general manager, was able to have the borough representatives appear before the commission as witnesses for the company. No protests were filed. One section of the agreement made with the borough describing the rights still held by the traction company states that the agreement shall be in effect for 49 years with the right reserved to the railway at any time previous to the end of the term to reconstruct the railway tracks.

It is provided, however, that in such event the traction company or its successors so reconstructing the tracks shall bear the entire cost of repaving between the rails and 18 in. outside.

Another section stated that the Borough of Beaver Falls shall not grant to any other company or individual the use of the streets covered by the contract for railway purposes.

The coach line is now being operated over the resurfaced streets and is giving more service than the former single-track railway line. This operation is by the Beaver Valley Motor Coach Company, a subsidiary of the Traction Company, under the management of C. D. Smith. A 10-cent cash fare prevails, with a ticket rate of seven for 50 cents, instead of the previous 5-cent fare which existed on the car line. The coach line is earning 30 cents per mile. The railway earned 23 cents per mile.

This is only one of the three coach lines being operated under the supervision of Mr. Smith in the territory covered by the Beaver Valley Traction Company. One of the other lines is operated from the terminal of the Pittsburgh & Beaver Street Railway at Leetsdale, through the Boroughs of Edgeworth, Shields, Quaker Valley and Sewickley, making connections with cars of the Pittsburgh Railways at the Sewickley Bridge. The third line is that operated between Rochester and Colona, across the Ohio River Bridge from Rochester into the Borough of Monaca, paralleling the tracks of the Beaver Valley Traction Company to the end of the line and then continuing on to Colona, a distance of 0.875 mile.

Pierce-Arrow coaches are being run. They are equipped with bodies made by the E. J. Thompson Body Company, Pittsburgh. Each seats 24 passengers.

The railway did not feel that it was warranted in risking the $125,000 for improvements and still face possible further unprofitable operation of the railway. As compared with this expenditure the bus installation is estimated to have cost $21,000. After three months operation the gross earnings of the bus line are 30 per cent greater than the earnings of the railway for a similar average comparable period.

Six-Mile Vermont Road Discontinued

The Bellows Falls & Saxtons River Street Railway, Bellows Falls, Vt., operating 6 miles of electric railway in a town of 5 000 inhabitants, has been discontinued. A year ago the carhouse and most of the rolling stock were destroyed by fire and although the equipment was replaced and the service maintained the company was dealt a financial reverse that has added to its difficulties. E. A. Pierce, former superintendent, is running a taxi service to carry mail and passenger service. No special. provision has been made for the large freight service that was done by the railway. At a public meeting on Dec. 5 business men and citizens of Saxtons River were recorded as opposed to the establishment of a bus line, and for the present will rely on the taxis and on independent, privately conducted facilities for handling freight. The road was built by C. W. Blakeslee & Brother, New Haven, and members of that family have been the principal owners. It was opened for service on June 13, 1900.

Trenton and Philadelphia Companies Merge

The Trenton, Bristol & Philadelphia Street Railway, the Pennsylvania & New Jersey Street Railway and the Philadelphia, Frankford & Tacony Traction Company, Philadelphia, Pa., have been consolidated. The company intends to rebuild a goodly portion of the roadway between Trenton and Bristol and purchase new cars with the intention of establishing express service between Trenton, N. J., and the elevated railway of the Philadelphia Rapid Transit Company at Frankford. The purchase by the Bristol company takes all the franchise rights the Pennsylvania & New Jersey now has in Pennsylvania, including the Morrisville and Yardley lines, and also the terminal privileges of the Trenton & Princeton Traction Company at Trenton, N. J.

Preferred Stock Offered.—The Old Colony Trust Company, Boston, and Bonbright & Company, New York, are offering at $97 a share and accrued dividends to yield more than 7.20 per cent 22,000 shares of cumulative preferred stock (no par value) of the New Orleans Public Service, Inc., New Orleans, La. The company owns and operates properties formerly owned and controlled by the New Orleans Railway & Light Company. These include 222 miles of electric railway. The value of the property as recognized by the city of New Orleans for rate-making purposes, including expenditures for additions and improvements to Oct. 31, 1924, is about $59,500,000.

Bonds Offered.—A syndicate, headed by Estabrook & Company, Boston, is offering at 92 and interest to yield 5.55 per cent $2,000,000 of first and refunding mortgage 5 per cent gold bonds of the Columbus Electric & Power Company, Columbus, Ga. The bonds known as Series B, are dated Nov. 1, 1924, and are due Nov. 1, 1954. The proceeds from this series will provide a portion of the fund for new hydro-electric development at Bartlett's Ferry, now in the course of construction.

Dividend Increased by Public Service Corporation of New Jersey.—Directors of the Public Service Corporation of New Jersey at their meeting on Dec. 2 increased the dividend rate on the no par common stock from $4 to $5 by declaring a quarterly dividend. Thomas N. McCarter, president of the corporation, in a statement following the meeting, said. "For ten months, this year the number of electric meters on our lines increased in round figures from 426,000 to 505,000, a gain of 79,000, and in the same period the number of gas meters in service jumped from 609,000 to nearly 638,000. There is a continued healthy demand for electricity and gas for industrial purposes, and the transportation situation is measurably better than it was a year ago."

Stock Increased.—A certificate has been filed in the office of the Secretary of State at Albany increasing the authorized capital stock of the Elmira Water, Light & Railroad Company, Elmira, N. Y., from $5,200,000 to $6,200,000.

Increased Fare Does Not Reduce Patronage.—Receipts of the Springfield Street Railway, Springfield, Mass., for November, show that there has been little reduction of patronage as a result of the increase of fares from 7 cents to 10 cents with three tickets for a quarter. Operating receipts for the month were $248,097, against $238,293 for the first thirty days of October and $241,565 for November, 1923. It is stated by General Manager H. M. Flanders that 91 per cent of the revenue for last month was derived from the sale of tickets at the three-for-a-quarter and zone rates and that the increased use of tickets has had a decided effect in speeding up traffic.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week $10,000 of Second Avenue Railroad, New York, N. Y., first mortgage 5 per cent bonds due February, 1948, 1908 and subsequent coupons attached, $100 lot.

Approval of $2,000,000 Mortgage Sought. — Approval of a corporation mortgage and immediate issuance of $2,000,000 of general mortgage bonds was asked in an application filed with the Illinois Commerce Commission at Springfield, on Nov. 29, by the Aurora, Elgin & Fox River Electric Company, Aurora, Ill. The company operates 75 miles of electric railway.

Seeks Interest Share.—The city of Seattle and the State of Washington have brought actions against King County in the Superior Court, seeking a share of the $254,261 interest on the 1919 street railway taxes recently paid the county by the Puget Sound Power & Light Company. The city contends its share is $113,725, while the state, through Attorney-General John H. Dunbar, asks for $38,213. County Treasurer W. W. Shields has stated that he will resist the action, maintaining that while both city and state were entitled to a share in the delinquent taxes, they had no title to interest.

Petition for Abandonment Filed.—The Public Service Commission held a hearing recently at New York City before Commissioner Semple on the application of the Northport Traction Company for consent to discontinue its 2.69-mile surface railroad at Northport, L. I. The road runs from the station of the Long Island Railroad to the village proper.

Manhattan Payment Deferred. — At the meeting of the directors of the Interborough Rapid Transit Company, New York, on Dec. 9, it was voted that the installment of Manhattan dividend rental, due on Jan. 1, 1925, be deferred. Under the terms of the Interborough-Manhattan readjustment plan of 1922 the amount of the quarterly installment of Manhattan dividend rental due on Jan. 1, 1925, is determined by the earnings for the three summer months ended Sept. 30, 1924. The earnings for that period, calculated as provided for in the plan, were not sufficient to warrant payment at the 5 per cent annual rate now applicable.

Additional Appropriation Required.—A final appropriation of $10,000, sufficient to carry on the work of valuing the properties of the Milwaukee Electric Railway & Light Company in connection with the proposed service-at-cost contract with the city, has been requested by the street railway acquisition committee. Previous appropriations have permitted an audit of the company's records up to 1921. This additional amount is needed so that the inspection of the books for 1922, 1923, 1924 will be completed by July, 1925.

Merger to Proceed.—The State Public Utilities Commission has refused to pass on an application for approval of the sale of the Tiffin & Fostoria Railway to the Toledo, Fostoria & Findlay Railway for $30,000. This is taken to mean an early merger of the two lines. The application was not acted upon by the commission on the ground that it lacks jurisdiction over the sale. Through Toledo-Tiffin service will be started by Jan. 1.

Another Duluth-Superior Payment.—The Duluth-Superior Traction Company, Duluth, Minn., has declared a dividend of $1 a share on the preferred stock, payable on Jan. 2 to holders of record Dec. 16. This is the same amount as had been paid quarterly for some time, with the exception of the payment due Oct. 1 which was passed.

Mortgage Bonds Offered.—A syndicate headed by Harris, Forbes & Company, New York, is offering at 95 and interest yielding more than 5.45 per cent $3,266,000 of first and refunding mortgage 5 per cent gold bonds of the Montreal Tramways, Montreal, Que., operating 270 miles of electric railway. The bonds are dated July 1, 1911, and are due July 1, 1941.

Book Reviews

Industrial Coal; Purchase, Delivery and Storage.

A report of the American Engineering Council. 419 pages. Ronald Press Company, New York, 1924. 419 pp.

This engineering survey of the possibilities of improving present methods of purchase, delivery and storage of coal was made at the request of the Federal Coal Commission and has been conducted with the co-operation of more than 400 engineers. The results are presented in 12 chapters, each signed by the author or authors, who took a prominent part in the study.

Briefly, the committee believes that seasonal storage of coal by consumers will overcome most of the difficulties now experienced, that sufficient storage will be obtained if each consumer annually purchases coal on a uniform monthly delivery basis, that such storage can be undertaken without serious risk or loss at a not very large expense and that this storage should take place at the point of use, or as near thereto as possible.

Management's Handbook

By a staff of specialists, L. P. Alvord, editor-in-chief, Roland Press Company, New York. 1924. 1607 pp.

In view of the great progress made in recent years in administration and management engineering, there is undoubtedly a call for a handbook on the subject, and the one just published, the first to be compiled, well answers the requirements. There are 32 sections in the book, each written by one or two experts. Briefly, these sections are divisible in three groups. The first, including the first four sections, is devoted to general information of fundamental character. The 17 sections forming the second group deal with established management functions, methods and mechanism, while the third covers such basic information as economic principles underlying industry, organization, budgetary methods, cost accounting, etc. There is much in the book which will be found useful on an electric railway property, particularly in the shops and storerooms.

Personal Items

Earl Sipe Made Akron City Superintendent

Earl Sipe has recently been appointed superintendent of the Akron City railway system and the Akron-Barberton-Wadsworth Division of the Northern Ohio Traction & Light Company. Mr. Sipe takes the place made vacant by the promotion of O. L. Freeman to traffic engineer. John Flaherty has been acting as superintendent since Sept. 1. He will continue as assistant city superintendent, the position he held prior to the transfer of Mr. Freeman.

Mr. Sipe has been general foreman of the Kenmore shops since May 15, 1923. Prior to that time he was chief clerk to the superintendent of equipment in the shop. He began work with the company as train dispatcher at Silver Lake Junction on Sept. 15, 1918, coming from the Cleveland Southwestern. He has had much experience as a motorman, conductor, train dispatcher, shop worker and instructor of trainmen. He is thoroughly acquainted with the Akron City work, as well as with the balance of this system.

Mr. Sipe entered railway service in May, 1906, when he became a conductor on the city lines of the Mansfield Railway, Light & Power Company, in Mansfield, Ohio. He was then in his teens. In June, 1908, he secured a place as motorman on the Cleveland, Southwestern & Columbus Railway, running between Bucyrus and Cleveland.

Two years later Mr. Sipe went to the Illinois Traction Company, with headquarters in Decatur and Staunton, Ill., as train dispatcher. Three years later he went back to the Cleveland, Southwestern as train dispatcher at Mansfield. In the spring of 1916 he was appointed traveling motorman over the entire system. In this work he acquired a general knowledge of men and learned the value of proper instruction. The following year he was appointed as general foreman of the Elyria shops. In September, 1918, Mr. Sipe entered the service of the Northern Ohio Traction & Light Company, in train service and shop work.

Blaine Gavett, secretary of the American Public Utilities Company, Grand Rapids, Mich., recently sold to the Insull interests, has gone into the wholesale oil and coal business in that city. Associated with Mr. Gavett is Willis J. Ripley, formerly treasurer of the company.

A. L. Linn, Jr., formerly vice-president and treasurer of the United Gas & Electric Corporation and the United Gas & Electric Engineering Corporation, New York, N. Y., has recently been elected president of the Colonial Gas & Electric Company, which has acquired the Newport Electric Corporation, Newport, R. I. The company at Newport operates the electric railway in Newport, Middletown, Portsmouth and Tiverton and generates electric current for light and power purposes in Newport, Middletown, Portsmouth and Jamestown, R. I. Mr. Linn is very well known in the electric railway field. He entered railway work in 1893 with the Cleveland Railway and later was for many years with the Utica & Mohawk Valley Railway and the New York State Railways.

F. R. Smalley has resigned as traffic manager of the San Diego Electric Railway, San Diego, Cal., to become general manager of the California Parlor Car Tours, Inc., with headquarters at San Francisco.

Ralph F. Carley, Quincy, has been named general manager of the western Illinois division of the Illinois Power & Light Corporation, with George F. Grote assistant manager. The headquarters are to be established in Galesburg, Ill., with the completion of the remodeling of the block at Kellogg and Simmons Streets. These men will direct business and operation of the interurban lines and local traction lines in the Quincy, Galva, Monmouth and Galesburg districts of the division.

H. N. Wood has been appointed commercial manager of the Pennsylvania-Ohio system, in charge of all sales and allied activities. He has held various positions with the system since 1914. Prior to that he was connected with the Westinghouse Electric & Manufacturing Company.

F. R. Phillips, mechanical and electrical engineer of the Pittsburgh Railways, Pittsburgh, Pa., was re-elected president of the Pennsylvania Street Railway Association at the meeting of the members of that association, in Harrisburg, on Dec. 5.

R. Harland Horton, vice-president of the International Railway, Buffalo, N. Y., in charge of traffic, has moved to Philadelphia and will be associated with the Philadelphia Rapid Transit Company, in special work. Herbert G. Tulley, president of the International, says that Mr. Horton will remain an officer of the Buffalo company.

John Goguel has been made roadmaster of the Fort Wayne & Decatur Traction Company, with office in Fort Wayne, Ind.

J. W. Osborne, formerly master mechanic of the Terre Haute, Indianapolis & Eastern Traction Company, is now superintendent of equipment with office in Lebanon, Ind.

W. H. Fairbanks has succeeded C. H. Parr as secretary of the Charles City Western Railway, Charles City, Iowa.

E. A. Young has succeeded C. C. Coan as treasurer of the Clinton Street Railway, Clinton, Iowa.

L. B. Andrus has succeeded Joseph H. Brewer as president of the Northern Indiana Power Company, Kokomo, Ind. Fred Olvey has succeeded L. C. Fitzsimmons as chief engineer of the power station.

J. N. Campbell has succeeded Edward Heydon as superintendent of overhead construction of the Indianapolis Street Railway, Indianapolis, Ind.

G. Rake has been appointed general foreman of the Kenmore shops of the Northern Ohio Traction & Light Company, Akron, Ohio, to succeed Earl Sipe, recently appointed superintendent of the Akron city lines. Mr. Rake has been connected with the company for several years.

P. L. Gray has replaced R. A. Crews as auditor of the Southern Illinois Railway & Power Company, Harrisburg, Ill. R. B. Tulpin is now the secretary. He succeeds P. A. Erlach.

O. L. Frazee has replaced J. P. Gannon as master mechanic of the Gary Street Railway, Gary & Hobart Traction Company and the Gary & Valparaiso Railway, Gary, Ind.

H. L. Bennett, formerly secretary and auditor of the Vincennes Electric Railway, Vincennes, Ind., is now in charge of operation and is fulfilling the duties of secretary and treasurer.

A. R. Horr is now secretary of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind. He succeeds R. R. Alexander, who performed the duties of secretary and treasurer.

H. C. Mackay, formerly secretary, treasurer and auditor of the Evanston Railway, Evanston, Ill., has been made vice-president, but will continue to serve as secretary. Charles F. Speed, vice-president in charge of operation, will perform the duties of treasurer. The transportation department is in charge of J. M. Sills.

Obituary

August Belmont

August Belmont, chairman of the board of the Interborough Rapid Transit Company, New York, financier and sportsman, died at 6:30 p.m. on Dec. 10 in his apartment in New York, less than thirty-six hours after he had been taken ill in his office. Mr. Belmont was 71 years old.

The directors of the company, as a mark of respect for the memory of Mr. Belmont, directed that at 4 o'clock on the afternoon of his funeral, Friday, Dec. 12, all movements of trains be stopped for a period of one minute. In addition the secretary was requested to prepare an appropriate memorial to be submitted at the next meeting for entry upon the minutes expressing the sympathy and profound regret of the directors and recording their recognition of his accomplishments, personal charm and integrity.

One of the outstanding achievements of Mr. Belmont was the financing of the first New York subway. Mr. Belmont had generally received a large share of the credit for the successful completion of the enterprise but no more credit than is properly due to him. Others hesitated, skeptical of the outcome, but Mr. Belmont went ahead. Then when the correctness of his judgment had been proved it was sought to jockey him out of his advantageous position.

Mr. Belmont obtained the contract

for the building of the original subway and a lease of the property for 50 years, with a 25-year renewal. When he started to build the subway the Whitney group began to make war on him for control of the transit situation in New York. Thomas F. Ryan was the principal member of the Whitney group, and a battle to the finish ensued between Belmont and Ryan. The Goulds, who controlled the Manhattan Railway, elevated lines, also waged war on Belmont. Mr. Belmont finally leased the Manhattan for 999 years.

Belmont and Ryan eventually arranged for a merger of their traction interests. This resulted in the organization of the Interborough-Metropolitan Corporation, an incongruous financial structure which has since passed out of the traction picture and which many at the time felt was ill conceived.

Mr. Belmont was jealous of the good name of the Interborough Rapid/Transit Company. Some years ago he said:

> The Interborough is the only company in my experience that can claim the distinction of doing any serious service for the improvement of traffic conditions in Greater New York, in spite of the abuse it has received. The treatment of this company has not been such as to inspire further effort on the part of private enterprise, and until private enterprise is encouraged and confidence restored we won't have any improvement. You can split the present system into its original component parts, but you won't have five feet additional service added to the system.
>
> The transportation problem must be treated from the standpoint of a reasonable return on the money invested, whether it be the city's or private money. You can't treat it on an ideal basis.

Mr. Belmont was educated at the Rectory School, Hamden, Conn., at Exeter Academy, at Haverford College and at Harvard College. He was graduated from Harvard in the class of 1874. He entered his father's banking house in September, 1875, the year after his graduation from college. Mr. Belmont learned the business from the ground up, and after his father's death in 1890 became the head of the house.

William Harris, vice-president of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., died on Nov. 29 at Northville. He had been interested in this property since its construction, and was a member of the board of directors for many years. Mr. Harris was 76 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Wages Up 100 per Cent Over 1914

Wages, as measured by average hourly earnings, have made a net gain of more than 100 per cent in the last 10 years, while the average of the cost of living has made a net advance of about 60 per cent. These figures are contained in a survey made a short time ago by the National Industrial Conference Board.

In September, 1924, the cost of living index number determined by the board stood 63.7 per cent above the level of July, 1914, as compared with 63.4 per cent in September, 1923. During the year ended September, 1924, hourly earnings of all wage earners remained practically constant. There was, therefore, no considerable change in "real" hourly earnings during the year.

The highest point reached, during the ten years reviewed, by the index number of "real" hourly earnings based on conditions in July, 1914, as 100, was 142, and the lowest point 139. In September, 1924, it stood at 141.

The substantial increase in actual weekly earnings between August and September of this year advanced the index number of "real" weekly earnings to 126 for the month in spite of the fact that the cost of living index number had also advanced nearly a point. Translated into other terms it means that in September, 1924, the contents of the average employed wage earner's pay envelope would purchase 26 per cent more of the necessaries of life than in July, 1914.

In referring to the industrial depression from which the country is now definitely emerging, the board expresses the opinion that the fear of the wage earner that a lower wage scale introduced as a temporary expedient may become a permanent level is not justified by facts. The wage reductions of 1920 and 1921 paved the way for and hastened the recovery of 1922-23, which was responsible in the early months of 1923 for the very general wage increases.

The report, which comprises the fullest data up to the end of September, 1924, concludes that employment, earnings and hours of work all registering substantial gains at a time of the year when manufacturing activity is usually low may be regarded as reliable evidence that the long anticipated upward turn has begun and that in spite of temporary reactions industry may reasonably soon look forward to a more satisfactory period of operating conditions.

Metal, Coal and Material Prices

Metals—New York	Dec. 9, 1924
Copper, electrolytic, cents per lb.	14.25
Copper wire base, cents per lb.	16.875
Lead, cents per lb.	8.90
Zinc, cents per lb.	7.45
Tin, Straits, cents per lb.	55.00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.125
Somerset mine run, Boston, net tons	2.15
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.50
Central, Ill., screenings, Chicago, net tons	1.35
Kansas screenings, Kansas City, net tons	2.15
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N.Y., cents per lb.	17.75
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.14
White lead in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.152
Turpentine (bbl. lots), N. Y., per gal.	0.84

Large Lubrication Contract Renewed

The Texas Company, producers of Texaco petroleum products, has renewed its contract with the Brooklyn-Manhattan Transit Corporation and the New York Rapid Transit Corporation. The contract calls for Texaco oils to lubricate the entire rolling equipment of these two great metropolitan transit organizations.

Commerce Body Defends Trade Associations

The position of American business on important current national economic questions was recently put before President Coolidge by the Chamber of Commerce of the United States in a statement setting out principles upon which the chamber lays emphasis as especially timely. In each instance the chamber's proposals are the result of action by the organization's membership. The subjects dealt with include: Repeal of income tax publicity; creation of a national tax commission; declaration of a policy regarding trade associations; the establishment and carrying out of a merchant marine policy; development of waterways; the Railroad Labor Board; the setting up of an immigration commission, to recommend and administer legislation; extension of the budget system.

The chamber thoroughly believes that trade associations, legitimately conducted, are an essential element to the promotion of American business and that legislation which would make them impossible, or make it impossible for them to function properly, would hinder not only industry but also the prosperity of the nation. It is felt that organizations and individuals against whom no accusation under existing law has been brought or is in contemplation are subjected to the injustice of being viewed with suspicion by the public.

The chamber holds no brief for trade associations that infringe the law, but seeks to point out the facts so as to remedy a situation which is already tending to hinder the development of business. The larger and richer the corporation, the less its needs for a trade association. Not so with the smaller concerns. They cannot afford, except through pooling their interests, to secure business data. The membership of the chamber, through a referendum vote, has made the following recommendations regarding the use of statistics by trade associations:

> Statistics of capacity, production, stock and sales, and statistics of actual prices in closed transactions, should be collected by a trade association for its industry or branch of commerce.
>
> Such statistics should be distributed without any comment or interpretation which could induce or facilitate concerted action on the part of members.
>
> The statistics should be made as available by a trade association to the public and government agencies as to the members of the association.

Rolling Stock

Jacksonville Traction Company, Jacksonville, Fla., is negotiating for the purchase of two additional cars.

Gary & Valparaiso Railway, Gary, Ind., has plans under way for the purchase of two new combination passenger baggage and smoking cars at a cost of $40,000.

Kewanee Public Service Company, Kewanee, Ill., has purchased 12 new cars of the Birney safety type.

Trenton & Mercer County Traction Company, Trenton, N. J., has placed 10 new cars in operation and has ordered 10 more. These cars cost $13,000 each. It is intended to operate them with one man.

Trenton, Bristol & Philadelphia Street Railway—Pennsylvania & New Jersey Street Railway, Philadelphia, Frankford & Tacony Traction Company. —Philadelphia, Pa., recently amalgamated, plans to purchase new cars.

Shreveport Railways, Shreveport, La., has just placed in service three new cars built by the American Car Company, St. Louis. These are double-truck, single-end, front-entrance, center-exit, one-man, two-man type. The length over all is 40 ft. 9 in. The total weight is approximately 30,000 lb. When arranged for one-man operation the car will seat 55 passengers, but when operated by two men the seating capacity is only 47.

Track and Line

Miami Beach Electric Company, Miami Beach, Fla., has started work on new tracks which are to be constructed on Washington Avenue, Biscayne Avenue, Ocean Drive and First Street.

Iowa Railway & Light Company, Cedar Rapids, Iowa, has completed a loop in Des Moines which will give a number of towns it serves duplicate service. The loop as completed extends from Boone west to Grand Junction, south to Perry, east to Madrid and north to Boone.

Cleveland Railway, Cleveland, Ohio, has filed plans for the erection of a one-story brick and steel substation at 1004 Central Avenue, to cost $45,000.

Chicago Surface Lines, Chicago, Ill., opened up two extensions recently aggregating about 1 mile. The West Seventy-first Street line was extended from South Western Avenue to California Avenue, making an additional route to Marquette Park. The Western Avenue line was extended from Seventy-first to Seventy-fifth Street with the expectation that it will subsequently extend several miles south into territory now developing.

Johnstown Traction Company, Johnstown, Pa., has completed its 1924 program of track renewals and street improvements at a cost of $239,520. This is the fifth year during which extensive work of this kind has been done by the company. Since the beginning of 1920 more than $850,000 has been spent for street improvements by the railway. The program will be continued next year, but definite plans have not yet been formulated for this work.

Georgia Railway & Power Company, Atlanta, Ga., is putting the finishing touches on a number of paving and track rebuilding projects before the close of the current year. One of the major projects recently on Fair Street necessitated rebuilding the entire roadway area, including the laying of heavier tracks and repaving of the street. A new type of work in which steel cross-ties were used was completed recently on Highland Avenue. Double tracks were installed on Pryor Street and Georgia Avenue and the rebuilding work on Kelly Street was completed. The laying of double track and the construction of a left-hand branch-off at Whitehall and Cooper Streets and the installation of two new crossings at Georgia Avenue and Washington Street are other jobs which have been completed, also the improvement program begun some weeks ago on Broad Street.

New Incorporation

St. Louis-Kansas City Short Line Railroad, St. Louis, Mo., has been incorporated. The articles provide for an authorized capitalization of $2,400,000, of which $240,000 has been subscribed. The incorporators are Lee Dunlap and Frank E. Lott, Kansas City, Mo., and Ernest H. Lawhon, Erba D. Smith and William H. White all of St. Joseph, Mo. Mr. Dunlap has stated a standard gage electric railroad is planned, but the company is authorized to use steam, electricity or other motive power. The line would run from St. Louis through Creve Cœur, St. Charles, Warrenton, Jonesboro, New Florence, Columbia and New Franklin, crossing the Missouri River at Arrow Rock and proceed thence through Marshall, Higginsville and Independence to Kansas City. The projected road, 238 miles long, would take 35 miles off the rail mileage between the two terminal cities.

Trade Notes

Economy Electric Devices Company, Chicago, Ill., is calling attention in a special letter to the aluminum coil which it exhibited at the Atlantic City convention. That coil was subjected to the most severe tests possible. A bare aluminum coil, oxidized by the company's usual process, was mounted on a transformer growler. Under one end of this coil was an alcohol lamp. The other end of the coil was kept saturated with water. A vise in the middle of the coil subjected it to pressure far in excess of any pressure a coil would have to withstand in service. The coil was clear of shorts even with one end soaking wet, the other end sizzling hot, and under pressure sufficient actually to deform the wire. Intentional shorts made on the coil would promptly clear themselves by the passage of the current. In the Economy aluminum field coils aluminum oxide is used as the insulator. A trial of the device is urged.

Rail Welding & Bonding Company, Cleveland, Ohio, announces the partial rearrangement of selling territories and the appointment of the following additional sales representatives: For the eastern Pennsylvania territory, Railway Track Work Company, 3132 E. Thompson Street, Philadelphia; for western Pennsylvania and northern West Virginia, Electrical Engineering & Manufacturing Company, 907 Penn Avenue, Pittsburgh, with branch offices in 330 Union Building, Cleveland, and 604 Mercantile Library Building, Cincinnati, Ohio; for the northern section of Illinois and for Wisconsin, Iowa and Minnesota, R. Roy Holden, 310 South Michigan Avenue, Chicago; for Louisiana, Mississippi, Alabama, Florida, Georgia, eastern Tennessee, Texas and Oklahoma City, P. W. Wood, 1003 Carondelet Building, New Orleans, La.; for California, A. W. Arlin, 519 Delta Building, Los Angeles, and for the states of Washington and Oregon, Burton R. Stare Company, 619 Fourth Avenue, Seattle, Washington.

Sullivan Machinery Company, Chicago, Ill., has removed its Cleveland office to Room 701, Rockefeller Building, from Room 824 in the same building. The district manager is Ralph T. Stone.

New Advertising Literature

General Electric Company, Schenectady, N. Y., is distributing a publication on lightning arrester grounds which is an elaboration of a paper by H. M. Towne, presented before the Southeastern Division of the N.E.L.A. at Tampa, Fla., on Nov. 20, 1923.

Horne & Ebling Corporation, 50 Church Street, New York, and factory in Jersey City, has listed in a four-page circular devices which it handles under the main heads: Motor and Controller Parts, Car Hardware, Line and Track Equipment, Specialties and Heat Treatment of Steel. Among the products of the company are brakes, malleable and brass castings, watertight crossing bells, junction boxes, case hardened pins, track sanders, car sash fixtures and trolley bases. The company is prepared to design and manufacture special railway devices.

Atlas Lumnite Cement Company, New York, N. Y., has published a 30-page pamphlet in which Lumnite cement is described and its uses illustrated. Instances are reported where Lumnite has proved an advantage in concreting between and along tracks of various electric railways.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has released folder 4586, a single-phase road locomotive for preference freight service. This folder describes the new single-phase locomotive known as the Type L-5, which has recently been placed in service by the Pennsylvania Railroad, and a supplement to the folder describes the L-5-A, d.c. locomotive, which has also just been completed.

New York, Saturday, December 20, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Company, Inc.
HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 25

Hoover Safety Conference a Great Constructive Success

A FORCEFUL, constructive influence, looking toward early relief from the terrible toll of life in street and highway accidents, has been set in motion by the National Conference on Street and Highway Safety held in Washington Dec. 15 and 16. The conference on this pressing problem was called by the Secretary of Commerce, Herbert Hoover. He personally acted as chairman during a large part of the deliberations, and the masterful way in which the meetings were conducted and the high character of the work accomplished pay tribute to his great ability as organizer and doer.

It was no small matter to bring together representatives of the many interests concerned from practically every state in the Union, with all their conflicting and divergent views on the subject, and work out of this chaos in two days time a distinctly constructive statement of remedial measures having the whole-hearted approval of so large and representative a conference. It was something of an accomplishment even to get some of the interests together around a common table to discuss this problem. But the preliminary work done in eight committees, the expression of opinion on the committee reports at the first day's sessions, the harmonizing of the views expressed and the compilation of the various recommendations into a consolidated report, and then adoption of this report, section by section, by the whole conference on the second day, constitute a truly great accomplishment.

As finally approved, the recommendations of the conference form a program which all interests can indorse and apply. In some details, it may not satisfy one party or another, but it represents a point of view arrived at after long and careful deliberation by men of highest standing in their own industries and representing all interests concerned. The personnel of the committees and the backing of the federal government give the report a stamp of authority and distinction which should commend it to the careful consideration of all public officials, the railways, the automotive industry and all highway bodies and safety organizations. It will go a long way toward securing the uniformity of regulation and practice throughout the country so sadly lacking now, while avoiding federal regulation in the matter.

Chief among the recommendations of interest to interurban electric railways is that calling for legislative action requiring motor vehicles to come to a full stop at certain railway crossings and putting the responsibility in the hands of the state commissions to designate the grade crossings to which the law is to apply and so to mark them. The proposal of a stop law caused more debate than any other point raised. The railroads naturally want indorsement of the full-stop law without qualification. The final wording, however, is a sensible compromise. The plan adopted, if applied, will doubtless go a long way toward taking the burden of responsibility off the railways, and, what is far more important, toward material reduction in grade crossing accidents.

Street railways are also much concerned directly and indirectly with many of the provisions of the conference report. They will find that they can indorse and help along adoption of the whole program urged. The report is reviewed in another part of this issue, but electric railway men will do well to write to the Department of Commerce, Washington, for a copy of the complete report for study and application, and to support it in a broad way in their own communities.

Definite Limits of Wear Promote Good Maintenance

IN NEARLY all maintenance work the subject of economy is uppermost in the mind of the man in direct charge—and of his superiors also for that matter. Constant effort and attention is directed toward obtaining increased life from the various parts of the equipment without getting excessive road failures. At the same time it is desirable to get the work done at minimum labor cost.

Sometimes, however, the constant pressure for economy causes the ultimate result to be lost sight of when striving for immediate savings. There is a natural tendency in the attempt to get every possible mile of wear out of each part of the car equipment. The desire to "make a showing" in immediate costs may lead to badly run down equipment and poor service.

This shows up strikingly in connection with the replacement of bearings and similar parts that must be periodically renewed and that run into considerable cost. On many properties there seem to be no definitely established limits of wear, and it is questionable whether on many others that do have generally understood limits they are actually lived up to.

An important step toward better maintenance practice will be taken when maximum wear limits are definitely established for all important wearing parts and are then rigidly adhered to. Even though a limit is established and later found to be too high or too low, it can be readily altered and maintenance forces instructed accordingly. But some limit should be established, and when the part becomes worn to that point it should be taken out. In that way only can uniformly good results be obtained.

This is the issue in December that is devoted essentially to maintenance subjects

He Knew When It Was Time to Throw a Machine Away

THAT it very often pays to spend money in order to save money is illustrated by the experience of a master mechanic who recently replaced a still serviceable power-driven hacksaw by one of more modern design. When the suggestion that this be done was originally made to the management of the railway in question, it occasioned some surprise. At first thought it appeared to be an extravagance to throw away one fairly good saw and buy a new one.

But this master mechanic had made a study of machine tools, and he was ready with his argument. He showed the management just how money could be saved by installing a better machine. In this case the better machine was primarily a quicker machine, and at present rates of wages any machine that saves time will soon pay for itself. So, he argued, instead of being an extravagance to install a new machine, it would really be an economy.

The management of this railway is always on the lookout for ways of legitimately reducing expenses. Moreover, the master mechanic was known to be a man with long experience at his work and having sound common sense. So a new high-speed saw was bought and installed in the shop. Its performance soon justified the expense. For example, it reduced the time required to cut through a steel axle to one-tenth the former time. The life of the saw blades was practically quadrupled.

Opportunities to make changes of this kind exist in nearly every railway shop. For thus being able to visualize the possible savings to be effected by throwing away an old machine this master mechanic deserves great credit. Equal credit is deserved by the management which listened with an open mind to his argument and was willing to put the proposal to the test.

Riding Comfort May Have a Stronger Appeal than Cheapness

DRIVING down by automobile from the house to the office is a pretty cold proposition these winter mornings. The wind howls and the snow sifts in through every small opening. An icy covering makes the pavement treacherous. If the old bus stands parked all day and gets snowed in, it may require a half hour's delay and use up the best robe under the wheels to get backed out and headed homeward. On the other hand, riding in the street car is comfortable and warm and safe and convenient.

An appeal to the automobile driver based on some such argument as the foregoing is likely to be effective at this season of the year. This idea was tersely put by Labert St. Clair in a telegram to the Pennsylvania Street Railway Association Convention at Harrisburg on Dec. 5, which was reported in this paper last week. In it he said, "Make the comfort of street car riding rather than the cost of running an automobile the basis of appeal to automobile owners."

That does not mean, of course, that the well-known slogan "Ride the street car and save the difference" is not effective. Its value has been proved by experience in many places and undoubtedly it has influenced a large number of people to ride the railway. But the average American automobile owner is more influenced by comfort and convenience than by cost. He will spend money freely to get what he wants. If he can be convinced that it is more convenient and comfortable for him to ride downtown in the street car than it is to get his automobile out of the garage and drive down, that is more apt to appeal to him than the fact that he is saving 10 or 15 or 50 cents.

Then, too, the economy argument is no longer new to the public in some cities, and novelty is one of the most important requirements of effective advertising. Skillfully worded publicity emphasizing the comfort feature might be more effective now than that which stresses primarily the cheapness of riding the street car.

A Subway Is an Expensive Luxury

IT IS a striking fact that in nearly every large city in the country there is a tremendous demand for subways. This applies notably to the two largest cities, New York and Chicago, but in Detroit, Philadelphia, St. Louis and other cities subway construction, or additions to the present systems, is being strongly advocated by many citizens.

This desire is understandable with the congestion of traffic on the surface of the streets, but the public should realize that subways are a very expensive luxury and that the cost of building them, like the price of many other desirable things, has gone up greatly during the past 10 years. This is shown in the estimated cost figures given out last week in New York for the Mayor's proposed subway between the southerly end of Manhattan and 193d Street. For one of the downtown sections of this line—0.83 route-miles in length—the cost is estimated at more than $25,000,000 per route-mile and the figure for the entire length of the division south of 64th Street—10 route-miles—is given as $114,000,000. This amounts to $11,400,000 per route-mile. Part of this section is two-track, part four-track and part six-track, there being 36.32 track-miles to the 10 miles of route. These cost figures are exclusive of all equipment or of shops, or of any land or easements.

For the section north of 64th Street and as far as 193d Street, the cost on the same basis is estimated at about $8,040,000 per mile of route, there being 6.65 route-miles and 24.95 track-miles. The reduction in these figures from those for the downtown section is due, of course, to less arduous conditions of construction.

Some of the factors which have an important bearing on the cost of building subways are narrow streets with high buildings, especially where this condition is combined with soft subsoil, extent of other substructures in the street, whether the subway is under water level, and the extent of the street congestion over the proposed construction. The latter condition affects the cost of receiving materials and the disposal of the refuse.

Most of these factors are present to some extent in the 0.83-mile downtown section of Manhattan, where the proposed line would have to cross under two subways of the Interborough Rapid Transit Company and one of the Brooklyn-Manhattan Transit Corporation, where much underpinning of these and other structures would have to be done, and where there is not much room for carrying on the work. Above 64th Street, conditions for construction are more favorable and this fact is reflected in the price. But, in general, it may be said that the cost of subway construction has considerably more than doubled since 15 years ago, when a rough estimate for the building of a two or four-track subway was $1,000,000 per single track mile.

Jigs and Dies to Reduce Shop Costs

Chicago Surface Lines Uses Special Tools to Make Many Parts in Punch Presses—These Formerly Required Several Hand Operations—Automatic Stripping and Ejection of the Finished Parts Speeds Up Production

IN THE West Shops of the Chicago Surface Lines many dies and jigs have been developed to hold down the cost of making replacement parts for car equipment. As a result, the number of hand operations has been reduced to a large extent and the punch press has been substituted for hammer, saw, file and drill press. These special tools have been made up from time to time over a number of years, the high wage scales prevalent in Chicago being an added incentive. Although many different types have thus been developed, each expenditure for new dies is carefully supervised and the cost of a proposed new tool is compared with the estimated saving to be made before the work is authorized.

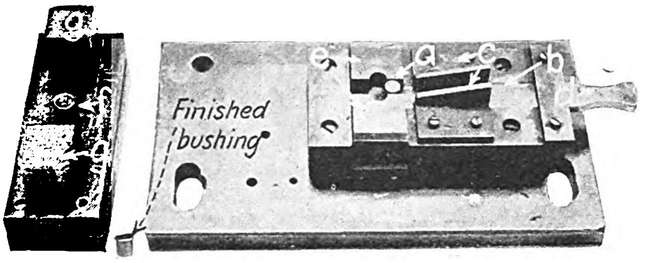


Fig. 1. Die for Rolling Bead on Push-Button Bushings

The pieces are stripped by pulling the handle at the right, which causes the bead on the bushing to engage the inclined surfaces at (*a*).

An endeavor is made to avoid the tendency in railway maintenance practice of manufacturing parts that can be purchased cheaper from other sources. In some cases, however, the decision is determined by the time element in delivery. Special parts that are required in comparatively small quantities frequently cannot be purchased at an attractive price except in large lots. Consequently the cost of carrying large stocks of such parts sometimes makes it desirable to manufacture them in the shop. Since punch press dies can be set up quickly in the machines, it is possible to manufacture comparatively small lots of special parts at prices that more than justify the cost of making up the dies.

The punch press equipment available was originally purchased for maintenance purposes and is not particularly suited to quantity production. It consists mostly of comparatively slow, heavy-duty machines. With the exception of one motor-driven V. & O. Press Company No. 21 punch, these are limited to a Williams, White & Company No. 14 press, a Long & Allstatter combined punch and shear and one other heavy-duty, deep-throat punch. The various types of dies and jigs that have been designed increase the service obtained from these machines. Since there is nothing unusual about the machine equipment available in these shops, the tools to be described are of types that can be utilized with the machines found in most railway shops.

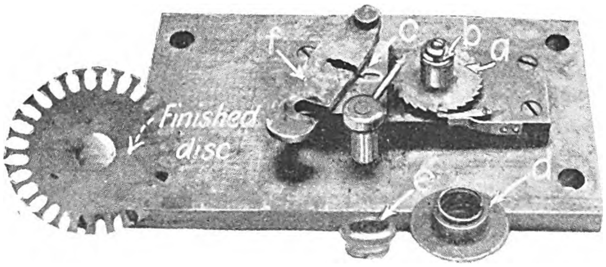


Fig. 2. Equally Spaced Slots in Fish Paper Insulating Disks for Fan Motor Armatures Are Cut in This Indexing Die

In the accompanying illustration, Fig. 1, is shown a die for making push-button bushings for the passenger signal bells on a comparatively large group of cars. This particular type of signal is no longer on the market, and repair parts are therefore not available from the original manufacturer.

The bushings are made of thin brass tubing, with a bead rolled on one end to protect the passengers' fingers. They are first cut off in a screw machine and the bead is then rolled by the punch and die shown in the illustration. The piece of tubing of proper length is slipped on the pin (*a*) projecting from the sliding member (*b*) shown in the illustration. This slide extends out to the right from the body of the die to form a handle at (*d*) which can be grasped by the operator. When the slide is pulled out to the extreme right the pin (*a*) is exposed so that the piece of tubing can be readily dropped into place. The sliding member is then pushed to the left until it strikes a stop. This places the bushing between the two halves of the split forming die (*e*), shown open in the illustration. This is held open by compression springs and is arranged so that the two halves of the die are free to slide in the die block. When the punch, shown at the left, descends, the two heavy lugs (*g*) engage tapered outer faces on the split die (*e*), and as the punch comes down into position the two halves of the die are brought together so as to clamp securely the bushing between them. The top of the bushing is rolled by the punch (*f*) in the center. When the punch is raised from the die the two split members are forced apart by the compression springs mounted between them, thus releasing the bushing and the hand-operated slide (*b*) so that the latter can be pulled to the right by hand. When this is done the newly rolled bead on the top of the bushing engages the two inclined surfaces (*c*), and as the sliding member continues toward the right the bushing is automatically drawn off the pin, so that another piece of tubing can be quickly dropped in place, and the operation repeated. This job is carried out on a V. & O. Press Company No. 21 motor-driven punch at the rate of approximately 2,000 pieces per hour.

A good example of an indexing die for making a number of equally spaced cuts in a single piece of material is shown in Fig. 2. This is used for cutting the slots in the circular fish paper insulation used in small ventilating fan motor armatures.

The round disks are first blanked out of sheet material. The slots for the windings are then cut in the die shown. A disk is slipped over the spindle (*b*) and the guard (*f*) is fastened in place to act as a stripper. The collar (*d*) is then slipped on the spindle (*b*) and the cap (*e*) is placed on top. This cap is provided with a projecting pin on the inside which enters the vertical slot near the top of the spindle (*b*). By pressing down on this cap the spring inside the collar (*d*) is compressed. The cap (*e*) is then given a partial turn so that its pin engages the circumferential slot shown near the top of the spindle (*b*), thus holding the collar (*d*) securely in place and clamping the disk of fish paper on the ratchet wheel (*a*). The various parts just described are all clamped together through the action of the spring inside the collar (*d*), but are free to rotate about the vertical pin in the center of the spindle (*b*). A spring engaging the notches in the ratchet (*a*) allows it to be rotated by hand, one notch at a time, corresponding with the spacing of the slots to be punched in the disk. As the piece is rotated, it is thus indexed to give the required number and spacing of slots. The work is done in a Williams, White & Company No. 14 power punch press at the rate of 25 complete disks per hour.

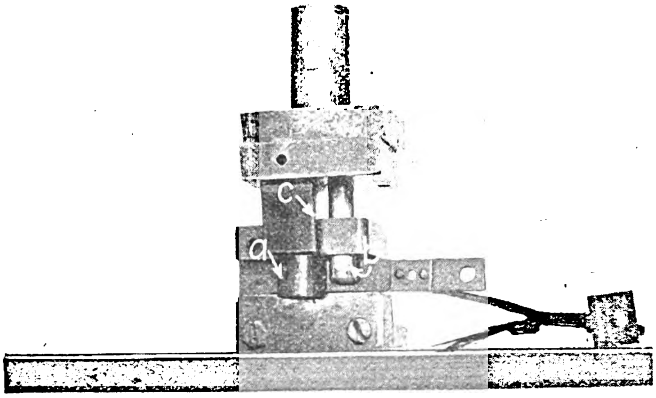


Fig. 3. Burning Tips Are Removed from Controller Fingers with This Equipment, Which Holds the Finger in Place While the Punch Shears Off the Worn Tip

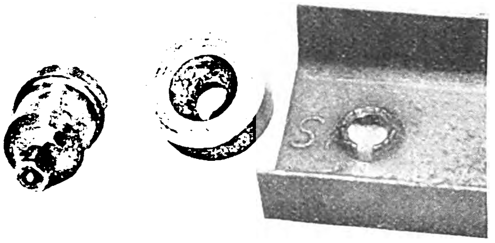


Fig. 4. Holes in Truck Pedestal Wear Channels Are Punched and Slotted at One Time with This Simple Equipment

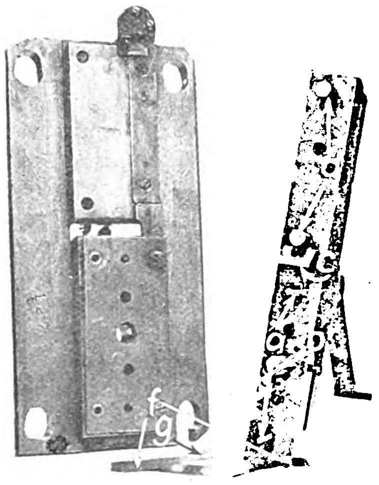


Fig. 5. Car Ribbon Fuses Are Made by a Continuous Process

The two pieces of ribbon are fastened together, the center calibrating hole is punched and the finished fuses are cut to the proper length.

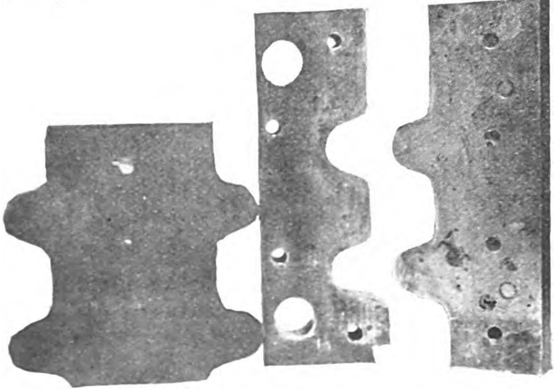


Fig. 6. Case-Hardened Wear Plates Are Bolted to Projecting Ears on Journal Boxes. The Pieces Are Cut to Proper Shape in a Punch Press

A punch and die for the removal of burning-tips on controller fingers offers an excellent example of the substitution of machine for hand operations in salvaging worn parts. This tool, shown in Fig. 3, is designed so that a projecting pin (*b*) on the punch passes through a hole in the die block to hold the finger securely in place while the punch (*c*) cuts off the burning tip (*a*). The condition of the two parts after the tip has been removed is shown at the right side of the illustration. The finger is then ready for a new tip. This work is done in the V. & O. Press Company No. 21 punch press at the rate of about 2,000 pieces per hour.

The simple punch and die shown in Fig. 4 is used to make countersunk slotted holes in 4-in. structural channel wear pieces for truck pedestal jaws. On this particular type of truck the wear pieces are held in place with countersunk head carriage bolts which have a lug at one side to prevent the head of the bolt from turning while the nut is being pulled up tight. As will be seen from the illustration, the punch not only cuts and countersinks the hole, but also forms the slot to take the projecting lug on the carriage bolt. This work is done on a heavy-duty power punch press at the rate of about 200 holes per hour.

CAR RIBBON FUSES MADE COMPLETE

In Fig. 5 is shown an ingenious die for making car ribbon fuses from thin strips of copper. The copper ribbon is purchased in rolls 1 in. wide and 0.005 in. thick. Two of these thicknesses of material are fastened together and a calibrating hole is punched in the center, to form the complete fuse, as shown at the bottom of the illustration. This has been pulled apart to show the two ribbons of copper. The entire operation of making these fuses is completed in the die shown, as a continuous process. The two ribbons of material are fed into the die from two different rolls. The projecting prongs (*a*) on the die pierce the two strips of copper in such a manner as to leave a projecting burr at two points spaced so they will come near each end of the completed fuse. At the same time the center hole (*g*) is punched in the ribbon. As the material is pushed forward again in the die, against a stop which fixes the proper length, the two projecting punches (*d*) flatten the burrs that were made at (*f*) so as to fasten the two pieces securely together. At the same time the descending cutter (*c*) cuts the completed fuse off to the proper length. The operation is then again repeated. This work is done in the V. & O. Press Company No. 21 press at the rate of about 3,500 complete fuses per hour.

A heavy cutting die for blanking out the irregular-shaped journal box wearing pieces shown in Fig. 6 is used in a Williams, White & Company No. 14 press. In this case it is necessary to make two cuts to complete the work, the piece being turned around after the cut on one side has been made. The material is 3/16-in. sheet steel and is later formed and punched to complete the wearing pieces. These are made up so that they can be bolted to projecting ears cast on the sides of the journal boxes. The jig for punching the holes in the ears after the piece has been formed is shown in Fig. 7. This is of interest chiefly because of the complicated shape of the piece to be punched. It will also be noted that several sets of holes in the jig permit it to be used for punching wear plates for different-sized journal boxes.

SEVERAL TYPES OF FORMING DIES USED

Two forming dies of widely different types are illustrated in Figs. 8 and 9. The one shown in Fig. 8 is used for the manufacture of the small eye-bolts shown at the bottom of the illustration. This is part of the car fuse box assembly and is made up cold from 5/16-in. round, cold rolled steel. The pieces are sheared to the proper length and are then formed in four operations. The successive stages of the forming are carried out in order on the four sections of the die marked, respectively, (*a*), (*b*), (*c*) and (*d*). The piece is moved from one position to the other in the die so that it requires four movements of the press to complete the operation. In the first position (*a*) the rod is kinked up at one end. In position (*b*) this kink is depressed so as to bring the stem approximately at the center of the loop. In positions (*c*) and (*d*) the loop is finally completed. The work is done in a Williams, White & Company No. 14 press at the rate of 75 pieces an hour.

Brass channel wearing pieces used to reinforce the stiles of body sash are formed from No. 18 gage strips of the proper width in the punch and die shown in Fig. 9. The completed channel is shown at (*c*) in the illustration. The punch and die shown are used to form the channel only, the screw holes and cuts for the sash locks being made in a second die that is not shown. In the Williams, White & Company No. 14 press these are formed at the rate of approximately 40 per hour.

An excellent example of a die which substitutes punching operations for what would ordinarily be a drill press job is illustrated in Fig. 10. The large holes in the channels that are used as wear pieces on truck pedestals are punched instead of being drilled. The block (*b*) in the die supports the web of the channel so that it can be punched without distorting the flanges. These channel pieces are also sheared to the proper length in a similar die designed to support the piece, so that both the web and the flanges are cut off clean. Both 14-in. and 16-in. lengths of channel are required for different types of trucks, and an adjustable pin at the left of the die shown in Fig. 10 enables the same die to be used for punching pieces of either length. The punching is done in the Williams, White & Company No. 14 press at the rate of 60 pieces per hour.

DIE LOCATES HOLES FROM CENTER PUNCH MARKS

In most railway shops the punching equipment is not suitable for making a number of holes in small structural members which have been laid out with center punch marks. This is due to the fact that such punch press equipment is usually of the rotating type, on which the punch stops in a raised position, making it difficult to locate the center punch so that the hole will be in exactly the proper position. The device shown in Fig. 11 was designed to make an ordinary punch press suitable for such work. When set up in the machine the end of the pointer (*a*) corresponds

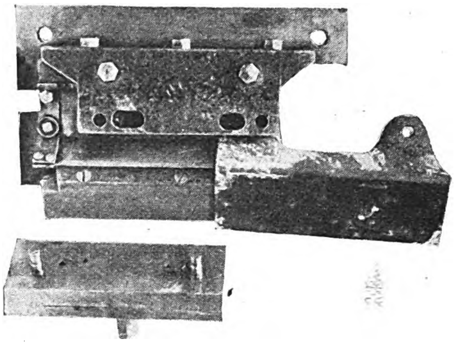


Fig. 7. After Forming, the Wear Plates Shown in Fig. 6 Are Punched in This Jig

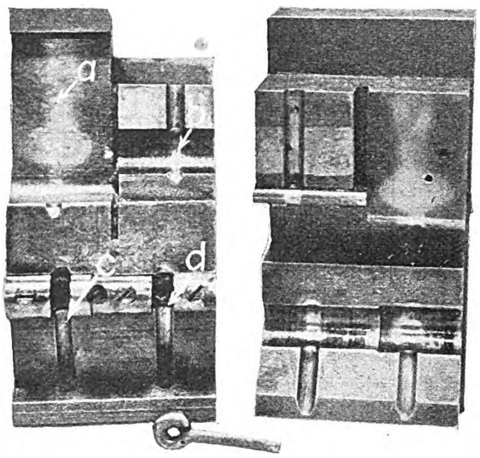


Fig. 8. The Piece Shown at the Bottom Is Formed Cold from 5/16-in. Round Stock in Four Operations

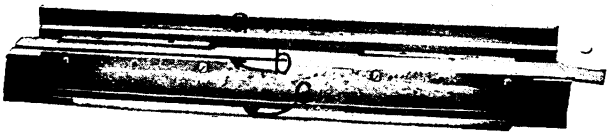


Fig. 9. This Die and Punch Are Used for Forming Brass Sash Channels from No. 18 Gage Material

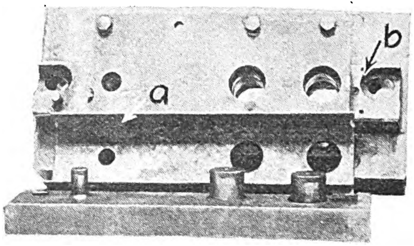


Fig. 10. Die for Punching the Large Holes in Webs of Truck Pedestal Channel Wear Pieces at a Substantial Saving Over Cost of Drilling

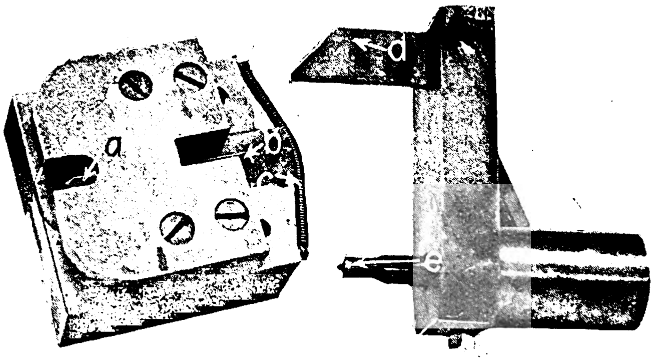


Fig. 11. Die for Punching Holes in Structural Members

The difficulty of working from center punch marks when using an ordinary type rotating press is overcome with this ingenious die, which contains a pointer for locating the position of the hole. The pointer is forced aside as the punch descends and returns to position when the punch is raised from the work.

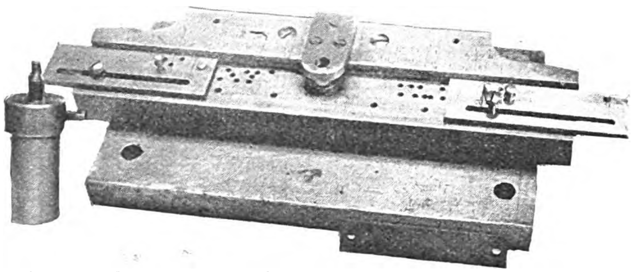


Fig. 12. The Holes in Various Types of Controller Cylinder Segments Are Located in This Adjustable Jig

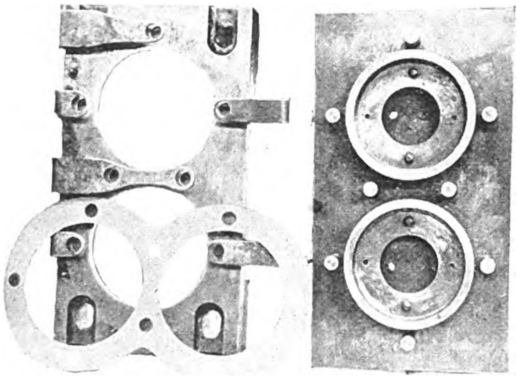


Fig. 13. Compressor Cylinder Head Gaskets Are Punched from Several Thicknesses of Material

exactly with the center line of the punch (*e*). When the work is moved, so that the end of this pointer coincides with the center punch mark locating the hole to be made, the punch itself will descend in the proper position. The pointer in the die is carried on the end of a cross slide having a slot near the rear end at (*b*). This slide is normally held in the forward position against a stop by the spring (*c*) which is stretched across the back of the die, and presses against the slide. A wedge (*d*) carried on an extension back of the punch enters the slot (*b*) as the punch descends and forces the slide back so as to move the pointer out of the way while the hole is being made in the material. As soon as the punch is again raised the pointer (*a*) returns to its normal position and is ready to locate the next hole.

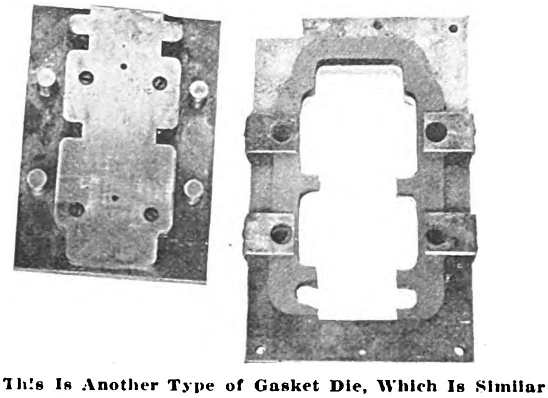


Fig. 14. This Is Another Type of Gasket Die, Which Is Similar in Construction to that Shown in Fig. 13

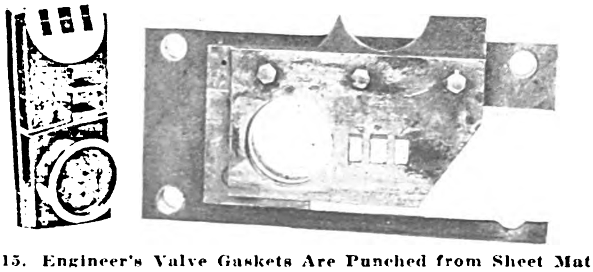


Fig. 15. Engineer's Valve Gaskets Are Punched from Sheet Material in a Continuous Process. The Punch Is Made in Two Parts So that Each May Be Used Separately if Desired

To make up different dies or jigs for each of a large number of similar parts which vary slightly in size and position of holes becomes a very expensive matter. In Fig. 12 is illustrated an adjustable jig which is indexed so that a comparatively large number of similar parts of varying dimensions may be all punched on the same piece of equipment. This is used for punching the holes in controller cylinder segments before they are formed. Pins in the slides at each side of the jig are dropped into holes corresponding to the positions indicated by the various scales which are laid out to locate the holes for various types of controllers. In this one jig all the various plates used on K-51, K-35 and K-28 controller cylinders are punched. The hole at each end of the piece is punched separately, the right and left hand sides being adjusted so that the piece is moved first to one side and then to the other. The work is done at the rate of about 1,000 pieces per hour in the V. & O. Press Company No. 21 power punch press.

Three different dies for punching gaskets are illustrated in Figs. 13, 14 and 15. The one shown in Fig. 13 is used to punch the bolt holes and the inside contour for compressor cylinder head gaskets after they have been blanked out on another die. That shown in Fig. 14 is very similar and is used for the outside cylinder head gasket. The equipment in Fig. 15 punches engineer's valve gaskets from strips of material in a continuous process. The three rectangular holes are punched in the piece first and the gasket is then blanked out on the second descent of the punch, while at the same time the holes for the next gasket are being made. The punch is made in two parts so that one or the other part may be removed and the tool used for either operation separately. All three of the dies shown in Figs. 13, 14 and 15 are used on the V. & O. Press Company No. 21 punch press. The cylinder gaskets are made at the rate of about 500 per hour by using several thicknesses of material at a time, while the engineer's valve gaskets are turned out at the rate of approximately 3,500 per hour.

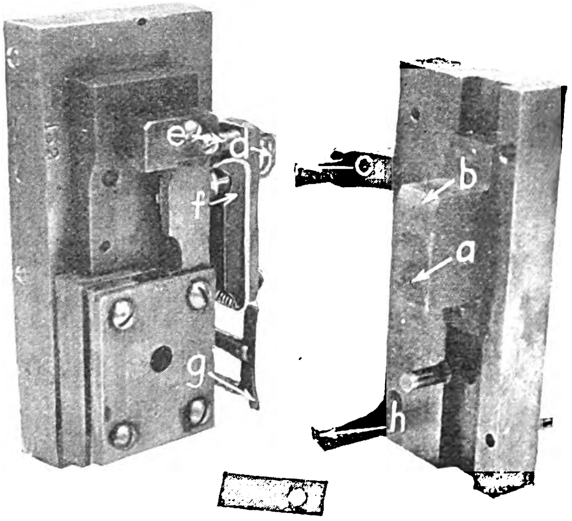


Fig. 16. The Controller Finger Part Shown at Bottom Is Punched and Formed from Brass Strips of Proper Width. An Ejecting Device Removes Finished Piece as Punch Is Raised

In Fig. 16 is shown an ingenious arrangement for ejecting a small piece of work after it has been punched out and formed. By thus automatically ejecting the completed pieces the production is very materially increased, as the material is fed in continuously and the

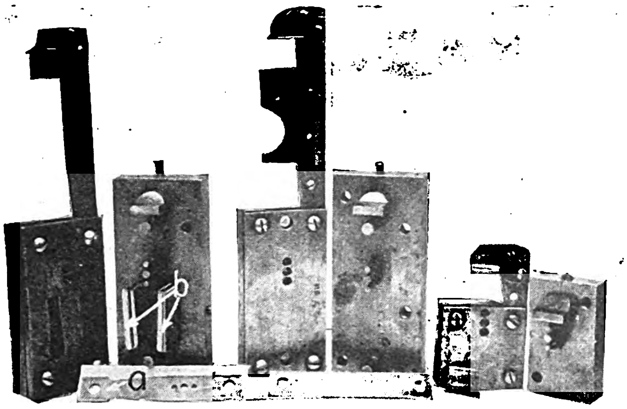


Fig. 17. Several Types of Forming and Punching Dies Are Used for Making the Various Parts of Controller Fingers

press operated at top speed. The part manufactured consists of a small brass strip, slightly curved at one end and having a hole punched near the other end, as shown near the bottom of the illustration. This is one of the pieces making up a controller finger assembly and is manufactured from strip brass of the proper width and thickness.

As the material is fed into the die the hole is punched first and the piece is then cut off to the proper length and formed to the proper shape while the hole is being punched for the next piece. The cutting edge is at (*a*) and the forming die at (*b*). After forming, the completed piece is left in the bottom of the die and it is necessary to eject this before the next piece is cut off. As the punch descends, the finger (*c*) enters the opening at (*d*) to force the U-shaped ejector out of the way of the forming punch (*b*). As this ejector is moved back the small spring (*e*) is compressed and the latch (*f*) drops into a notch, thus holding the ejector back in position. While the above action is taking place the hook (*h*) slips below the secondary latch (*g*). The piece of work, in the meantime, has been cut off and formed and lies in the bottom of the die. As the punch ascends again the hook (*h*) trips in turn the secondary latch (*g*) and the latch (*f*), releasing the ejector (*d*), which, under the action of the spring (*e*), snaps the completed piece out of the bottom of the die. The operation is repeated as the punch descends on each stroke. These pieces are made at the rate of 3,000 per hour in the V. & O. Press Company No. 21 press.

A group of three dies used for forming the various parts of K-35 controller fingers from strip brass and bronze is shown in Fig. 17. The completed pieces are illustrated at the bottom of the illustration. In addition to cutting off and punching, the die at the left also cuts the outside contour of the piece to the proper shape as shown at (*a*). This cut is made by the cutting edges (*b*) on the punch at the same time that the holes are being made. All of these parts are made continuously from strips of material fed into the dies and a production of approximately 3,000 per hour is obtained in the V. & O. Press Company No. 21 press.

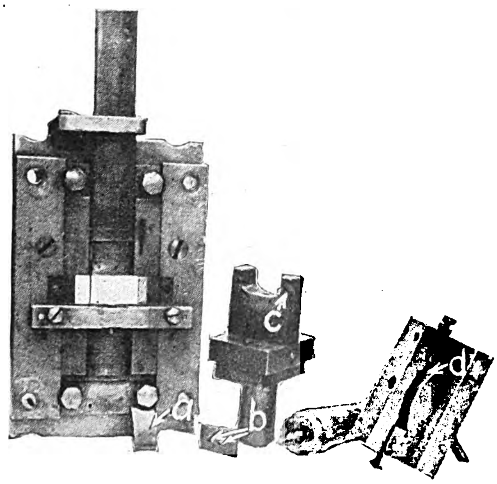


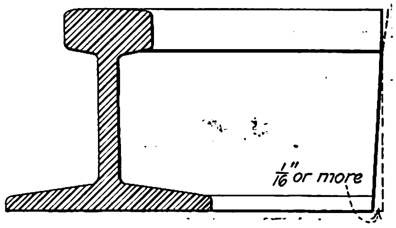
Fig. 18. Short Controller Segments Are Sheared from Formed Copper Bars and Holes Are Punched Radially in Die Shown at Right

Short controller cylinder segments are cut with the equipment shown in Fig. 18 from copper bar formed to the proper contour. The pieces for the segments are sheared from the formed bar with the punch and die shown at the left of the illustration. At the right is an interesting type of die used for punching the two holes in these pieces. The holes must be radial rather than parallel, and in order to accomplish this the piece is moved first to one side and then to the other in the curved slot in the die.

Keeping Rail Ends in Contact

Milling in a Plane Perpendicular to the Longitudinal Axis, and Undercutting the Web and Base to Produce Better Joints

EXPERIENCE has shown that in order to avoid having open joints at the running surface of the rail head, it is frequently necessary slightly to undercut the end of each rail. Otherwise, variations in the accuracy of the cutting of the rails, or in the grade or alignment of the track, may cause the rails to touch at the bottom and be open at the top. If rails are undercut in this manner, however, and the top edges only are in contact, then when wear takes place, the rail ends are no longer in contact.



Method Developed by Third Avenue Railway for Finishing Rail Ends

To overcome this difficulty a special method of finishing the rail end has been designed by E. M. T. Ryder, way engineer Third Avenue Railway. According to his plan the end of the rail is undercut, preferably to a greater extent than in standard practice. The head of the rail is then milled or otherwise cut to a plane which is perpendicular to the longitudinal axis of the rail. The ends of the heads of two adjacent rails are brought into contact, and as the area in contact is only 1 in. or 1½ in. in depth, and about one-sixth the depth of the rail, a slight variation, either due to error in cutting or grade or alignment in laying the rail, would be negligible, and the heads of adjacent rails would still be in substantial contact throughout.

In fact, variation in width of the head and lip would be more likely to be material than would variation in depth. Such variation in the width, however, can to a considerable extent be taken care of during the operation of laying the track, as a saw cut can be made between the lips of the adjacent rails if necessary, or between the outsides of the heads, thus leaving a limited area at the end of one rail which is in contact with the corresponding area of the adjacent rail.

A patent has been granted Mr. Ryder covering this method of finishing rails.

Experience with Bolted Joints in San Francisco

Among 16,000 Joints of This Type Installed by the Market Street Railway During the Past 13 Years the Only Failures Have Been a Few Broken Rail Ends—Redwood Ties on Rock Ballast Are Used with Concrete Stringers Under the Rails

SINCE 1911 the Market Street Railway, San Francisco, Cal., has been making extensive use of bolted track joints. Among more than 16,000 such joints that have been installed the only failures during this period have been the breaking of 16 rails through the bolt holes. The track structure is of the ordinary type, in which rock ballast and wood ties are used, but special care is exercised in making the joints. Subsoil conditions vary widely in different parts of the city, ranging all the way from soft mud to rock.

In the lower business district the land has all been made artificially by filling in the shallow parts of the bay. The soil underneath the fill is a peculiar soft mud, and in many places it settles at a rate of about 0.1 ft. per year. Reference to this was made in an article published in ELECTRIC RAILWAY JOURNAL, issue of Dec. 23, 1922. This layer of mud is often as much as 300 ft. in thickness, and no matter what type of track construction is used both it and the entire street settle at a more or less uniform rate.

Outside the area of made land, which extends about ½ mile back from the waterfront, the subsoil is sandy in many places. In other districts, a soft shaly rock is found. Adobe loam and ordinary silty loam are present in certain localities.

Where any kind of rock is present the railway uses only enough ballast to be able to tamp thoroughly. In all other cases 9 in. of crushed stone ballast is placed under the ties. The latter are of redwood, 6 in. x 8 in. x 8 ft., spaced on 2-ft. centers. Rails are Lorain Steel Company section 106-422 and section 121-519. Round 1-in. tie rods are placed 8 ft. apart. The rails are spiked to the ties and in some cases tie plates are used.

A concrete stringer between the ties supports the rail. Concrete is used also as a paving base. On some streets 8-in. stone blocks are laid at right angles to the rail on top of this base. Elsewhere the blocks are omitted, the concrete is brought to a higher level and topped by a 2½-in. coating of asphalt.

The standard joint now being installed has two Lorain bridge type splice bars for 9-in. rail. These are held in place by 12 bolts of 1-in. diameter. All joints are installed by the same crew, consisting of a foreman, who has been in the employ of the railway for many years, and three or four other men. The head bonder has also had long experience at this work, and the remaining men are laborers who have been trained to install joints and do nothing else.

Brazed concealed bonds are first installed. Before fastening the plates, the rails are butted together as closely as possible. Then the plates are put on and bolted, six of the bolts being inserted from one side of the rail and six from the other side. In tightening them sledgehammers are used on the heads and on the plates to drive the latter in to make a perfect fit. In this way, if there is a slight inequality in the fishing sections of the rail, the plate is driven in and made to fit the inequality. The bolts are then tightened again by means of a long-handled wrench.

Cars are permitted to run over the new joints and for several days after the first installation the track gang is kept busy tightening the bolts. This is done five or six times and is repeated immediately before the street is paved, so as to insure that all bolts are snug before concrete is placed around the plates. The head of the rail is then planed with a Vixen planer, so that there shall be no unevenness in the running surface. In a comparatively short time after the rail has been planed and placed in service there is nothing to show the existence of the joint except on the flange side, which has not been affected by wheel passage

With joints constructed in this way, the railway believes that there is little chance of cupping. If cupping should develop, however, the joints are immediately ground smooth. It is thought that cupping at the joints loosens the bolts rather than that loosening of the bolts causes cupping. Experience in San Francisco indicates that so long as proper attention is given to keeping the rail head smooth the bolts do not become loose.

Traffic is extremely heavy on a number of lines where these bolted joints are used, the rush-hour headway being as short as 10 seconds. On other lines, the traffic is not so heavy, but only in a few cases is the headway as long as 5 minutes.

The accompanying illustrations show a number of joints after being subjected to varying amounts of service. No. A-1 to A-4 were taken on Mission Street in the summer of 1921, after the track had been in service about a year. At that time approximately 155,000 cars weighing 28 tons empty had passed over this track. The same joints were photographed again in September, 1924, as shown in No. B-1 to B-4, after 690,000 car passes.

A joint installed in April, 1916, near the intersection of Folsom and Second Streets was photographed on April 7, 1921, as shown in illustration A-5, after the passage of 210,000 cars weighing 26 tons each. When the second photograph B-5 was taken in September, 1924, the joint had had 346,000 car passes.

So far, it has been necessary to grind down the joints on only a few lines, and in these cases the joints had been made from 10 to 14 years ago and had not been planed at the time of their original installation. Since the Market Street Railway has been using the present standard bolted joints, there have been 16 failures due to broken rail ends. In all of these cases it was discovered that there had been a crack in the rail through the bolt holes. Except in these instances, it has not been necessary to open up any of the joints, either to tighten the bolts or to insert a section of new rail.

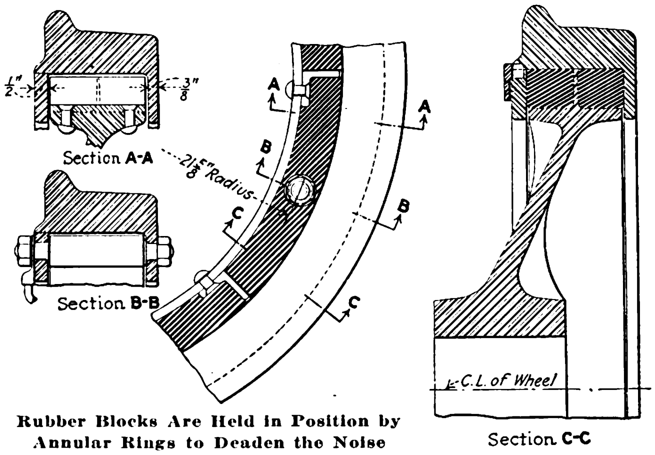
Cushion Wheels Tested to Reduce Noise

Rubber Insulated Rims Are Being Tried Out in Oil City, Pa.—The Results So Far Secured Have Been Encouraging

By JOHN A. DEWHURST
Day & Zimmermann, Inc., Engineers, Philadelphia, Pa.

THE desirability of eliminating noises in street car operation was emphasized in the report of the 1923 American Electric Railway Engineering Association committee on car design. With this end in view, a trial set of cushion wheels has been put in operation on the lines of the Citizens Traction Company at Oil City, Pa., and is now on test on one of the standard safety cars.

This type of wheel has been in use in gasoline railcar construction for about 3 years, but to the knowledge of the writer this is the first application of this type of wheel to an electric car. The early observations indicate that, while the noise is not reduced to a minimum, the cushion wheels have materially helped to deaden the sound of the rail and wheel contact.



Rubber Blocks Are Held in Position by Annular Rings to Deaden the Noise in This Cushion Car Wheel

One of the most unfavorable points of comparison between the electric car and almost any form of automobile transportation is that of noise. Even a perfect steel wheel rolling against a perfect steel rail will produce a certain amount of noise that cannot be avoided. Add to this condition a little dirt on the track, a few loose joints, or a rail that is partially scored or worn, and the noise is very greatly increased. However, the noise produced between the wheel and the rail is not the only source which exists in street car operation. Loose brake rigging, the action of brakeshoes against the steel wheels and worn gears will add materially to this unpleasant feature and oftentimes produce a very irritating condition. The general public is so used to the noise accompanying street car operation, especially on hard paved streets, that it sometimes does not arouse as much criticism as in many cases is warranted.

The accompanying illustration shows the construction of the cushion wheel, which is designed to reduce the amount of noise occasioned by the ordinary electric car operation over the average track. The wheel has a cast-steel hub which is machined exactly as is the hub of a rolled-steel wheel and is pressed on the axle. The periphery of this cast-steel center, as shown in the diagram, is machined to contain a set of rubber cushions, one set placed on either side of the center web in blocks about 8 in. long around the entire wheel. The rolled-steel tire is then pressed on with a light pressure, being held firmly in place by the through bolts.

When the steel rim is in place, it rests snugly against the rubber inserts, but the steel flange on either side does not quite come in contact with the cast-steel center, there being a space of about $\frac{1}{16}$ in. The through bolts are really a part of the rolled-steel rim and do not come in contact with the steel center but hold the steel rim in place through the agency of the center web cast on the wheel center.

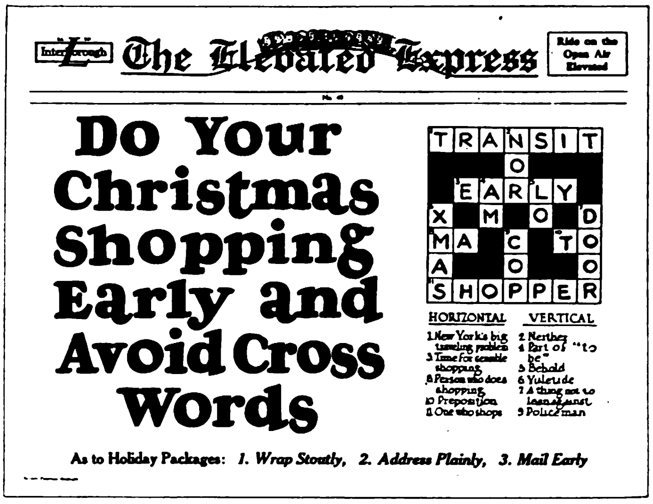
The driving action of the motor is transmitted through the cast-steel center and into the rim through the agency of short angles, which are riveted to the steel center and rest against the ends of the rubber blocks, the driving action passing lengthwise through the rubber blocks to the bolts and hence to the steel rim. Under extreme conditions for this type of car, the pressure passing through the rubber does not exceed 100 lb. for each bolt. The rolled-steel rim is so thoroughly insulated from the steel center that it is necessary to use a flexible copper bond between the two elements of the wheel in order to complete the return circuit to the rail.

The rubber inserts are constructed especially for this purpose and are of a very high-grade, soft, pliable gum rubber, similar in general composition to the rubber inserts used in the Mead cushion wheels; in fact, they are manufactured by this concern.

Besides the noise-reducing qualities of this type of wheel, it is expected that the slight give of the steel rim with respect to the wheel center will tend to reduce very materially the flange wear in special work occasioned in going around curves of short radius. If the wheel flange wear is reduced by this means, it also follows that the rail wear should be reduced on curves and in special work likewise.

Besides this test at Oil City, there is also a set about to be put in operation in Zanesville, Ohio. An additional set for a double-truck car is being constructed for the York Railways at York, Pa.

How to Avoid Cross Words



Interborough **The Elevated Express** Ride on the Open Air Elevated

Do Your Christmas Shopping Early and Avoid Cross Words

T	R	A	N	S	I	T
■	■	■	O	■	■	■
■	E	A	R	L	Y	■
X	■	M	■	O	■	D
M	A	■	C	■	T	O
A	■	■	O	■	■	O
S	H	O	P	P	E	R

HORIZONTAL
1 New York's big traveling problem
3 Time for sensible shopping
8 Person who does shopping
10 Preposition
11 One who shops

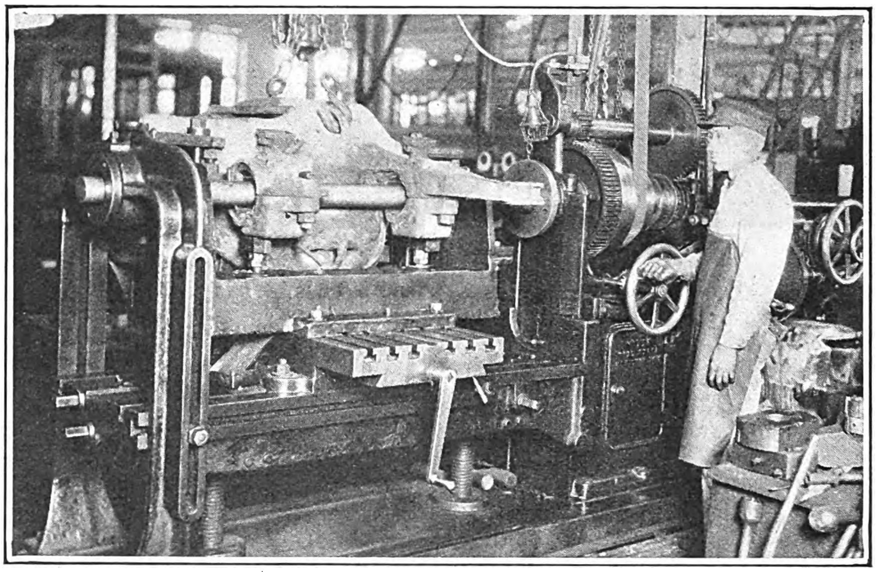
VERTICAL
2 Neither
4 Part of "to be"
5 Behold
6 Yuletide
7 A thing not to lean against
9 Policeman

As to Holiday Packages: *1. Wrap Stoutly, 2. Address Plainly, 3. Mail Early*

During the period before Christmas the *Elevated Express* has been displaying an unusual window poster in the elevated cars in New York City. This has been cleverly devised, as shown above, to encourage early shopping.

Improving Railway Motor Bearings

By Reboring Motor Frames to Make an Accurate Fit for New Simplified Housings and Improved Bearings the Public Service Railway of New Jersey Has Reduced Motor Troubles and Cut Bearing Maintenance Costs



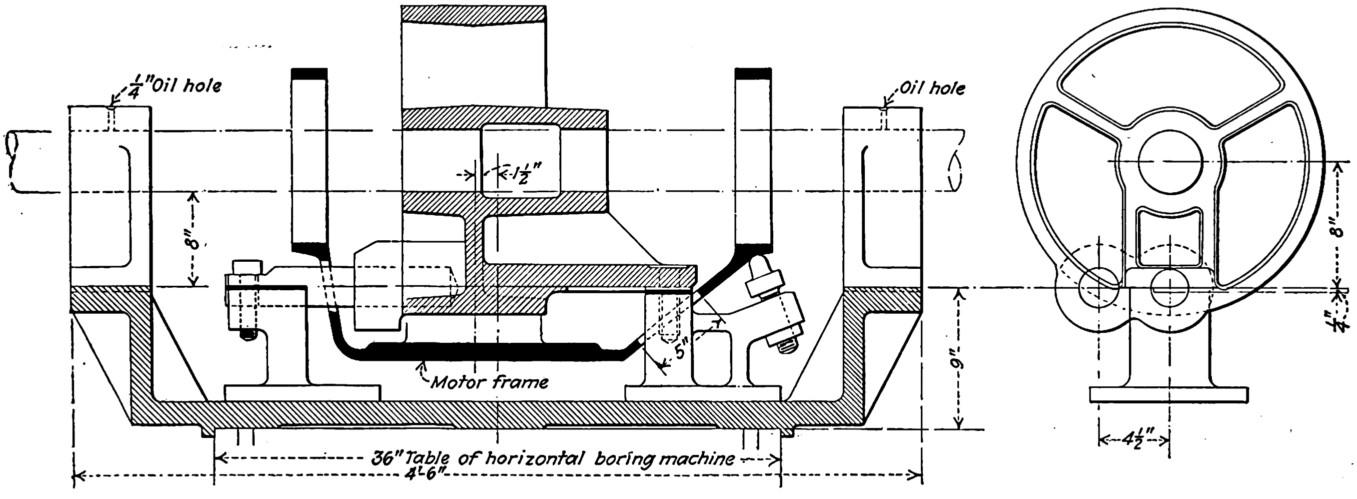
Reboring a Westinghouse Type 101-B-2 Motor Frame in the Newark Shops of the Public Service Railway

AN ELABORATE program of rehabilitation of the older types of railway motors is being carried out by the Public Service Railway of New Jersey at its Newark shops. This consists of a complete change of the end housings and bearings, both armature and axle, on some motors, and on all others changes to provide for bronze bearings with thinner walls and the use of a new system of lubrication. Up to Nov. 1 of this year approximately 5,000 motors had been revamped, including Westinghouse types 68, 101-B, 101-C, 307 and 514 and General Electric type 80-C. Other types which will be remodeled in the near future include the Westinghouse 93, 310 and 508.

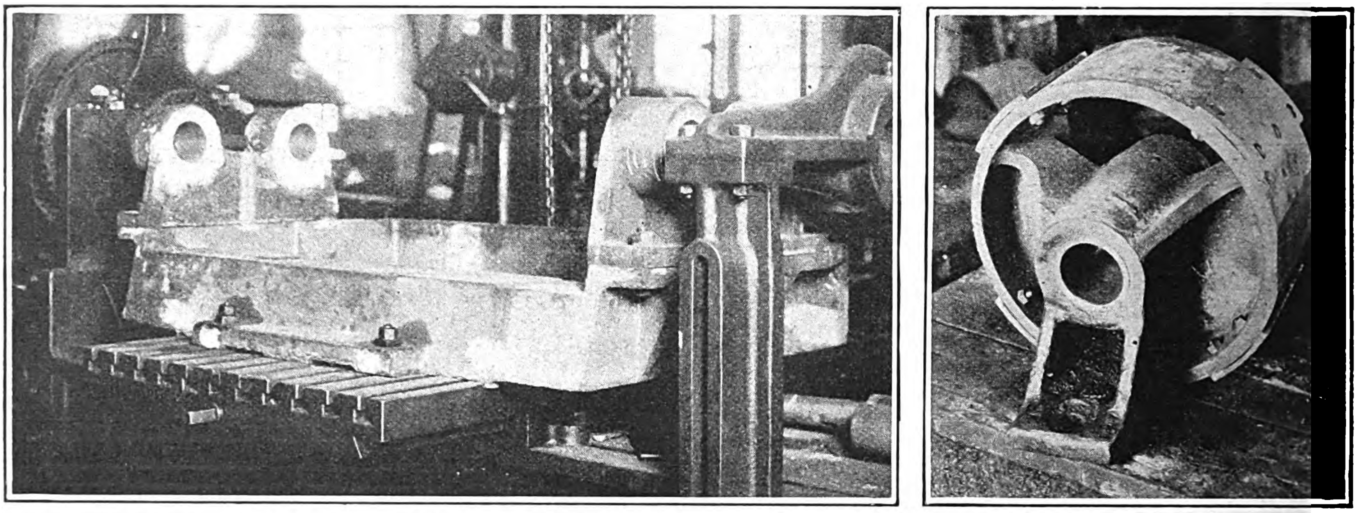
The tap bolts used to retain the armature housings on certain types of railway motors have always given much trouble due to their working loose in service. This looseness has caused wear on the outside of the housing, on the inside fits of the motor frame, and in wearing away of the threaded holes in the housings themselves. The result has been the loss of the clamping action of the two halves of the motor frame on the housing. Naturally the wear on other parts has been excessive, and the maintenance costs have been correspondingly high. The parts affected include armature windings, brush-holder parts and carbon brushes, as well as the bearings and housings.

For revamping the motors a through-bolt type of bearing housing has been designed. This is considered a great improvement over the old tap-bolt type, which had to be replaced on the average every 5 years. A new system of lubrication is being installed and other changes are being introduced. An entirely new type of housing is being used in the Westinghouse 101-B and 514 motors. All the other types used by the company are having the necessary changes made to install the new system of lubrication and to provide for bronze bearings with thinner walls than those previously used. The axle bearing caps and fits for the axle bearings in the frame also are being changed to make a more satisfactory design. The new design of housing used by the Public Service Railway is simplified and of lighter weight, requiring less care and expense in casting. Provision has been made for use of lighter weight bronze bearings and Rico vacuum oilers, giving a great reduction in the quantity of waste necessary for packing and maintaining the bearing lubrication.

Among the motors being revamped are both split and box-frame types. Some have armature bearing hous-



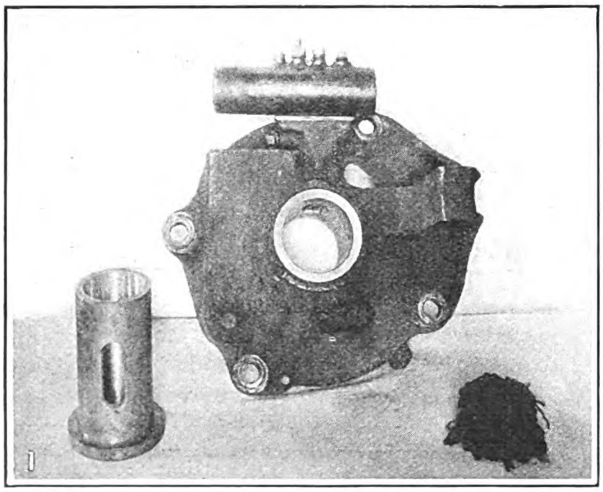
Set-Up and Jig Used for Reboring Westinghouse 101-B-2 Motors



At Left, Frame of Jig Used for Holding Westinghouse Type 93 Motor During Reboring. At Right, Drum for Lining Up Bearing Fits from the Pole Face Seats of Motor Frame

ings and others are without them. The work necessary with the different types varies, and the changes as made will be outlined for a representative motor of each class.

As an example of the work done on a split-frame motor with armature bearing housings, a housing of entirely new design has been provided for the Westinghouse type 101-B motor. In order to take up the wear in the housing fits of the motor frames, these are rebored to a diameter $\frac{1}{16}$ in. greater than standard, and the outside diameter of the fit on the housing is made larger than the original housing by $\frac{1}{16}$ in., plus from 0.002 to 0.006 in. The waste chamber and the oil pocket in the original design have been done away with. Instead provision has been made for a Rico vacuum



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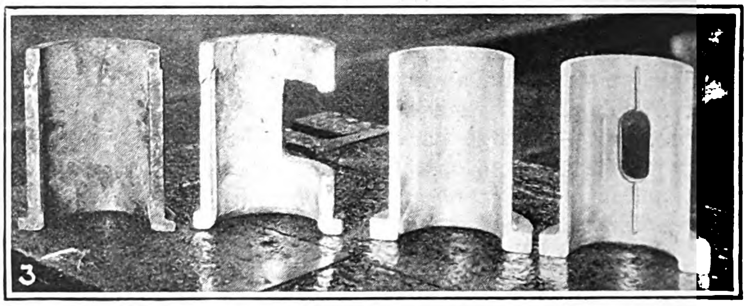

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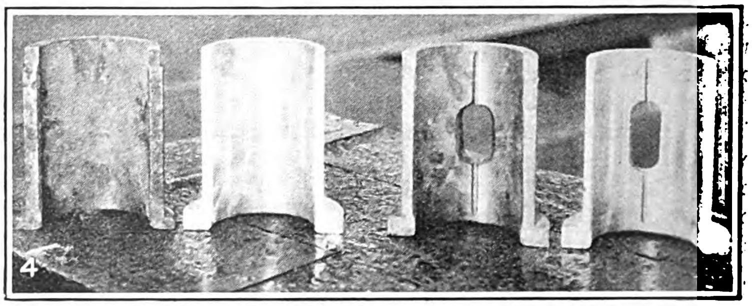

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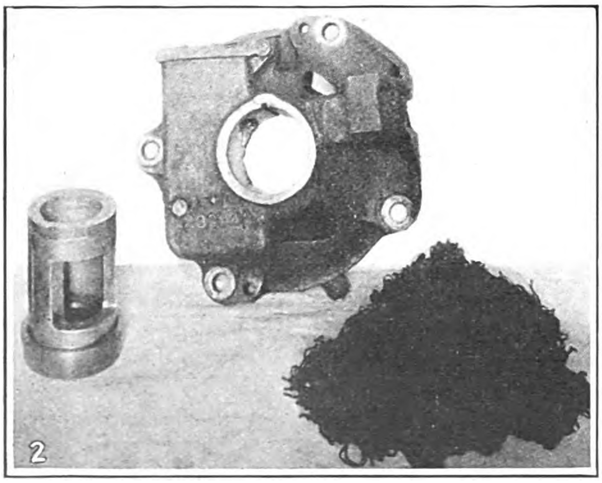

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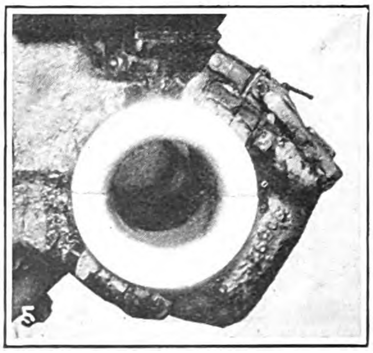

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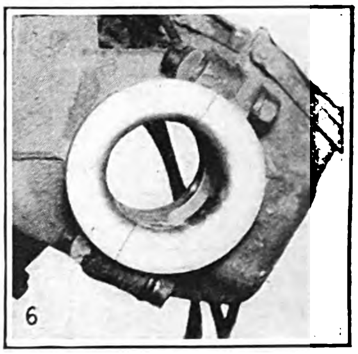

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Changed Housings and Bearings Compared with Old Types

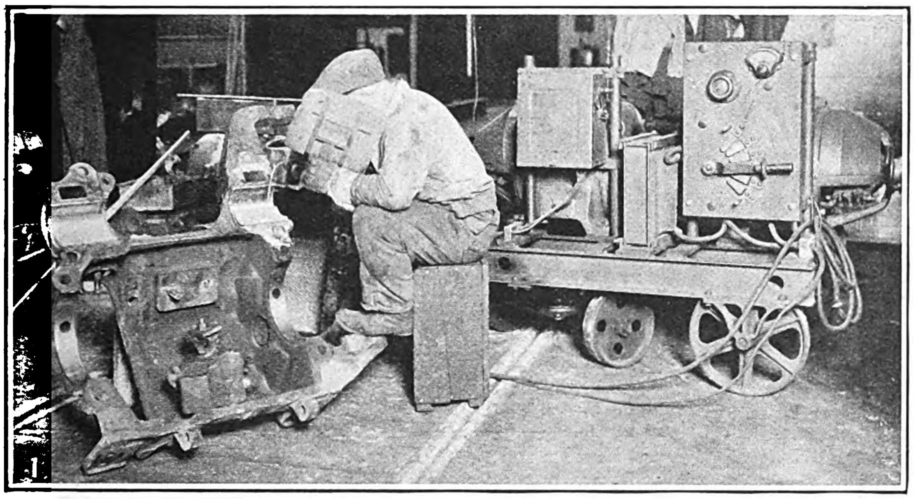
No. 1. New housing and bearing for Westinghouse type 307 motor with pile of waste used for packing.

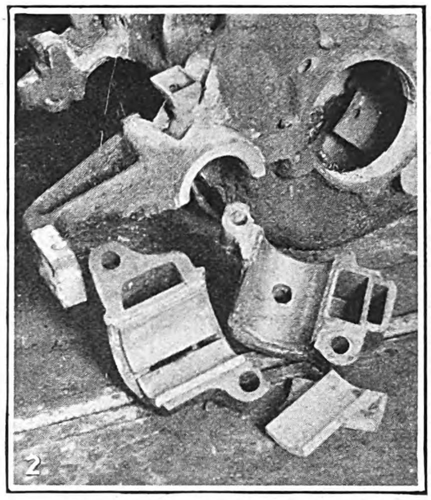
No. 2. Old housing and bearing for Westinghouse 307 motor with waste packing.

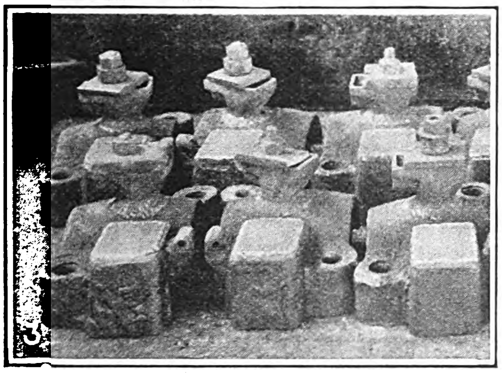
No. 3. Old and new axle bearings used with Westinghouse type 101-B motors.

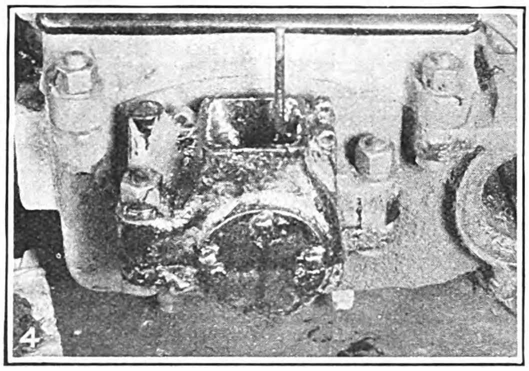
No. 4. Old and new axle bearings used with Westinghouse type 68 motors.

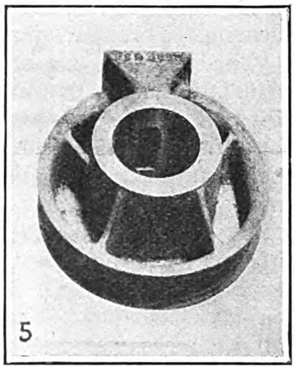
Nos. 5 and 6. New and old arrangement of axle bearings for Westinghouse type 514 motor. In the new position shown in No. 5 the split for the bearing halves has been rotated from that used with the old construction to bring it horizontal.











Welding Operations Constitute an Important Part of the Rehabilitation Work

No. 1. Welding plates in the frame part of the axle bearing fit for a Westinghouse 101-B-2 motor.

No. 2. Plates are welded into the axle cap and frame of 101-B-2 motors to reduce the diameter of the bearing fit. At left, axle cap with plates welded in position. At right, finished axle cap. In front at bottom, plates used for welding in.

No. 3. Pile of Westinghouse 101-C axle caps with waste opening welded shut and adapter welded in place.

No. 4. Plates are welded into the waste opening of the General Electric type 80-C armature housing to form a V leading down to the window of the bearing.

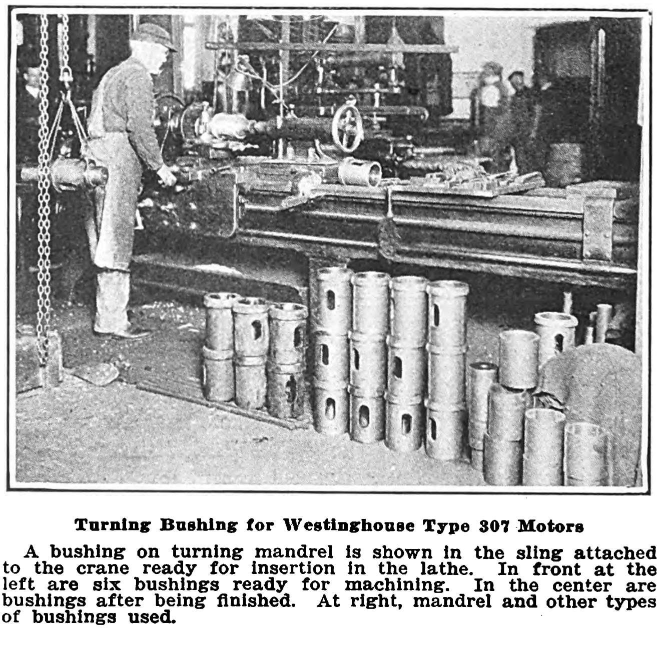
No. 5. New armature housing for Westinghouse 101-B motors.

oiler with a much smaller waste opening located directly on top of the shaft. The size of window in the housing itself has been decreased from $4\frac{11}{16}$ in. x $5\frac{3}{8}$ in. to $1\frac{1}{8}$ in. x $3\frac{1}{2}$ in., with a corresponding decrease in the bearing window. The bore of the housing into which the armature bearing is pressed has been decreased from $4\frac{7}{8}$ in. to $4\frac{1}{8}$ in., giving a corresponding decrease in the thickness of the bearing walls. Provision is made for the through-bolt type of fastening. Other simplifications in construction will be evident from the accompanying illustrations. The amount of waste required with the new housing is a handful as against 1 lb. with the old type.

THREE DIAMETERS OF SHAFTS PROVIDED FOR

For the 101-B motor, bearings are bored out to three standard sizes, which are the same for both pinion and commutator ends. These bores are $3\frac{1}{4}$ in., $3\frac{3}{16}$ in. and $3\frac{1}{8}$ in. inside the babbitt lining. As the outside diameter of the bearing is $4\frac{1}{8}$ in. plus the allowance for pressed fit, the thickness of wall for the $3\frac{1}{4}$-in. bore is but $\frac{3}{8}$ in. The bearings for the old-style housing with the $3\frac{1}{4}$-in. bore had a $\frac{3}{4}$-in. wall, so there is a reduction in thickness of the bronze of 50 per cent. The weight of an old 101-B pinion end bearing was 24 lb., while the new bearing weighs but $13\frac{1}{2}$ lb. The lubrication system now used has permitted a decreased size for the windows. For the commutator end, 101-B bearing, the window opening is 1 in. x $3\frac{1}{4}$ in., and for the pinion-end bearing 1 in. x $3\frac{1}{2}$ in. The window is beveled, so that the narrow dimension is $1\frac{1}{4}$ in. at the outside diameter. The old bearings have a window opening at the inside bore of the bearing of 4 in. x $2\frac{1}{4}$ in. for the commutator-end bearing and $4\frac{5}{8}$ in. x $2\frac{1}{4}$ in. for the pinion-end bearing. An increased bearing surface is thus provided in the new bearings which results in increased life.

The armature bearings used with the new housings are of bronze with $\frac{1}{16}$-in. babbitt lining. The com-



Turning Bushing for Westinghouse Type 307 Motors

A bushing on turning mandrel is shown in the sling attached to the crane ready for insertion in the lathe. In front at the left are six bushings ready for machining. In the center are bushings after being finished. At right, mandrel and other types of bushings used.

positions of the metals for the shells and linings are as follows:

COMPOSITION OF BEARING SHELLS AND LININGS, PER CENT

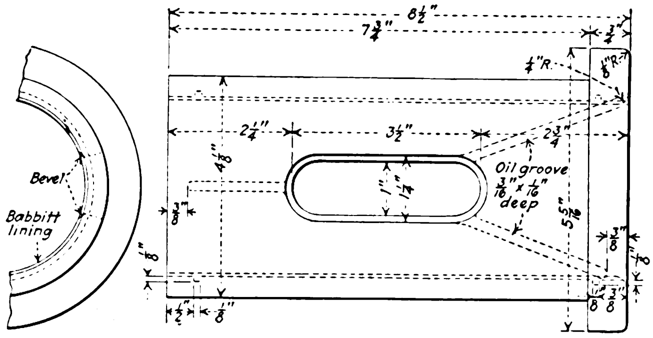
	Bronze Shells	Babbitt Linings
Copper	77	2 (Lake)
Tin	8	90 (Straits)
Lead	15	....
Antimony	..	8

For the shells a variation of 10 per cent is allowable in the tin or lead, with a maximum impurity of 1 per cent. It is considered essential, to get good results, that only Straits tin and Lake copper be used in the babbitt lining.

An accompanying illustration shows the new design of armature bearings. Two oil grooves run from the window toward the flanged end of the bearing, one going entirely through, so as to lubricate the flange. One groove runs toward the outside end of the bearing. An accompanying illustration also gives the finished bearing tolerances allowed.

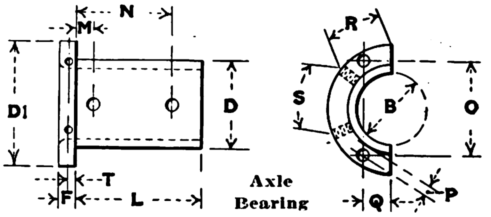
The pressure required for pressing bearings into housings runs between 4 and 5 tons. The reduced size for the waste-window opening has done away with buckling and distortion of the bearings while they are being pressed into the housing, giving a tighter and more even fit. No keys are used, but the bearings remain tight. Records show that after 100,000 miles of operation the pressure required to remove this new type of bearing from the head is far greater than with old-type bearings. There is better distribution of the oil with the waste window at the top of the bearing and the danger is eliminated of oil running between the bearing and the head, as in the older type. The waste is held in close contact and cannot fall away, and as it is continuously saturated with clean oil, glazing is eliminated. The necessity of inspecting the waste, teasing it, or repacking the bearing is thus done away with.

Another advantage found with the top feed bearing is the uniform use of oil. With side-feed bearings, the amount of oil delivered to the waste at the window depends upon the distance that the oil is lifted. In an article by C. Bethel in the ELECTRIC RAILWAY JOURNAL for April 19, 1924, the maximum lift for safe oil supply was given as about 3 in. and the minimum lift for reasonable economy as ¾ in. A variation from ¾ in. to 3 in. in the lift of the oil was also shown to cause a variation of 8 to 1 in the oil feed. With waste-feed lubrication, oil is used again and again, sometimes after its lubricating value has been destroyed through accumulation of foreign material. With the top-feed bearing the oil passes through the bearing but once.



New Armature Bearing Construction Used for Westinghouse Type 101-B-2 Motors

Axle bearings of railway motors are held tight by the clamping action between the axle caps and the frame. In addition, they are kept from turning by dowel pins or keys. The axle bearings for the 101-B motor used by the Public Service Railway were reduced in size from 6 in. outside diameter by 4½ in. bore to 5¼ in. outside diameter by 4½ in. bore. The thickness of the wall was thus reduced from ¾ in. to ⅜ in. No lining is used in axle bearings and the composition is the same as for armature bearings. The improved lubricating system permitted the axle bearings to be split in a horizontal line. The window is in the center of the upper half, while the lower half is solid.



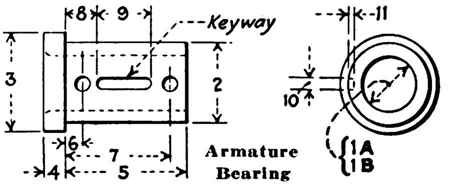
TOLERANCES FOR FINISHED AXLE BEARINGS, MINIMUM FOR WORK, MAXIMUM FOR INSPECTION

	Maximum, Inch	Minimum, Inch
B	+0.016	+0.012
D	+0.016	+0.003
D1	+0.031	—0.031
F	+0.016	—0.016
L	+0.000	—0.062
M	+0.016	—0.016
N	+0.016	—0.016
O	+0.031	—0.031
P	+0.016	—0.016
Q	+0.016	—0.016
R	+0.031	—0.031
S	+0.031	—0.031
T	+0.047	—0.000

TOLERANCES FOR FINISHED ARMATURE BEARINGS, MINIMUM FOR WORK, MAXIMUM FOR INSPECTION

	Maximum, Inch	Minimum, Inch
1A*	+0.013	+0.009
1B†	+0.031	—0.000
2	+0.004	+0.003
3	+0.031	—0.031
4	+0.016	—0.016
5	+0.031	—0.031
6	+0.016	—0.016
7	+0.016	—0.016
8	+0.031	—0.031
9	+0.031	—0.000
10	+0.000	—0.002
11	+0.031	—0.000

*Bore in babbitt. † Bore in shell.



Tolerances for Finished Axle and Armature Bearings

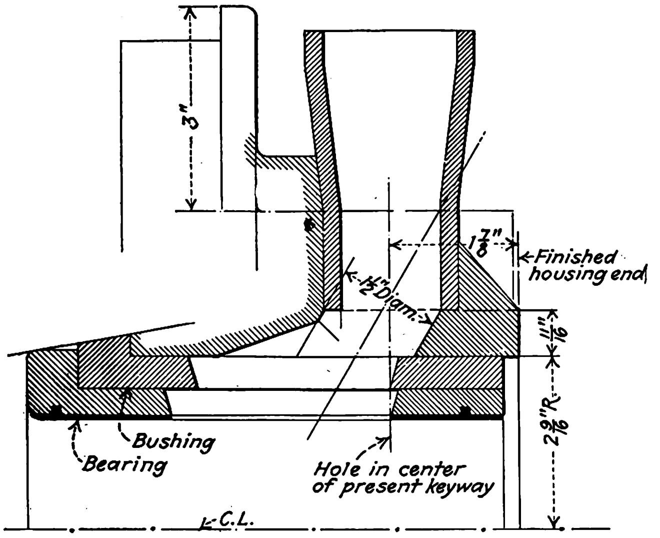
The window opening in the old bearing was 3⅞ in. long and occupied an angle of 90 deg. in the half bearing. The new bearings have windows 2⅞ in. long by 1¼ in. wide. The original bearings had a 13/16-in. dowel hole in the half containing the window. The new design provides two 31/32-in. dowels in the solid bottom half of the axle bearing. Two oil grooves are used in the upper half of new bearings. Many of the advantages of the new design of armature bearing also apply to the new axle-bearing construction. Placing the split in such a position that the wear will not come at that point is an advantage. The relocating of the bearing also gives more metal around the dowel holes.

To reduce the size of the opening in the motor frame and axle cap four steel plates are welded in for each bearing opening. Two are in the motor frame and two are in the lower half or axle cap. The space at the edges of the plates and between them is then filled in with the electric arc, after which the opening is ready to be bored out to size. On 101-B motors, the adapter for the new oilers is welded to the motor frame, so as to come on top of the axle bearing. This adapter also provides the opening for the waste and for lubrication to the bearing. The original opening through which the waste was inserted for packing is welded shut, eliminating the covers and any danger of water entering, due to loose or chattering covers.

In addition to the 101-B motors, the Public Service

Railway also has a number of 101-C motors. These have a somewhat different axle-bearing arrangement. In the latter type the adapter is welded into the axle cap and a sheet-iron cover is welded on to close the original waste opening. Accompanying illustrations show the two types and the various methods of welding required.

The work of reboring motor frames, which follows the welding, is carried out on a single-spindle horizontal boring mill. The Newark shops of the company have two of these machines, one being a Niles mill and the other made by the Betts Machine Company. The jig used in connection with this reboring is an important part for securing accuracy of the work as well as speed. Two men with one of these machines will rebore eight motor frames in 24 hours.



Method of Applying Bushings to the Housings of Westinghouse Type 307 Motors

The jig, which is shown in an accompanying illustration, consists of a heavy iron casting with lugs on the base for supporting the motor frame and uprights at each end, with holes through which the boring bar rotates. The centers for reboring the armature and axle fits are obtained from the pole face seats. The lining up from the pole seats is obtained by means of a large drum mandrel which fits inside the motor and has plates on the outside to fit against the pole faces. It is shown in an accompanying illustration. By varying the thickness of these plates, the same drum may be used for different types of motors.

One of the supporting brackets for the motor frames has an extension which passes up through the bottom hand hole of the motor frame. The top of this extension is used for bolting the central drum in position. Various screw adjustments on the jig provide for rapid adjustment of the motor frame when it is once set. The central drum, together with the end support for the boring bar used to bore out the armature housing fits, provides for accurate location of this from the pole face seats of the motor, and the bearings for the boring bar which bores out the axle bearing fit are accurately located from these. The boring bar has two cutting tools, so that two armature housing fits or two axle bearing fits are machined at the same time. In reboring, a rough cut and a finishing cut are taken. Setting up a motor for reboring takes about one-tenth of the total time required for the entire finishing operation. Both boring mills are served by jib cranes, which are of material assistance in handling the work and heavy parts of the jigs and in adjusting the motor shells for reboring.

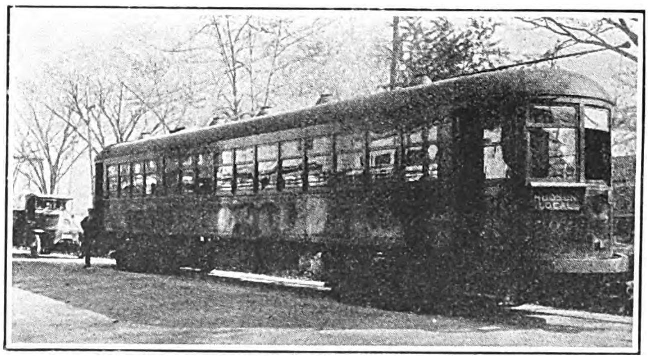
PROCEDURE ON BOX FRAME MOTORS

The work done on box frame motors is essentially the same as for the split-frame Westinghouse 101-B motor. Several of the illustrations show various details used with the Westinghouse 307 and 514 types, which are both box frame motors. In some cases variations in design make necessary some different methods. The General Electric type 80-C motor has the waste opening for the armature bearing on top. In this case two plates are welded into the opening so as to form an open-ended V with the narrow opening at the window of the bearing. The oiler is bolted directly to the top of the housing without an adapter, and the modified waste opening is used as a receptacle for the waste.

The original armature-bearing housings of the Westinghouse 307-CD-3 and CD-4 motors, which are of box-frame type, are used by pressing in steel bushings to reduce the size of the armature-bearing fits. An accompanying illustration shows the construction used. These steel bushings have a ½-in. wall so that the walls of the armature bearings are reduced by this amount. The old armature bearings were 5⅛ in. outside diameter. The new bearings are 4⅞ in. diameter, with an inside bore of 4⅛ in. The adapters for mounting the oilers are welded into the tops of the housings, and an opening is made in the steel bushing in line with the bearing window. In this case the work consists of boring out the housing and cutting a recess for the opening at the top, after which the adapter is welded in place and the steel bushing is pressed in. The work of machining the steel bushing is done on a small lathe, and the bushings are held by a special mandrel for turning.

Cars Operated Over New Concrete Roadbed in 26 Hours

THE use of Lumnite quick-hardening cement allowed the Albany Southern Railroad to operate heavy interurban cars over a new concrete roadbed in Hudson, N. Y., in a remarkably short time after its construction. The concrete was poured during the morning of Oct. 26, 1924. On the following morning, only 26 hours after pouring, a 32-ton interurban car was operated over this track. No damage whatsoever resulted to the pavement. Lumnite cement was used in this case because the route is one over which the interurban cars are scheduled on a comparatively short headway and it was desired to



This 32-Ton Interurban Car Was Operated Over a New Concrete Roadbed 26 Hours After Its Construction

reduce to a minimum the time the track was out of service.

Lumnite cement is made by the Atlas Lumnite Cement Company and is essentially aluminous. Its chemical composition is approximately silica, magnesia, etc., 5 per cent; alumina, 40 per cent; lime, 40 per cent, and iron oxides, 15 per cent. It is used in the same general way as portland cement, except that on account of its more rapid hydration slightly wetter mixtures are used. For several hours after setting the surface must be kept damp to prevent incomplete hydration.

While this cement develops at 24 hours a greater strength than ordinary cement develops in 28 days, it is not quick setting. It allows the usual time for mixing, transporting and pouring into forms, but after setting its early strength develops with great rapidity. These qualities are of special advantage in such cases as that occurring at Hudson, and a number of street railway companies are experimenting with this cement.

Steel Reinforcing Bar Sizes Simplified

THE Division of Simplified Practice of the Department of Commerce, through the unanimous action of a joint conference of representatives of manufacturers, distributors and users of square and round steel reinforcing bars, has promulgated a simplified list of recognized sizes for the purpose of eliminating a large number not in common use, as follows:

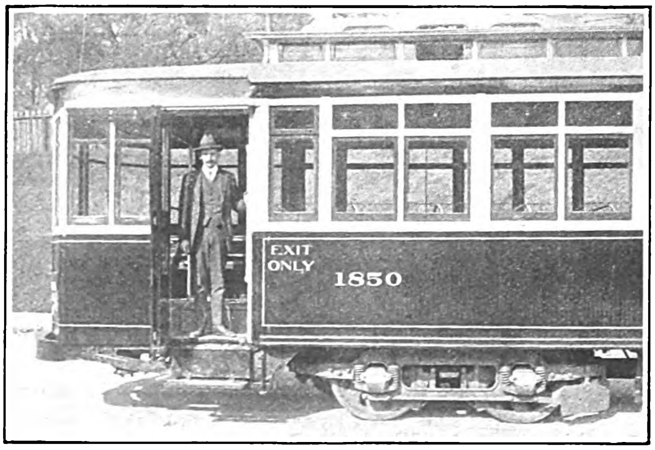
Area in Square Inches	Size in Inches	Style
0.049	¼	Round
0.110	⅜	Round
0.196	½	Round
0.250	½	Square
0.307	⅝	Round
0.442	¾	Round
0.601	⅞	Round
0.785	1	Round
1.000	1	Square
1.266	1⅛	Square
1.563	1¼	Square

This reduced list of sizes becomes effective as applying to new production Jan. 1, 1925, and will remain in effect for a trial period of one year, at the end of which time all interested organizations will be given an opportunity to suggest modifications or additions.

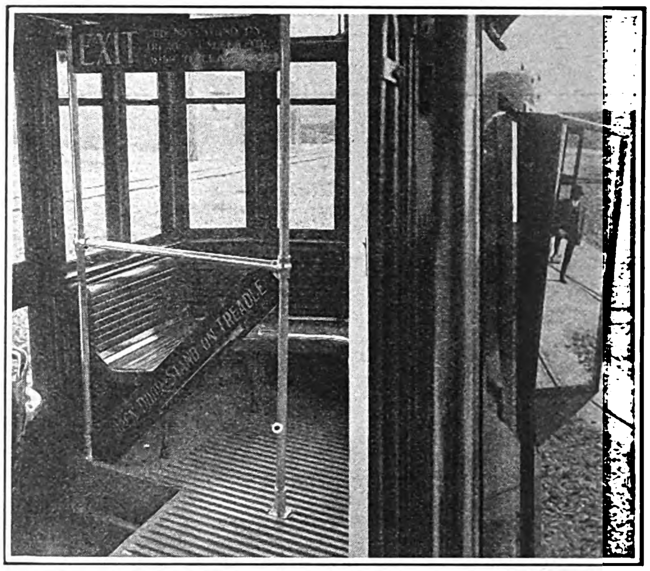
How Treadle Works on Toronto One-Man Cars

SINCE the publication in ELECTRIC RAILWAY JOURNAL for Nov. 8, 1924, page 799, of an article describing the automatic rear exit doors on Toronto rebuilt cars, additional information and photographs have come to hand. In the accompanying illustrations are shown the step from the rear platform down to the treadle, and the sign directing passengers who wish to get off the car.

Another picture shows a passenger standing on the treadle with the door in the open position, and the lower step down. A third picture shows the mirror fastened to the front door of the car in such a way that the motorman can see clearly the condition at the rear end of the car.



The Treadle Which Operates the Rear Exit Door Is 9½ In. Below the Level of the Rear Platform



At Left, Rear End of Rebuilt Toronto Car Equipped with Automatic Exit. At Right, by Means of This Mirror the Motorman Can See the Condition of the Rear Exit

The Readers' Forum

Both Babbitt and Tin Used for Thin Lining of Bearings

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

EAST PITTSBURGH, PA., Nov. 20, 1924.

To the Editors:

In the Oct. 25, 1924, issue of ELECTRIC RAILWAY JOURNAL, page 725, under the title of "Armature Bearing Practice for Railway Motors," there is a statement to which I wish to call attention. Quoting from the JOURNAL:

"There is, however, a decided tendency away from the babbitt lining for armature bearings. Motor manufacturers are now furnishing a bronze type of bearing with thin tin linings almost entirely with their new motors."

Regarding the above, it appears that this refers to axle bearings instead of armature bearings, as it is the practice of the Westinghouse Electric & Manufacturing Company, and I believe also of the General Electric Company, to use solid bronze axle bearings tinned. However, for armature bearings, bronze bearing shells with from a 1/16 in. to ⅛ in. lining of babbitt metal is considered good practice. JOHN S. DEAN,

Renewal Parts Engineer.

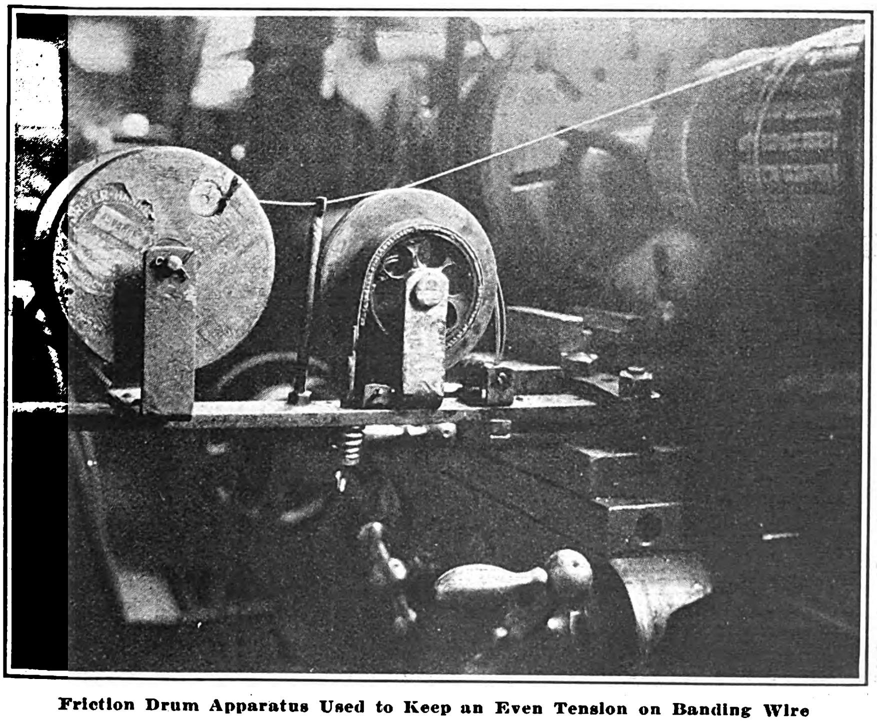
Equipment Maintenance Notes

Friction Brake Puts Tension on Banding Wire

A WINDING brake consisting of a grooved steel friction drum and a brake drum mounted on one shaft is used by the Gary Street Railway, Gary, Ind., to maintain a uniform tension on banding wire being wound on an armature. The banding wire passes around the grooved drum before it is fed to the revolving armature, while a lined metal band wrapped around the brake drums retards the rotation and applies tension to the wire.

The shaft is mounted on a U-shaped support, fastened to a steel bar, one end of which is bolted to the carriage of the lathe. Near the other end of the bar is a second support holding the wire reel. A light braking effect is used to keep the reel from spinning. Between the reel and the drums is a guide. This arrangement is shown below.

The friction drum has a diameter of 9 in. and is 1 in. wide, with five semi-circular grooves, of the same size as the banding wire, cut in the face. From the reel the wire passes through the guide and thence to the outside groove of the friction drum. It is carried around the drum four times, a small pulley being used to change the wire from one groove to the next. The brake drum is 1 in. wide but has a diameter of only 6 in. A brake band around this drum is fitted with ordinary automobile brake-lining material. One end of the band is attached to the supporting frame while the other is fastened to a threaded rod which passes through the horizontal supporting bar. The brake pressure is adjusted by means of a winged nut which rests against a compression spring at the threaded end of the brake band below the horizontal bar. This apparatus has been found very satisfactory to maintain a uniform tension in the banding wire.



Friction Drum Apparatus Used to Keep an Even Tension on Banding Wire

Bearings Rebored to Fit New Style Motors

AT THE time when the Eastern Massachusetts Street Railway decided to replace all of its type 67 motors by those of a newer model it had on hand a large number of armature bearings of the old design. In order to adapt these for use in modern motors it was decided to rebore them. The bearings originally designed for use on the commutator end of the No. 67 motor was rebored for use on the pinion end of No. 247 motors. The pinion end bearing of the old No. 67 motor was rebored for use on the pinion end of type 200-E motors. By this process the railway was able to obtain a year's supply of new bearings of types now needed.

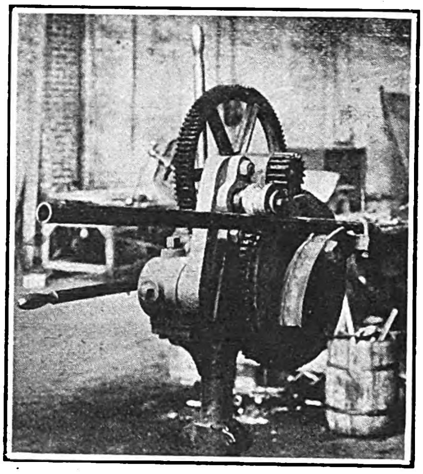
Pipe Bending Machine Built in Kansas City Shop

By John W. Hogan

Foreman Kansas City Railways

THE machine shown in the accompanying illustration was built in the shop of the Kansas City Railways for bending the larger sizes of pipe and conduit.

As shown in the illustration, the forming die is mounted on a face plate, hand driven through reducing gears by four long levers. The end of the pipe is slipped into a U clamp mounted at one end of the die. A small roller fastened to the frame of the machine holds the pipe in position as the face plate is rotated.



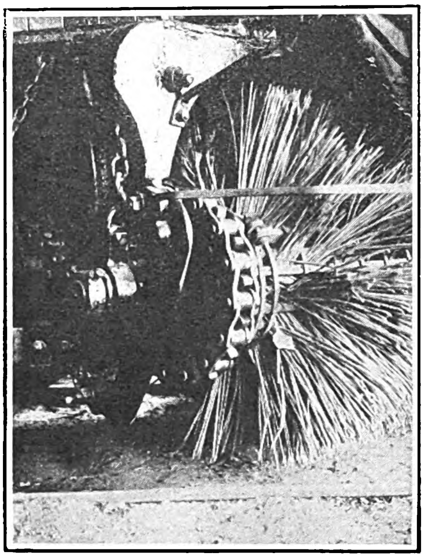
This Hand-Driven Pipe Bending Machine Built in the Shops of the Kansas City Railways Has Proved to Be a Valuable Time Saver on Large Reconstruction Jobs

Forms of various sizes can be used in connection with the machine, and they are inexpensive to make up. For conduit work it is, of course, undesirable to make bends of very short radius, due to the difficulty of pulling the cables into place. As used in the Kansas City shop, several different forms for the various sizes of conduits have been found particularly useful. This includes forms for making bends of 7-in. and 10-in. radius in 1-in. and 1¼-in. pipe, 7-in. and 14-in. bends in 1½-in. pipe, and 16-in. bends in 2-in. pipe.

On the larger overhaul and rebuilding jobs such as are undertaken in most electric railway shops this machine has proved to be a particularly valuable time saver.

Steel Roller Chains for Snow Sweepers

WHEN the snow sweepers of the Altoona & Logan Valley Electric Railway were overhauled last summer in preparation for the coming winter, steel roller chains to drive the brooms were installed in place of the old malleable-iron link chains. This was accomplished at small cost under the direction of C. E. Keefer, master mechanic. In the past, some trouble was experienced on account of breakage of the malleable-iron chains while the sweepers were at work. It is expected that the new chain will eliminate this trouble, and will last as long as the sweepers themselves. Another interesting point in connection with the overhauling of the sweepers is the fact that they were painted a bright red to increase the visibility.



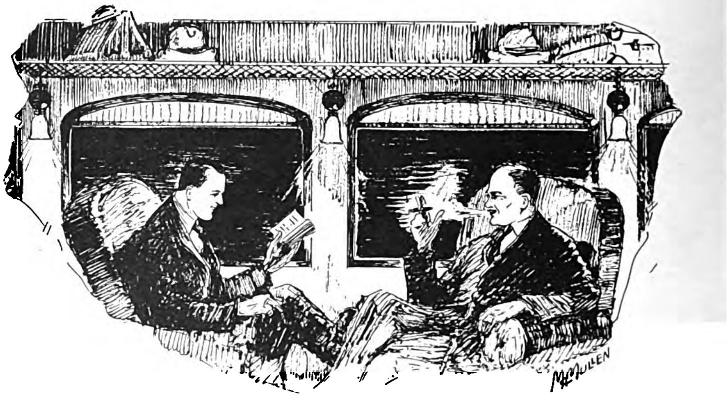
More Reliable Sweeper Operation Is Secured by Using Steel Roller Chains

Convenient Mounting for Pinion Puller

AN ARMATURE mounting used in connection with a pinion puller in the 39th Street shops of the New York Rapid Transit Corporation, Broklyn, N. Y., is shown in the accompanying illustration. The ar-

Dick Prescott Starts His Journey

And Rehearses Some Questions



AT LAST Dick Prescott, the newly appointed engineer of equipment of the Consolidated Railway & Light Company, and Steve White, the carpenter shop foreman, found themselves in the club car of the Limited bound for Centerville, the first stop on their trip of inspection. They had made out an itinerary and also had made up a list of things to go over on each property visited. Both Dick and Steve had carefully reviewed the files of ELECTRIC RAILWAY JOURNAL before starting. In that way they were able not only to select properties showing the most evidence of progressiveness, but also had found that the complete information available made it possible for them to concentrate on getting a first-class impression of how the new methods work out in practice.

"Well, Steve," said Dick, as they settled back on the cushions, "tomorrow we ought to have an interesting time out at the Centerville Railway shop." Taking a memorandum book from his pocket, he continued:

"I've made up a list here to use as a guide in asking questions about the work of the engineering departments. Here's some of them.

"How many men in engineering department?

"Is the policy to standardize parts and fittings used on cars?

"Do they have a drafting room?

"Are drawings made of standard patterns—and are they kept up to date?

"Do they make sketches for special jobs?

"Are limits of wear established for parts frequently renewed?

"Does the engineering department follow up the performance of parts put on cars for test?

"Are wiring diagrams and data put in convenient form for shop and carhouse foremen?

"Does the engineering department prepare specifications for new material?

"Does it co-operate with the storeroom and make drawings for ordering special parts?

"Does an inspector reporting to engineer of equipment determine if drawings are followed and if maintenance methods are up to the standard?

"Does it prepare estimate on cost of new work and issue storeroom requisition for materials on special jobs so that they can be ordered early enough to be on hand when wanted?

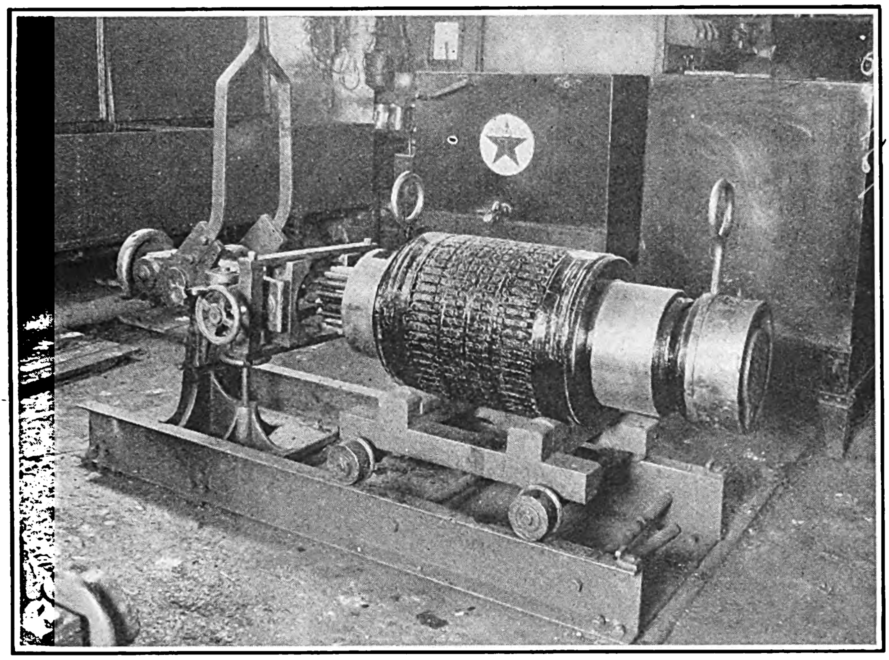
"Does it ...."

Then Steve interrupted. "Gosh, Dick, that list must be a mile long. You're way ahead of me. I can see you've put lots of thought in there and I want to go over your questions when we can discuss them more fully. You've got work enough laid out there to keep an engineering department busy for a long time."

"Of course I have, but I haven't even scratched the surface. Remember this, Steve. So far as I can see every one of those functions is being performed by somebody in every railway shop. If an engineering department doesn't do them, then somebody else who ought to be putting all his time on productive work is doing them. If they are not being done right, the whole shop is working at reduced efficiency, work is spoiled, and maintenance costs are higher than they should be and pull-ins are too numerous."

"That's the spirit, Dick. You're going at it the right way. But I think you're working on something almost entirely new in this old electric railway game and it'll be a hard grind to make our shop really understand what you're driving at. We can't settle it tonight, anyway, so let's turn in so as to be all fresh in the morning when we visit the Centerville people."

"I guess that's a good idea," said Dick as they moved out the door. "I'll shoot these questions at them tomorrow and find out what they've got to say."



A Carriage with Adjustable Wedges that Centers the Armature with the Pinion Puller

mature is placed on a carriage, so that it can be pushed into position readily and is always centered with the pulling apparatus. The carriage, which consists of a wooden framework with four small cast-iron wheels, moves back and forth on a short track made of two pieces of 6-in. channel. The armature support on the carriage has wedges with four different bevels, adjusting the height to support four different armature diameters. The faces of the wedges are marked so that they can be readily placed in position for the particular type of armature from which the pinion is to be removed, so that it will come central with the shaft of the pinion puller when shoved into position.

To remove a pinion the carriage is pushed forward so as to come in contact with the central shaft of the pinion puller which rests against the end of the armature shaft. Two jaws which go in between the end of the pinion and the head of the armature slide in guides and are moved by a screw with a handwheel on the side of the guide. Another screw on the end of the pinion puller forces the central shaft firmly against the armature shaft. The pinion then can be removed by pulling the vertical handle which actuates an eccentric cam to give the necessary force for removing it. The pinion puller was made by the Metropolitan Engineering Company, Brooklyn, N. Y., but the mounting and adjustable features were made in the shops of the railway.

Old Car Made Into Traveling Paint Shop

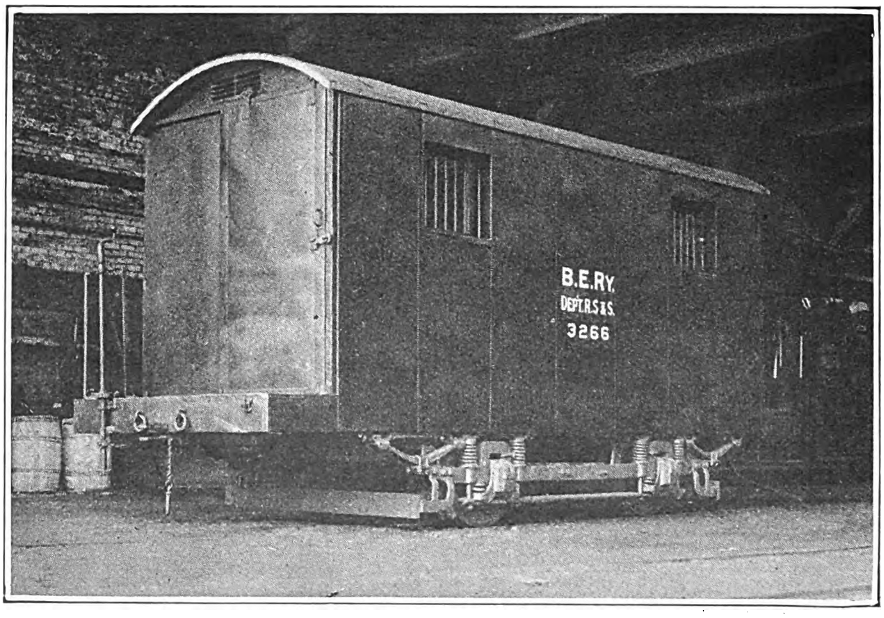
SINCE the building of the new Everett shops of the Boston Elevated Railway, car painting has been done there whenever possible. The cars operated in the Cambridge subway, however, are too wide to be operated over the tracks reaching the new shops. For that reason a traveling paint shop has been arranged by building a new body on the frame of an old single-truck car. This vehicle carries a complete outfit of painters' supplies and also provides a place where the men can change their clothes. The car is not motorized, but is pulled from place to place by a service car. Since its completion the traveling paint shop has proved to be a convenience for the purpose intended, as well as for other odd painting jobs.

Reclaiming Worn Compressor Cylinders

WHEN air compressor cylinders become badly worn or scored the efficiency falls off very rapidly. Several different methods are used for reclaiming the cylinders, the most common being to follow the automotive practice of grinding the cylinder to an oversized dimension and using oversized pistons.

The Twin City Rapid Transit Company's mechanical department does not use this method because of the necessity of carrying special pistons in stock, and also because the capacity of the compressor is changed by the oversized bore. Instead, the practice on this property is to bore out the worn cylinder to a predetermined dimension and then to insert cast-iron sleeves which are pressed into the cylinder. These sleeves are then bored and ground to a final finish which retains the original standard size for the bore.

When the cylinders are bored out, they are made large enough to leave the finished sleeve with approximately a $\frac{1}{8}$-in. wall. Before they are pressed in and rebored, these sleeves have an interior bore small enough to give a wall thickness of sufficient strength to withstand the strain of pressing into place in the cylinder. This thickness is approximately $\frac{1}{2}$ in.



This Car Carries a Complete Outfit of Painters' Supplies and Provides a Place Where the Men Can Change Their Clothes

The cylinders themselves are bored 0.002 to 0.003 in. under the outside diameter of the sleeves, to allow for a press fit.

When the cylinder is bored out, a shoulder is left near the bottom of the cylinder wall, and this forms a stop for the sleeve when the latter is being pressed in. If the cylinders become worn or scored a second time, it is a simple operation to bore out again and install new sleeves.

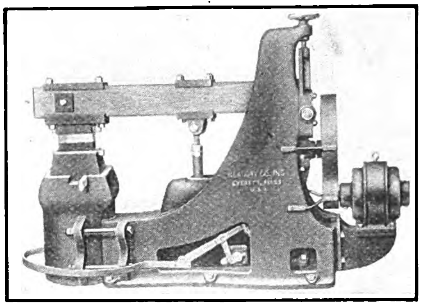
New Equipment Available

Air-Cushioned Helve Hammer

An air-cushioned helve hammer with many new features in design is being introduced to the market by Baudry Company, Inc., Everett, Mass. The hammer has a semi-inclosed frame, upon the rear of which is an adjustable yoke supporting the helve at its pivoted end. The air compressor within the frame is cast in one piece with a cylinder actuating the helve, the piston of which connects with the helve. A rotary valve operated by the treadle is located between the two cylinders for controlling the blow.

The machine is designed for either belt or motor drive. When belt driven, tight and loose pulleys and belt shifters are included as a part of the unit. For motor drive, the tight pulley is replaced by a gear engaging the pinion of the motor, making the machine entirely self-contained.

The hammer has no rubber bumpers, being cushioned entirely by air. The machine will also deliver its lightest tap or its heaviest blow at full speed. This results in increased production. Regulation by the pedal does not change the speed of the hammer but only the strength of the blow. When at rest the hammer is at the top of its stroke with the helve elevated and dies apart ready to receive the work. The hammer compresses its own air so that no outside supply is necessary. The two cylinders are cast integral with the semi-inclosed frame. One compresses air and the other distributes it for the use of actuating the hammer helve. The air supply to the cylinder is regulated by a rotary valve operated by a treadle. The hammer helve is adjustable for varying thicknesses of stock. The anvil is entirely separate from the main frame casting.


Helve Hammer with Air Cushioning

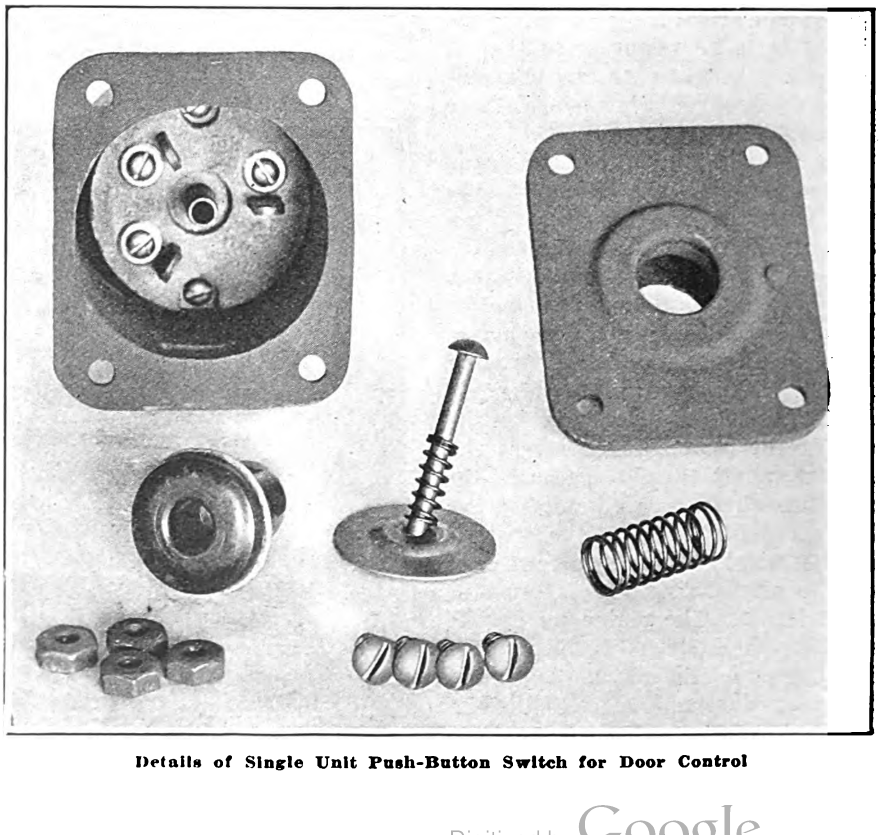
The pivot of the helve has hardened steel centers easily adjustable and affording a means for entirely eliminating side play of the dies so that they will always register with each other. When adjusting the dies for different thicknesses of work, four nuts are loosened on the pivot yoke and the hand wheel on top of the machine is turned the proper amount to raise or lower the yoke, after which the four nuts are tightened. The connecting rod of the helve is adjusted by a turnbuckle. This makes the adjusting a one-man job. The machines are built in four sizes with from 40 to 200 lb. rams. The floor space occupied is small, being 26 in. x 60 in. for the 40-lb. size and 36 in. x 75 in. for the 200-lb. size.

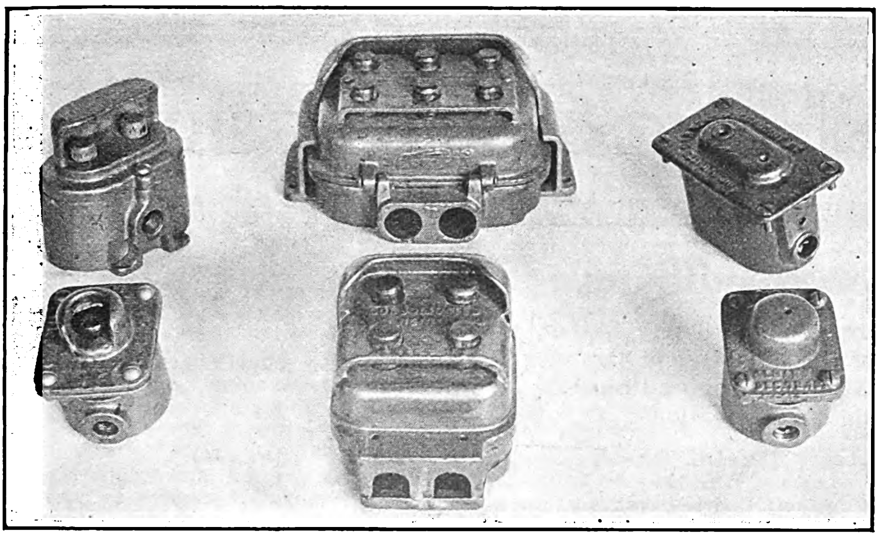
Push-Button Switches for Door Control

Several improvements have been made in the construction of the 307-type of push-button switches furnished by the Consolidated Car Heating Company, Albany, N. Y., for electric control of door engines. An accompanying illustration shows some of these switches, which are made in single, double, four or six-button units. All have cast-iron cases.

The contact disk is made in two types. For low-voltage use (battery circuits) a metallized carbon disk is employed, and a monel metal disk is used for 600-volt circuits. When the metallized carbon disk is used, a reinforcing plate is added to prevent breaking.

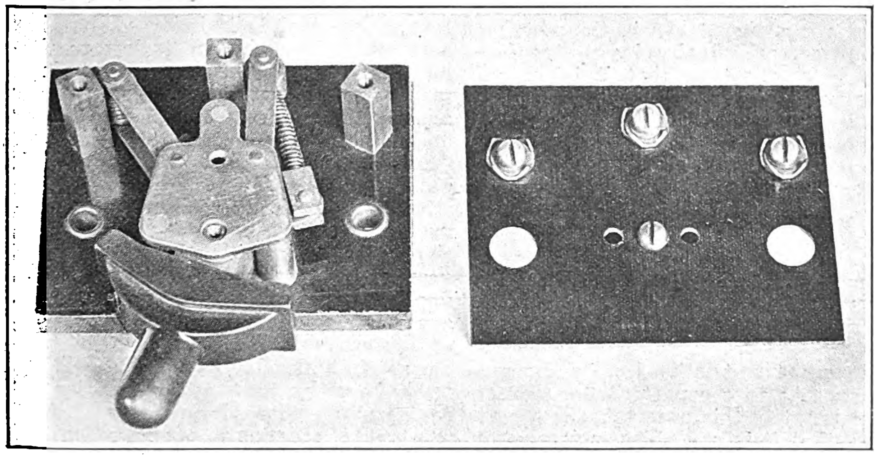
In the illustration which shows the details of a single-unit 600-volt switch, it will be noticed that the monel metal disk has a boss at the center. This provides for a rocking action of the disk, so that it will make firm contact without being influenced by the pressure of the push button or stem. Two helical springs are used with this construction, one between the insulated base and the disk to open contact as soon as pressure is released, the other between the push button and the disk to permit a further movement of the push button after the disk is firmly in contact. The springs are of phosphor bronze to eliminate corrosion.


Details of Single Unit Push-Button Switch for Door Control



Six Types of Push-Button Switches Used for Electric Control of Car Doors

The cases are arranged for conduit connection and are ventilated to prevent an accumulation of moisture. The stationary contacts are mounted on a molded base. The plunger has a long guide to eliminate binding and is provided with a button head to fit into a recess in the push button. This button head allows the button to rock, so that a side thrust will not interfere with the working of the plunger. A rawhide washer between the back flange of the button and the case takes up any shock in case the button is released suddenly, and eliminates breakage. The standard construction for the stationary contacts is with three posts. This insures better contact. The cases are provided with shields to protect the buttons where there is likelihood of passengers leaning against them. In the illustration showing six types of switches, the two at the right without push buttons are arranged for outside operation of doors. A small opening in the cover provides for the insertion of a nail or small wire to operate the button. Improvements have also been made in the electric switch which is furnished for door control, where push buttons are not desired. The operating mechanism of this switch is of toggle form so that the switch is thrown with a snap as soon as the operating handle passes the center. The switch has a bakelite handle and the bearings of the toggle mechanism are of hardened steel. An accompanying illustration shows the construction.



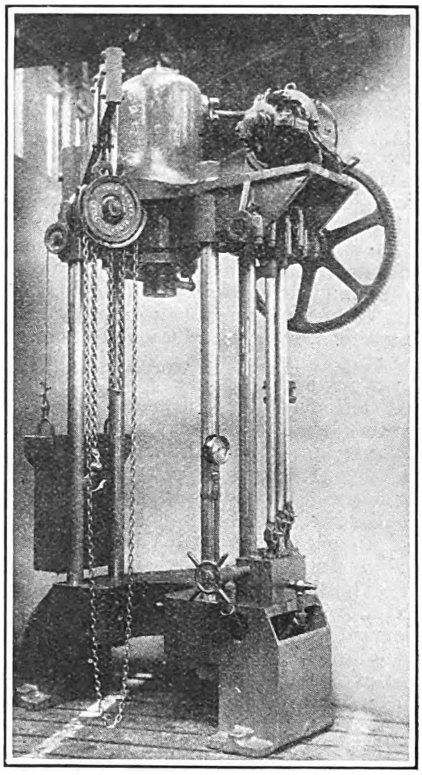
Toggle Switch Used for Electric Control of Door Engines

Twist Drill Grinder

AN ELECTRICALLY driven 6-in. bench or pedestal grinder which will quickly and accurately grind straight or taper-shank twist drills up to $\frac{5}{8}$ in. in diameter has been placed on the market by the Black & Decker Manufacturing Company, Towson, Md. The twist drill is fed to the cup-grinding wheel by means of a micrometer screw feed. No adjustments are necessary for grinding different sizes of twist drills, this being compensated for in the new design.

Rapid Action Hydraulic Press

A SELF-CONTAINED rapid action hydraulic bushing press has recently been placed on the market by the Southwark Foundry & Machine Company, Philadelphia, Pa. The press is entirely self-contained and is complete with a hydraulic pump and electric motor so that no auxiliary water or air connections are necessary. The rapid movement of the ram is obtained by a triplex pump with one low and two high pressure plungers. The high-pressure plungers are of small diameter. The third plunger is of larger diameter and pumps a large volume of water, bringing the ram rapidly down to the work. As soon as contact is made the pressure builds up in the cylinder and the low pressure plunger then automatically cuts out and the working pressure is supplied by the high-pressure plungers. A counterbalance returns the ram to the starting position.



This Hydraulic Press Has a High and Low-Pressure Triplex Pump to Do Fast Work

The bottom platen or work table has the slack water tank as an integral part of it. This platen can be furnished in several designs to suit work. The press can be furnished in capacities of from 30 to 200 tons. An overhead jib crane is supplied to take a chain block hoist so as to handle work on both sides of the press.

Association News & Discussions

Hoover Conference on Road Safety

Representatives of All Concerned in Street Traffic Safety Gather and Give Solution of the Accident Problem a Big Impetus by Drawing Set of Principles for Guidance of All in Developing Proper, Adequate and Uniform Laws and Regulations

UNDER the auspices of the federal government, a most remarkable nationwide conference directed toward reduction of the serious number of accidents on our streets and highways was held in Washington, Dec. 15 and 16. The National Conference on Street and Highway Safety was called by Herbert Hoover, Secretary of Commerce, who personally acted as chairman during a large part of the deliberations. The attendance of some 500 came from practically every state in the Union and included representatives of every industry and activity having any concern with the use of the streets and highways. There were police officials, public service commissioners, highway and motor vehicle commissioners and representatives of insurance companies, railroad and street railway companies, safety councils, chambers of commerce, labor unions, women's clubs, automobile associations, automobile manufacturers, and various other national groups. National associations which co-operated with the Department of Commerce in organizing and financing the conference were the American Electric Railway Association, American Railway Association, American Automobile Association, American Mutual Alliance, National Automobile Chamber of Commerce, National Safety Council, National Bureau of Casualty and Surety Underwriters, the National Taxicab Association and the Chamber of Commerce of the United States.

The morning session on Monday was given over to a presentation by summary of the eight committee reports which had been prepared at the direction of Secretary Hoover during the past six months. These covered statistics, traffic control, construction and engineering, city planning and zoning, insurance, education, the motor vehicle and public relations. The personnel of each of these committees was made up of men selected by the secretary in co-operation with the various associations and organizations in order to get the most competent as well as most representative groups together on each committee. E. J. Murphy, chief statistician American Electric Railway Association, was a member of the committee on statistics. J. P. Barnes, president Louisville Railway, was a member of the committee on traffic control and the committee on public relations. C. E. Morgan, vice-president Brooklyn City Railroad, was a member of the committee on construction and engineering. L. S. Storrs, president the Connecticut Company; Daniel L. Turner, consulting engineer New York State Transit Commission, and Charles B. Scott, Bureau of Safety, Chicago, were among the members of the committee on city planning and zoning. Mr. Scott was also a member of the committee on insurance. Edward Dana, general manager Boston Elevated Railway, and W. D. B. Ainey, chairman Public Service Commission of Pennsylvania, were members of the committee on education. L. H. Palmer, vice-president and general manager United Railways & Electric Company of Baltimore, was a member of the committee on the motor vehicle. Thus the electric railway industry was represented on each of the committees.

At the afternoon session on the first day the eight committee reports were opened to discussion. At five o'clock Chairman Hoover announced that the time had come for the various groups to assemble, according to an announced plan, and each to select a delegate to represent it on the "steering committee" which would meet that evening to draw up a report that would form a consolidation of the eight individual committee reports and place a definite program of recommendation before the conference on the following morning for its action. The electric railway group selected L. H. Palmer as its representative and Mr. Barnes also served on the steering committee by virtue of being official delegate of the American Electric Railway Association.

On Tuesday the conference went over the consolidated report, point by point, and passed upon it. The debate on many points was lively and earnest. Each point in the final report represents the harmonizing of views, first in the committees, then in the steering committee, and finally by the conference as a whole, so that it is an expression which probably comes as nearly as can be obtained to meeting the approval of all interests. A review of the final report as adopted by the conference follows:

Recommendations Requiring Legislation

Under the general heading of Legislative Principles, the report indicates the desirability of avoiding too much detail in legislation, and also advises a minimum of restrictive laws and regulations. As to the part of the federal government in this program, the report states that it is one of encouragement, of assembly and distribution of information, and the development and use of best practices, but expresses the belief that uniformity of traffic laws will be secured by voluntary action of the various states.

Each state should enact constructive legislation, including enabling acts, which will empower cities and other local units to provide for a proper development of the traffic situation in their territories. A state department or bureau should be created to administer the laws applying to motor vehicles, including the issue and revocation of licenses for both cars and drivers and the enforcement of regulation on the highway. The motor vehicle department should have a staff adequate and qualified not only to handle licenses but to examine drivers, regulate traffic on the highways, investigate accidents and enforce regulations regarding design, construction, inspection and maintenance of motor vehicles. Regulatory legislation should be for adoption by states and not by cities.

Under municipal government there should be an adequately manned traffic division in the police department, with traffic safety a major function. In all states and municipalities there should be specific provision for adequate and timely planning of traffic facilities and traffic control measures. These should be closely co-ordinated nationally, between adjoining states, and between states and their political subdivisions. Large metropolitan areas should establish special traffic planning commissions to study the flow of traffic and to eliminate hindrances to this flow and correct unsafe traffic conditions.

Full Stop Urged at Dangerous Railroad Crossings

To eliminate grade crossing accidents, the conference recommended that legislation be passed requiring all motor vehicles to come to a full stop before crossing such railroads as are designed and marked accordingly by the state railroad or public utility commission. In other words, the stop law as a principle is indorsed, but its application in each case is left to the judgment of the state commission, rather than to suggest a blanket law applying to all grade crossings. Elimination of grade crossings, either by relocation of highways or rail lines or by grade separation, the report states, constitutes the only perfect solution of the grade crossing problem. But this should be carried on under proper programs, so as not to impose an excessive financial burden, resting in the last analysis upon the public. Relocation of highways offers many possibilities not yet fully developed, which should be worked out by the state authorities in co-operation with the railways. Authority to order grade separation or proper protection at grade crossings should be vested in the state commis-

Coolidge Stresses Urgency of Conference Task

PRESIDENT COOLIDGE asked the privilege of addressing the Hoover Conference and at 2 p.m. on Tuesday made the following statement to some 500 delegates assembled before the South Portico of the White House:

The national conference on street and highway safety has been called by the Secretary of Commerce for the devising of means and the making of recommendations toward the lessening of the numberless accidents which now kill and maim so many of our citizens. Few conferences are more opportune or deal with graver affairs. With the deplorable and continuing increase in highway mortality and injury the time is highly appropriate for a comprehensive study of the causes, that we may have proper understanding of conditions and so may intelligently provide remedies.

The problem is but one of those inherent in advancing civilization. The increasing demands upon our highways from a growing population, the development of new uses, the imposition of modes of transportation not contemplated when they were created, have brought about congestion, confusion and conflict, until the yearly toll of traffic accidents has reached an appalling total. If the death and disaster that now fall upon innocent people, through the year and over our country as a whole, were concentrated into one calamity we would shudder at the tremendous catastrophe. The loss is no less disastrous because diffused in time and space. The evil you are combating is so widespread as to be of national concern, and we do well to look at it with a country-wide vision. But its solution does not rest in national action. Highway control is primarily for the states, and it is best that this is so.

We cannot regulate local traffic by act of Congress. Means to overcome the difficulties, to keep our complex traffic moving with order and safety, must be found by the states. It is a proper function of federal authority to mobilize the best experience in each part of the country that it may be applied elsewhere, to the end that rules may be wise and uniform. But uniformity, while of the greatest value and highly advisable, so far as shifting local requirements will permit, should not be imposed by the inflexible fiat of central power. Rather, it should come from the common desire of the states to give the highest protection to their people, to regulate traffic in the most efficient manner, with final realization in the attainment of a common standard of perfection.

This is the high ideal toward which you are striving and your task is the finding and suggesting of methods of accomplishment. You have already done much by impressing upon the minds of our people knowledge of the terrible toll of traffic accidents. The further course of action and regulation will largely depend upon your recommendations. The undertaking is of supreme value, and you have my best wishes in your efforts.

sion having jurisdiction over the railways, which should also determine and enforce a proper division of the cost between the railroad and the public. These matters are of such importance and involve to such an extent the public safety as to require that priority be given to them in the allocation of capital funds by the railroad, over expenditures for other safety measures designed to protect the public.

Special traffic courts for handling violation of traffic laws should be established, both rural and city. No unlicensed person should be permitted to operate a motor vehicle, and before an operator's license is granted, the applicant's ability to operate a motor vehicle safely should be determined by ascertaining his physical and mental fitness, his knowledge of the laws and by actual demonstration. Such a license should not be granted to any person under 16 or unable to read.

Reckless driving and any other flagrant disregard of the rights of others by any user of the street or highway should be vigorously and unceasingly prosecuted. Adequate penalties should be provided, including the mandatory revocation of licenses for a specified length of time for cumulative evidence of carelessness or irresponsibility, or for operating a motor vehicle while under the influence of liquor or drugs, and severe penalties should be provided for driving during the period of suspension or revocation.

Regulation of speed of vehicles should be directed primarily at reckless driving and should be uniform throughout the country, as far as practicable. It should be unlawful to operate a vehicle at speeds greater than are reasonable and proper, having regard for the traffic and the use of the highway, or so as to endanger the life, limb or property of any person. The state law should prohibit any municipality from establishing a speed limit lower than 15 m.p.h. In rural areas, instead of an absolute speed limit, it should be provided that when any vehicle exceeds 35 m.p.h. that speed shall be *prima facie* unreasonable.

All states should adopt the principle of certification and registration of automobile titles as an effective means of reducing thefts and the accident hazards which go with them. Statutes should be passed in every state making it the specific business of some state agency to receive traffic accident reports and to investigate accidents, whether occurring in or beyond the corporate limits of municipalities. It should be made obligatory by law for those concerned to report traffic accidents involving serious personal injury or property damage.

Safety education should be incorporated in the curricula of all schools.

Administrative and Regulatory Principles

Under this general head, the report recommends uniformity with respect to all traffic regulations, and emphasizes the importance of careful statistics on street and highway accidents, urging their collection, publication and analysis in every state and community. A form of accident report is suggested, as is also the maintenance of spot maps as a means of detecting those points at which accidents occur most frequently.

Special regulation for the use of particular streets, such as the placing of automatic signs and signals, designation of arterial streets, restriction as to class of traffic, direction of traffic, parking privileges, etc., should be based upon competent traffic counts and analyses and established in accordance with some general plan of traffic movement founded upon the design of the street system in each city.

In congested centers where large volume of vehicular movement takes place between points considerably removed, the report suggests that an effort be made to segregate street cars, motor trucks and passenger automobiles on separate thoroughfares.

Under the heading of City Planning and Zoning, the report speaks of the fact that street hazards can be greatly reduced by a proper arrangement of streets and that each community should study its own special problems, with particular emphasis upon elimination of grade crossings with railway lines, classification of traffic with suitable facilities for each, location of traffic-originating centers so as to distribute them, and creation of by-pass highways and belt highways. Other subdivisions under the heading of city planning and zoning treat of day storage space for automobiles, design and equipment of streets, importance of sub-centers and satellites, relation between street facilities and development of private property, playgrounds and schools, inter-relation of traffic facilities, comprehensive traffic and thoroughfare plans.

Construction and Sign and Signal Standards

Under the heading of Street and Highway Construction, the report deals with roadway width and suggests that every pavement in a city street should be wide enough for at least three lanes of traffic without street cars or four lanes of traffic with street cars. These widths should be multiples of 9 ft. for motor vehicle lanes and 10 ft. for street cars. Right-of-way for parking space and for clear view at curves and intersections, provision for parking space, grades not to exceed 6 per cent, curves of not less than 300-ft. radius on highways of primary importance, cross-section of the pavement and guard railing are other topics treated. A clear view of approaching vehicles for at least 300 ft. should be provided at all points on highways of this character. Every bridge on an improved highway should be least 22 ft. wide.

For signs and signals, both luminous and non-luminous, the conference adopted the following recommendations for color indication: Red for "Stop," green for "Proceed," yellow for "Caution" as at curves; some special cautionary indication at crossroads; white letters or symbols to be used on the red or green background and black on yellow. Distance and direction signs should be black and white.

Railroad crossings remaining at grade should be safeguarded in every reasonable way. Standard warning signs and pavement markings should be used to indicate the approach to all public railroad crossings. Where the volume of traffic requires it, additional protection should be afforded by the use of flagmen, gates or approved electric or mechanical devices. So far as possible, a clear view along the track in both directions from both sides should be maintained. Sharp curves, abrupt changes of grades, roughness in the pavement or other conditions at or near the track which tend to divert the attention of the motorist should be avoided. Spotting of cars near the highway so as to obstruct the view should be prohibited. Marking and lighting of highways was also treated under this section.

REQUIREMENTS OF THE MOTOR VEHICLE

Pending adoption by constituted authority of a code for standard braking ability, all motor vehicles should be capable of stopping by means of the service brake alone in a distance of not more than 50 ft. from a speed of 20 m.p.h. on a dry, smooth, hard-surfaced road free from any loose material. The emergency brake should be capable of the same performance. Lost motion or play in the steering gear should be limited to about 15 deg. The toe-in of front wheels should never exceed $\frac{5}{8}$ in. Clear red should be used for tail-lights and the rear aspect of parking lights, and it should be prohibited for any other exterior lights on the car. Clear yellow should be used for stop lights. The location of spot lights should be limited to the right of the vertical center line of the vehicle and the beam of the spot light should never be directed to the left of the vertical center line. Design of bodies and cabs should be carried out with due regard to the necessity of reducing to a minimum the shut-off area of driver vision. The use of posters or any other obstruction to vision on the front windows or on the windshield should be avoided.

The over-all width of vehicle and load of any motor vehicle should be limited to 96 in. Loading beyond the rated capacity of any vehicle should be prohibited. Adequate and periodic inspection and proper adjustment and repair of motor vehicles are absolutely essential. To this end there should be prepared a simple and practical inspection chart applicable to all makes of motor vehicles, giving particular attention to items affecting safety, for distribution by the Department of Commerce. Public service commissions and other public bodies having control of common carriers operating motor vehicles should establish reports and methods of supervision to insure adequate inspection and upkeep.

Under the heading of Conduct of Drivers and Pedestrians, rules of the road, passing, parking and stopping, hand signals and courtesy are all treated. A single cautionary signal, made by extending the arm well outside the vehicle, is recommended as the one and only signal to be used by the operator of an automobile or motor vehicle about to turn, slow down, stop or back. This is recommended as preferable to a code which attempts to show more exactly what the operator intends to do. A speed exceeding 15 m.p.h. on approaching within 100 ft. of any railroad crossing should not be permitted at crossings where the full stop is not required by law. The use of badly worn tires, especially on the front wheels, should be avoided as a positive source of danger.

The report recommends that education in safety and accident prevention should be incorporated in the curriculum of elementary schools by various means which are enumerated. It deals at some length with suggestions for co-operative work among various associations, unofficial organizations, manufacturers, insurance companies, automobile clubs and public agencies, operators of fleets of motor vehicles, and the schools and colleges. Suggestions are also made for safety education of the public.

Secretary Hoover made it plain that it is not his desire to set up a new permanent national organization devoted to safety.

The work of this initial conference will be followed up as effectively as possible, and it is probable that it will be called into session again one year from now, to determine how much has been accomplished, and to continue the general effort. Meantime, special phases of the problem will be given study by a few special voluntary committees of technical experts.

A New Conception of the Job*

Maintaining Street Railway Personnel Depends on Explaining Company's Purposes to Employees and Relation of Individual to Railway—Attitude of Employees Should Be Made Constructive and Conservative

BY S. F. FANNON
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IN A MILL, plant or factory, the entire proposition is practically under one roof or at least under several roofs in close physical relation. All the factors are conveniently located and grouped so the management can keep its finger on the pulse from the moment raw material enters until the finished product goes out the other end of the plant. And yet such are the inherent difficulties that even under these favorable physical conditions the 100 per cent successful industrial plants are relatively very few.

In the street railway business you at once find the executive is confronted day and night by an infinitely more difficult situation, on which the following reasons will throw some light:

CONDITIONS DIFFERENT ON RAILWAY

1. His plant (machinery and equipment) is split up into as many unit plants as he has cars in operation.
2. His working force is also split up into as many unit forces as he has car crews in service.
3. Both his unit plants and unit forces are out of sight most of the time. This makes it practically impossible for him to keep his eye on plant or personnel as he could in any other industry.
4. It follows, therefore, that his men work largely without supervision of the kind that every industrial manager would consider essential.
5. Not only must his unit plants, which cost large sums and are subject to heavy depreciation if poorly handled, be intrusted to the care of the unsupervised employees who are charged with the duty of operating the cars, but he must depend on those unsupervised employees to perform a series of important duties, namely: His employee must (1) *manufacture* his product (which is transportation and service to the public); (2) *display* his product to his patrons; (3) *sell* his product to his patrons; (4) *deliver* his product to his patrons; and (5) even *collect* his money from his patrons and turn the receipts in at the cashier's office.

There seems to be no parallel in any other industry where such a demand is made on the loyalty and interest of the employee. Suppose a worker in a factory which manufactured autos, shoes, or any article or commodity were charged with duties similar to those of a street railway platform man. That factory worker would have to work without supervision to manufacture his product, then he would change his clothes and go out to display and sell his product. He would come back, change his clothes again, pack up and deliver his product. Then he would have to go back again to the customer and collect the bill for the product, so manufactured, so displayed, so sold and so delivered.

The executives of a street railway have a larger problem in employment than most executives. The platform man has to perform his duties under unusual conditions. He is obliged to stand on his feet a good percentage of the time; he must work night or day as the schedule demands, and may miss regular meals and have no regular hours with his family. He must be exposed more or less to the elements in all kinds of weather; he must work every day, week days, Sundays and holidays—he must work in contact with the public which represents the patrons of his employer, he must virtually represent his employer—the company—in fact he *is the company* to the average car rider. These are a few of the conditions that face the street railway executive of today.

You have been hearing a great deal in your various meetings and through your various journals about the maintenance and upkeep of your properties, shops, machines and rolling stock. You have heard of and know the importance of each in the railway business. They stand out in great prominence, but it is indisputable that in all lines of industry today the human factor is the controlling factor, and in the street railway business and on your property the human factor is by far the most important factor with which you have to deal. No matter how modern your equipment or how automatic your machine the successful operation of these devices rests entirely in the hands of the employee, actuated by various motives, because a motive, or an interest of some kind, is behind every act of every man.

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*Abstract of a paper before the New England Street Railway Club, Boston, Mass., Dec. 4, 1924.

A man's motives, more than anything else, determine his usefulness as an employee. Now let us make a scientific analysis of the employees in business today. We find in every business three kinds of motives, and consequently three kinds of employees. I don't mean three kinds of employees by race, sex, creed, language, craft or trade. In this, it makes no difference whether employees are skilled or unskilled labor, or where they work, or what they make.

We find the conservative employee, whose motives are constructive. We find the negative employee, whose motives are negative and reactionary. We find the neutral employee, whose motives are neither definitely for bad nor good.

TEN PER CENT CONSERVATIVE, TEN PER CENT DISCONTENTED, REST NEUTRAL

The proportions into which we find a working force to be divided into these three kinds of employees will vary, naturally, but taking a thoroughly typical case, we find that 10 per cent are conservative, thoroughly contented with their employer and employment; another 10 per cent are negative, thoroughly discontented with their employer and employment; the remaining 80 per cent are neutrals, not contented as the conservatives are, not discontented as the radicals are, but indifferent.

We find that the conservative employee gives his employer a full day's work up to the limit of his skill. This means practically a 100 per cent return for the employer. We find that the negative employee gives his employer only 50 per cent or less of a full day's work. And we find that the neutral employee gives his employer 75 per cent of a full day's work. Now, you have always known that these three kinds of employees existed upon your property. You have always known the good employee who gives you a real full day's work and gives it willingly. You have seen his sunshiny face upon the platform of your cars. You have heard his pleasant "good morning." You have noted his assistance of the elderly on and off the car. You have heard his polite reply to numerous questions of the passengers. You have noted his close following of schedule, his interest in the upkeep of the car. He has time and again brought to you suggestions. This is the conservative, the man who is giving to you 100 per cent effort in return for the wages he draws. You have many times noted the man whose face carried the frown, whose very bearing spoke antagonism. He has no interest in carrying out the schedules. It is of no importance to him as to the appearance of his car or to the service he is rendering either the public or the company. This is the negative man—the man who is giving to you but 50 per cent of his ability. And again you have seen that great company of employees whose whole demeanor is that of unconcern. They seem to be saying, "Oh, what's the use, so many hours to put in, so many miles to travel. How soon will we be through?" They keep their eyes on the clock and go listlessly through the motions day after day with but a half interest in their work.

In the maintenance of the personnel in industry we have been very watchful as to the health of the employee. We are selecting with greater care each day the man whose mentality is strong. We are quite alert as to his morals. All these are important and are bound to aid in developing our employee's interest and satisfaction in his work. But do you not realize that the all-controlling power, the real force, is the employee's motives?

Does not the above analysis point out to you that we have another far more important step to take, the development of the motives of the neutral and negative employee to those of the conservative, the developing from this misunderstanding to understanding, from lack of interest in the job to real interest?

It is men we are dealing with, men made in the image of God, men upon whose shoulders rests the responsibility for the development of our civilization and nation. Dare we give to them less attention than we give to a machine? The machine is not working correctly. Do we leave the machine to run on giving under-production? Do we throw it to the scrap heap? No. We call upon the man who understands that machine. He analyzes and locates the trouble. But we do not stop there. We have him put that machine into such condition that it works properly, that it may give to us the desired capacity.

The employee must have brought to him in a tactful way, in a language that he understands, in a way that has a pull for him, the real facts about economics. He does not understand that 80 to 85 per cent of his entire output he buys back, and not only buys back but sets the price of the buying. He does not understand that it is not the number of dollars in his pay envelope that counts, but what the dollars will purchase. He must be told about his position, its opportunities and responsibilities. He must be led to understand the value of the town he is living in, why it is a good place for him and his family, to the meaning of liberty, the value of laws and the courts, the responsibility of citizenship.

Here is the problem that faces us today. It requires the most intimate knowledge of humanity. It is a challenge of the most scientific sort. But I am glad to be able to say that it is being accomplished. Skillfully, scientifically, through great study and deep research, scientists are leading the employees of various industrial organizations to a clear conception of their responsibility and obligation to a motive that puts interest into the job that is theirs to perform.

Eliminating Street Car Noises*

Numerous Sources of Noise on the Car Are Pointed Out and Remedial Measures Suggested for Each—A Higher Standard of Maintenance the Main Remedy

By R. W. BAILEY

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SINCE the advent of the rubber-tired vehicle into the transportation field the noise emanating from metal wheel on metal rail, with the many contacts of metal to metal in trucks, brake rigging, etc., has become a source of annoyance. Noise is more or less a relative thing. Whether or not a thing is considered noisy is generally determined by comparison with other sounds. A car that would be considered extremely noisy today, ten years ago would have been considered a quiet running vehicle. With the clatter of the hoofs of horses, rolling of steel-tired wagon wheels over the street, etc., the noise from a street car was given very little consideration. Times have changed and something must be done to reduce the noise made by street cars.

The first question that confronts the mechanical department of the street railway today is the elimination of noise in the cars we are now operating. It must be remembered that many of these cars have been in service for from 5 to 20 years. In the design of this equipment very little attention, if any, was paid by the manufacturers to the elimination of noise. Metal to metal contacts, without any particular attention to close fits, make a condition that is hard to control. For instance, the present brake rigging on our cars consists of numerous floating parts joined together by pins and bolts. Our trucks, journal boxes and lids, springs and spring clips, air compressors, drawbars and attachments, motors and motor suspensions, gears and gear cases, door engines and step mechanisms, all body noises, and trolley bases and trolley wheel noises, all contribute more or less to the general noise made by the car. Last, but not by any means least, is the condition of the track over which the equipment is to operate. However, assuming that the track is in fair operating condition, with not more than the usual number of loose joints, corrugated rails, cup joints, etc., there are many parts of the equipment that can profitably be given increased attention. Just how far we can go in making cars quieter depends to a certain extent on the amount of money that is to be spent.

Wheel noises are largely due to vibration in the metal of the wheel itself. At a meeting of our mechanical men held recently two means of muffling this ringing were discussed. One method consisted of drilling additional holes in the web of the wheel and the other contemplated bolting oak blocks or pieces of lead plate to the web to deaden this ringing noise. We are attempting, with cast iron wheels, to produce the same results by putting a lead plate between large washers and bolting onto the wheel. While this deadens the sound, it has not as yet been demonstrated that it is practicable. We are still following it up with great interest. Flat wheels are another source of disagreeable noise and if properly inspected and ground these can be practically eliminated. However, under certain conditions they are so frequent that the expense of properly removing the flats promptly is prohibitive and the wheels are allowed to continue in service.

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*Abstract of paper presented before meeting of Midwest Electric Railway Association, Nov. 24, 25, 1924, at St. Louis, Mo.

A cushioned wheel is being manufactured and is now in service on steam railway inspection cars. Application of this construction to street cars would undoubtedly materially reduce the vibrations that are set up in the wheel and transmitted to the equipment. Just how far this would go to eliminate noise must be demonstrated, but it is worthy of serious consideration.

JOURNAL BOXES AND BRAKES

Journal box noises originate from wheel impacts transmitted through the journals to journal box covers and such parts of the truck as make metal to metal contact. The wear plates on pedestals should be kept tight. Some types of journal boxes are also provided with plates that should be given the same attention. We have decided to do away with all spring lids on our present journal boxes and have devised a method whereby all lids are now bolted tight in place. We have also tried a few wooden lids to see what success we might have.

Brake noises are due in many instances to the fact that not enough attention is paid to the fit of the brake head and shoe. If a shoe is properly fitted to the brake head and properly keyed there should be very little noise at this point. Closer inspection as to the replacement of brake heads undoubtedly would eliminate considerable noise. Swinging brake beams, brake levers, equalizers and brake rods are another source of noise, and it seems that about the only proper thing to do is to maintain closer fits, taking care of pin wear and bushing renewals and making fits on clevices as close as possible, without binding the brakes. This is a matter that I think we have all overlooked more or less. Also, attention should be directed to seeing that brake rods are properly supported so that they will not be striking other equipment or the car body.

TRUCKS CONTRIBUTE ALSO

Trucks that have not been well maintained and on which worn parts have not been replaced, generate noises at many points. The disagreeable noise made by motor gears is due primarily to the fact that we do not maintain close centers between gear and pinion. We have all been trying to get the longest life possible out of all types of bearings for purposes of economy, and noisy operation has been the result. Worn axle brasses, by permitting gears to mesh poorly, are thus one of the chief causes of noise. It may be because axle brass renewal already is one of the largest items of equipment maintenance cost that we tend to overlook the noise from this source. If axle brasses are removed before the gears become noisy the present limits of wear allowed will have to be decreased materially.

This question also involves serious consideration of gear cases. When properly installed they cause little noise, but when the gear is out of alignment or off center, the case acts as a sounding board to magnify these noises. Excessive lateral wear in armature and axle bearings will allow the gear or pinion to strike the case and it then becomes very noisy indeed. Proper lubrication of gears, in fact of all moving parts, is another important factor to be considered in connection with this subject.

Body noises originate from many causes and include a wide variety of squeaks and rattles resulting from service strains and from loose parts. The body and vestibule sash, body doors, register mechanism and many other fittings are the chief sources. Special attention should be given to keeping sash tight, as they are one source of particular annoyance. Also, many rattles can be removed by taking care of the fits of doors and their operating mechanism.

All of us, probably on account of the necessity for economy, have been giving more attention to our maintenance cost per car-mile than to the fact that the car is not as pleasing to the public as might be desired. Our first job, therefore, is to raise the standard of maintenance so as to eliminate noises resulting from loose or worn parts. After that the use of fiber and lead or other sound-deadening materials may be experimented with profitably.

In my opinion, noise reduction is a progressive problem, and if we are able to control what we now consider the loud and disagreeable noises in our equipment, other noises will become apparent and seem objectionable that at the present time are not giving us any concern. For instance, if all other noises were quieted, the noise of a compressor would probably be very objectionable. Also, the drumming reflected to the car roof from the trolley wheel would probably become objectionable. In other words, noises which are not taken into consideration at all at the present time eventually may become an annoyance. Consequently there is a big job ahead on our old equipment.

Modern Methods an Economic Factor in Car Maintenance*

BY HENRY S. DAY
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IN THE many discussions of modernization very little has been said of the need of equally modern methods of maintenance and the savings that could be accomplished by them. In what follows I am using the electric car as the dominating factor because all things on an electric railway start and finish at the car. The universally accepted method of discussing economies of operation is by comparison, and to this end I will quote costs and describe practices gathered from some 50 roads during the past 18 months.

On four roads, where operating conditions are similar, the total mechanical department cost per car per year was in round numbers: Road A, $866; Road B, $950; Road C, $1,200, and Road D, $1,800. On each of these roads the annual car-miles was practically the same, the cars and equipment were equivalent in weight and power and were built largely by the same manufacturers at approximately the same time. It is interesting to note that on Road A 60 per cent of the equipment was modern and on Road D there were practically no modern cars or equipment.

The Northern Texas Traction Company, which at the time of the Coffin award showed a maintenance cost per car-mile of 1.9 cents, was operating 85 per cent modern light-weight cars and the Eastern Massachusetts Street Railway, referred to as road A, which was operating with a cost of 3.5 cents per car-mile, had only 60 per cent of its cars of the modern light-weight type.

Road A, with a cost of $866 per car per year, has a definite and constructive overhaul program carried out strictly along modern lines, while road D, with a cost of $1,800 per car per year, has not overhauled its cars for 6 years. On road B, with a cost of $950 per car per year, the low cost was obtained almost entirely by modern methods of maintenance, as all passenger cars in service are of composite wood and steel double-truck type, the average weight being 42,000 lb.

It seems surprising that cars of the same type and weight, not infrequently built by the same car builder, equipped with the same motors and in equivalent service should cost some $900 more per year operating in one city than it did in another.

The road that was spending $1,800 per car per year had more than 300 cars in service. If this operator had gotten his cost down to $866 he would have saved more than $900 a year on each car. This would have reduced his mechanical department costs about $270,000 per year, and would have wiped out the operating deficit.

Figures obtained from nine roads showed that the average cost for material only on each road ranged from $22.08 to $63.04 per motor per year. The additional labor charges in the total cost of maintenance varied from 47 per cent to 73 per cent of the material cost.

On 10 roads the total cost of materials and parts for 17,469 motors was $410,272, or an average cost per motor per year of $23.48. With the labor added this makes the cost per motor around $50 per year. On these same roads the material only charged to car account for electrical equipment for

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*Abstract of a paper before the New England Street Railway Club, Boston, Mass., Dec. 4, 1924.

four-motor cars, showed the cost per car per year to range from $113.42 to $268.18. These great discrepancies in cost at least hint that the maintenance methods employed lacked standardization or, if you please, modernization. To bear this out it is found that a gear, armature winding, bearing or other part has a much longer life on one road than another, although made by the same manufacturer out of the same material and put to work in the same service.

The question is frequently raised that local conditions create influences that cannot be controlled, particularly those of the weather and elements. We used to think that the worst thing that could happen was a snowstorm. This idea is becoming out of date, with a good many others. For example, in the past 5 years the average per cent of armatures in service rewound by the Montreal Tramways is 9.36. On this road the average motor performance per armature rewound in the 5-year period was 252,200 miles. On the basis of 36,000 miles per year an armature would go 7 years between windings. So if equipment is in good condition "local conditions" are not the factor in operating costs that they have been claimed to be.

Recently an association of equipment men published two reports, showing cost per 1,000 car-miles and miles per pull-in. The reports were gotten up to show the improvement brought about by the good work of the association, which apparently was very effective. The striking thing about these reports seemed to be that in a group of eight roads, the total mechanical department maintenance per 1,000 car-miles ranged from $18.43 to $38.13, and the total miles per pull-in from 6,189 to 46,062. It is also significant that the cost of operation on the road with the poorest showing in pull-ins was greater than on the road with the best showing. To continue the comparison, a road in New York state is operating motors with the original gears, gear cases and some of the pinions which were placed in city service 10 years ago, still in good condition. On this road, operating about 100 revenue cars, one man does all the winding, using only a part of his time. A road in Michigan rewound, last year, 125 per cent of the armatures in service.

Different Bases of Overhaul

Some roads inspect and overhaul on a mileage basis, some on a time basis, some on a watt-hour consumption basis. Others carry on inspection and overhaul by a system of light and heavy repairs as necessity dictates or equipment failures make compulsory. Overhaul periods on different roads vary from 45,000 miles or about 16 months between overhauls to 100,000 miles or about 33 months.

As a matter of fact any of the overhaul and inspection systems previously mentioned will keep cars in service with what is generally considered dependable operation. But it is also equally a matter of fact that but few of these methods keep cars in service economically when the possibilities of that economy are really analyzed.

Cars can be kept in service and maintained at low cost and with infrequent failures when new. Therefore, the system of inspection and overhaul that perpetuates the original condition, of course taking into account the yearly increasing age, is the one that will come closest to this standard and result in the lowest cost. A system like this will bring the cost of maintaining the average city street car down around $1,000 per year, with only approximately 5 per cent of the total cars out of service for overhaul, paint, collisions and running repairs. Today it is not unusual to find anything from 5 per cent to 25 per cent of the cars out of service for various reasons. The annual dead car hour cost is equal to a big sum.

The electric railway operator must come to the view point that constructive economy lies in higher standards and better methods, and that truly cheap maintenance means the care of rolling stock, power houses, line, and track along the lines intended by the engineer and manufacturer who was originally responsible for their production. That some operators have not done so, and have daily paid for it is evidenced by the very discrepancy in costs and operating records obtained from different roads. There seems no logical reason why two cars or equipment units made by the same manufacturer and placed in service at the same time in different places should at the end of a few years show widely varying results. Yet such is the case—neither can there be any question that the result is in direct ratio to the degree of skill and care exercised in the upkeep.

It is not unusual to find workmen with little training or skill and no comprehension of fits or close measurements, dismantling, repairing and assembling equipment and apparatus which had to be designed and built to what were practically micrometer specifications, in order successfully to meet operating conditions.

Modernization of methods of course means modern shops, tools and facilities. Baking ovens, spray painting, spray washing, large lye vats, power operated cranes and trucks, electric and gas welding, heat controlled babbitt pots, pneumatically or electrically operated hand tools are modern necessities. Light, comfortable shops, arranged to economize time and do away with hand labor will in themselves permit large economies. But these things alone will not reach the economies that can be attained by modernizing methods, which really mean constructive planning for and co-ordinating of the maintenance demands according to the character and requirements of the physical property. Higher standards and thorough execution of constructive maintenance schedules on a budget basis with an accurate method of tabulating costs backed up by engineering supervision and advice is another way of applying modernization of methods to any property.

For some reason hard to explain, this question of maintenance has never seemed to come into its own. The day isn't coming, but is already here, when reduced operating costs are going to decide to a large degree the question of profitable operation.

Quantity Production of Renewal Parts*

By H. R. Meyer
Westinghouse Electric & Manufacturing Company

An analysis of several railway properties indicates that a careful study of maintenance methods with more thought given to the selection of renewal parts has been materially reflected in the earning capacity of these properties. Nine times out of ten the cost of the renewal part itself is only a relatively small percentage of the cost of replacement. The big costs are in the removal of the car from service and the labor cost.

A general survey of the renewal part production in this country will show that the great majority of electric railways manufacture their own renewal parts to a greater or lesser degree and the numerous independent manufacturing concerns are also engaged in this business, with the result that large quantity production is not practiced. Many electric railway men are of the belief that they can manufacture their renewal parts cheaper than they can buy them. In some instances this belief may be justified, but in the great majority of cases it is not supported by facts. Several companies which have made a close study of this subject have learned that it was a mistaken policy.

Manufacture of renewal parts by an operating company is entirely uneconomical from the standpoint of manufacturing standards as they exist today. The mechanical department of a street railway is fundamentally a maintenance organization. This organization is laid out on lines almost entirely foreign to that of a manufacturing company in that its work consists in the repair of apparatus rather than its design and fabrication. In some cases the plea is made that the use of maintenance men for manufacturing purposes is warranted on the basis that there are many occasions when some of these men have nothing to do. If this is actually the case, then there is room for improvement in the layout of the maintenance work. If the street railways had today a suitable system of cost accounting in the shops, we are firmly convinced the records would show that the cost of manufacturing is higher than the cost of the best material which can be bought on the market today.

On an average, the number of pieces of any one part is not large enough to warrant the setup required for the production of that part for one operating company. As the cost of the setup and handling operations must be included in the total cost of the job, each piece when a small number is involved must bear its share of this setup. This is too great a percentage of the total cost of the piece. In a plant which manufactures nothing but renewal parts for general maintenance consumption, the price of the unit can be based on large quantities, as the shop load for the particular part in question can be figured on the total number of completed pieces of apparatus in use throughout the country and not on just one property.

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*Abstract of a paper presented at the convention of the Pennsylvania Street Railway Association, Harrisburg, Dec. 5, 1924.

Have you ever considered the question of the proper tools required for manufacturing any part in quantities at a low cost? Each time another concern takes up the question of manufacturing a part which is already on the market, the cost of a new set of tools, jigs and fixtures is involved. This is a very uneconomical procedure and tends to keep the cost of a product up. Probably the most serious phase of this situation lies in the fact that as a rule the tool equipment is insufficient for an accurate reproduction of the renewal part. It stands to reason that to keep the cost down as few tools as possible are going to be made. This is not just a general statement but rather the result of many comparisons made between standard parts and those of other manufacture.

To manufacture renewal parts which will pass inspection as called for by the drawing information, the best of machinery equipment is required. A renewal part to give satisfactory service must be made to the exact dimensions of the part which it replaces. If this is not the case, the cost of a second replacement in labor alone would more than offset any saving which the home manufacture made. A survey of the street railways which was made a very short time ago showed that the average age of lathes now in service was twenty years. Manufacturing experience indicates clearly that close dimension work with duplication of parts cannot be obtained at low cost with such equipment. As the operation of the complete apparatus is dependent on the design and manufacture of the integral parts, it is evident that the tools for the renewal parts must be as near perfect as it is possible to obtain them. Only a good load factor will permit the investment for such tools.

The materials which go into a renewal part are of as much as if not more importance than the general appearance. Often is it possible to obtain at a low price reproductions of standard parts which resemble somewhat the high grade article. The question is, however, of what material is it compounded? The manufacturer of renewal parts should be constantly working toward the ultimate goal of perfection as it affects maintenance rather than that of first cost. To do this it is necessary to keep in touch with up-to-date research developments in materials and processes. A corps of trained engineers should be working on these problems at all times, testing all commercial products for the best and devising new methods of obtaining high quality materials when they are not available on the market. No materials should be used which do not come up to definite specifications laid down by these engineers. This service can only be available where the renewal parts receive only a very small proportional share of the expense.

When the operators manufacture their own parts, the materials for the fabrication are bought on price and hence are not necessarily of the best. An examination made of the materials used in a number of coils proved this point almost conclusively. Scrap materials for such items as bearings may be of almost any composition by the time they are cast, and hence the wall of the bearings may be brittle and coarse grained in structure, all of which tends to lessen their life.

As a rule, the men employed in the manufacture of renewal parts are inherently maintenance men. However, in many cases their time is split between the maintenance of equipment and the manufacture of parts. The supervisory force employed in the manufacture of renewal parts in most cases also has charge of the maintenance work. Does it not seem probable that under such conditions either one or the other of these two duties will suffer through this combination? The needs of an operating company in its maintenance work are so diversified and the quantities as a rule are so small that the support of a complete and separate manufacturing unit hardly seems justified.

The Question of Tolerance

Not so many years ago the question of tolerance on renewal parts as they affected the maintenance was one of seemingly minor importance. With the improved maintenance methods of today, and hence a greater appreciation of the necessity for correct tolerances, this question is of foremost importance in some of the major problems. You realize the importance of correct tolerances on your axles, wheel and gear bores because the effect of incorrect tolerances is immediately apparent in loose wheels and gears. This is not so true on many of the other parts of the equipment, as they will at least operate in some fashion. If you are subject to an epidemic of hot bearings and consequent troubles, you will become vitally interested in this question of tolerances and the effect when the improper ones are used.

Consider the question of brush-holders. The original manufacturer is very careful to see that the proper dimensions are adhered to from a consideration of neutral setting. If this question of neutral point of the motor is a vital one, then it is very necessary that all renewal part brush-holders be made to the same dimensions as the original. Unfortunately there are many renewal part brush holders in the manufacture of which this point is entirely neglected.

Probably in no way is the answer to tolerances so well exemplified as in the case of armature bearings and armature bearing housings. This particularly as it applies to change in gear center distances, overheated bearings and poling of armatures, with especial regard to lubrication. The life of a bearing shell is dependent to a very great extent on its fit in the housing. A loose fit of the bearing not only shortens its own life but makes necessary in many cases the reboring of the housing before a new bearing should be used. Noise in gears is mostly attributable to worn gears. However, a very large percentage of this noise is due to improper meshing caused by incorrect gear center distance. The wear of gears and pinions is increased by changes in gear center distances due to worn and improperly fitting parts. New gears and pinions under these conditions will be noisy.

Many renewal parts are made to drawing on which no tolerances whatsoever appear. Some of these drawings are made up by measuring parts for which, if tolerances were allowed, an error is bound to creep in.

Probably no one thing contributes more to the successful operation of a renewal part than the inspection which it receives before it leaves the point of manufacture. Adequate inspection of parts costs money, but it is just one of many things which must be done to service properly an operating company's requirements. Here again the load factor on any renewal part must be large enough so that each part will only have to bear a small proportion of the cost. If a clear conception of the importance of tolerance is conceded, then the importance of inspection is understood. This question of inspection is often neglected in the manufacture by operating companies.

In some cases it has been found that stocks of renewal parts exist in operating storerooms which far exceed the requirements for many years. This condition has been brought about by the necessity for making large quantities to keep the cost down. Quite a number of these parts are for apparatus which has become obsolete and therefore the remaining stock represents a total loss. The book value of this material and the interest loss is another factor which tends to offset any estimated gain through internal manufacture. When the manufacturer stands ready to protect your needs by local stocks at all times there is very little argument left for the operator to manufacture his own parts.

One large operating company estimates that by eliminating the manufacture of parts it will reduce its payroll by very nearly $100,000 per year. This does not mean a total saving of that amount, but a very, very good percentage of it will show up as a saving.

Indorses Better Business Methods

At the last meeting of the executive committee the policy committee was authorized to draw up a resolution indorsing the work of the Better Business Bureau and the National Vigilance Committee. The resolution follows:

"Recognizing the effectiveness of the work being done by the National Vigilance Committee and the Better Business Bureau in protecting the public against fraudulent, semi-fraudulent and hazardous investment propositions, this executive committee hereby indorses the work of both organizations. It urges member companies to support these organizations locally and nationally and to co-operate with them in whatever manner seems advisable."

American Association News

Arc Welding Discussed Before Metropolitan Section

A. G. BISSELL, arc-welding engineer of the Westinghouse Electric & Manufacturing Company, was the principal speaker at the meeting of the Metropolitan Section of the American Electric Railway Association in the auditorium of the Engineering Societies Building in New York on Dec. 12. His subject was the "Metallurgical Analysis of Electric Arc Welding" and he illustrated his remarks by means of lantern slides. He said that an electrode wire of hard drawn mild steel contains an average chemical composition of carbon, 0.16; manganese, 0.56; phosphorus, 0.032; sulphur, 0.024, and silicon, 0.016 with a tensile strength of 100,000 lb. per square inch. In passing through the arc, this metal in the molten and vaporized states comes in contact with the elements of the air, the extent of this contact being determined by the length of arc held by the operator. The shorter the arc, the less the metal is affected by the atmospheric elements. At the temperature of the arc the main elements of the air, oxygen and nitrogen, have a great affinity for the metals in the arc stream. The result of this affinity is that the nitrogen and oxygen combine with the elements of the wire to form oxides and nitrides. The carbon of the wire combines with the oxygen of the air to form carbon dioxide and carbon monoxide. Both of these compounds are gases and escape. The oxides of iron, manganese and silicon float to the surface of the molten metal as slag. The phosphorus and sulphur are altered but little. The nitrogen combines mainly with the iron. Some of each of the oxides and nitrides are scattered throughout the metal, but the extent of this is determined by the amount that is permitted to enter by the operator. An analysis of the metal after passing through the arc shows the following elements: Carbon, 0.05; manganese, 0.18; phosphorus, 0.031; sulphur, 0.036; silicon, 0.011; nitrogen, 0.114-0.138, and oxygen, 0.55-0.25 per cent. The tensile strength is from 55,000 to 62,000 lb. per square inch.

By holding the arc between ⅛ in. and 3/16 in. the arc stream is completely surrounded by an envelope, mainly of iron oxide vapor, that prevents the active oxygen and nitrogen on the outside from coming in contact with the active elements on the inside and permits a fairly pure metal to be deposited on the work.

By melting the steel wire and again solidifying it cast steel is produced, and at the same time the crystalline structure of the plate metal in the immediate vicinity of the deposit is altered. Photomicrographs show a section of metal extending from the added metal through the line of fusion into the plate in one layer. The light metal is of a cast structure. This is the deposited metal and consists of iron of the analysis given above. This structure blends into a different structure at the line of fusion between the plate metal and the deposited metal. The heat conducted through the plate away from the line of fusion produces structures corresponding to the temperatures reached. The dark, coarse structure is characteristic of an overheated steel and is brittle. This material extends about 0.015 in. into the plate. Further into the plate the grains grow smaller until the minimum size is reached at the point where true annealing occurs. Here the temperature reached is about 780 deg. C., or just above the critical point of the steel. The material at this point has a tensile strength of about 60,000 lb. per square inch and an elongation of about 25 to 30 per cent in 2 in. Further on the structure again coarsens, blending into the original structure of the plate. The crystals of each metal are perfectly enmeshed. The added metal may be identified by the inclusions of oxide and nitride that appear as black specks in it.

The principal discussion was by J. S. McWhirter of the Third Avenue Railway. The general opinion was expressed that electric railway operators had much to learn from the applications of arc welding carried out by the steam railroads.

Myles Lambert of the Westinghouse Company responded to the invitation of President Thompson of the section by addressing his remarks more particularly to the young men in the industry, and by making a plea for everybody engaged in electric railway work to do more to sell the industry to the public. Mr. Lambert said that the educational opportunities of the day were almost limitless and he urged all the men in the industry, particularly the younger men, not to leave any stones unturned in their efforts better to fit themselves for their jobs and for their work as citizens and as members of the community. He said that the interest of railway men everywhere was not only in the perfection of the physical apparatus with which they worked, but with the problem of studying how people regarded the service that was being rendered.

Secretary Hodges said there was a balance of $1,259.46 in the treasury and that since the last meeting the membership had increased 157, or from 569 to 726 members.

Mr. Thompson said that a broad program had been laid out for the year—one that he hoped would touch intimately the work of every man engaged in the industry. On each property included in the territory covered by the Metropolitan Section at least one man has been appointed who will keep in touch with the members in order to find out what subjects were uppermost in the minds of the men. In that way it could best be learned what the men desired to hear discussed.

May Singhi Breen and her Syncopators furnished the principal entertainment. They were roundly applauded. Miss Breen broadcast from Station WEBJ of the Third Avenue Railway, and the stage of the auditorium in the Engineering Building was equipped with a microphone and wires and announcements were made over the microphone to the invisible audience, but at the conclusion of the performance the announcer detached his instrument and darted off the stage while it was dawning on the audience that the broadcasting stunt was only a hoax.

Committee of 100 Disbands

ITS purpose accomplished, the Committee of 100, which was formed for the purpose of furthering the dissemination of correct information regarding the industry, will disband Jan. 1. Announcement to this effect was made in a letter sent by Gen. Guy E. Tripp, chairman, to each member of the committee. The letter follows in full:

"The Committee of 100, of which you are a member, will be dissolved on Jan. 1, 1925, on which date the American Electric Railway Association will take over its funds and work, and as chairman, I wish to take this opportunity to report to you what we have accomplished in the 5 years of our existence.

"The work for which the committee was originally organized, that of saving electric railways from seemingly imminent danger of general bankruptcy, by telling the public the facts about the industry, has been accomplished. Machinery for reaching the public with the industry's story was set up shortly after the organization of this committee, and this machinery has been perpetuated in its original form, enlarged and kept functioning under funds raised by the committee ever since.

"Initially, in 1919, the committee funds were expended in giving to the public facts developed by the Federal Electric Railways Commission, and such good results were accomplished by the publicity machinery then set up that it was transported to the American Electric Railway Association headquarters in New York, and since that time has functioned under the name of the Advertising Section of the association. Included in the beneficial accomplishments of this Advertising Section in the last four years are these:

"'Established a point of contact between the electric railway industry and writers for newspapers, magazines, financial papers and other publications interested in electric railways through which they could obtain authorized information, including statistics, regarding the electric railway industry. This service, by its frank and honest dealing with publications, enjoys the highest standing and today is being utilized throughout the country.

"'Encouraged electric railway companies to improve their public relations by frank dealing with the public, and caused the number of companies using publicity and advertising to increase during the 4-year period from about twenty to more than three hundred. The total amount of money now being spent for electric railway advertising and publicity annually chiefly through local company channels is estimated at $3,000,000.

"'Originated an advertising service for the dissemination through electric railway companies of posters, suggested newspaper advertisements, booklets, etc., carrying authenticated information about the industry. This service is supplied regularly to all electric railway companies in the United States.

"'Aided in the organization of state companies on public utility information and arranged a co-operative arrangement with them whereby newspapers, state legislators, city officials and libraries and colleges in the 37 states where the committees operate are supplied regularly with electric railway material.

"'Enlisted for the first time the co-operation of manufacturers of electric railway materials employing some 200,000 men in telling the facts about electric railways to the public.

"'Made personal surveys of and gave national publicity to such outstanding electric railway situations as those which have arisen in Des Moines, Iowa; Okron, Ohio; Saginaw, Mich.; Toledo, Ohio, and Bridgeport, Conn., in which the bus sought to supplant electric cars.

"'The Advertising Section has worked in close harmony with the executive committee of the A.E.R.A. and all of its activities have been carefully supervised by leading executives of the industry. The universal opinion of association executives familiar with the section's work is that it has accomplished effective results and that its efforts should continue along the general lines followed heretofore.'

"Happily, the finances of the association are in such condition that it is now able to carry on the educational work heretofore financed by the Committee of 100. Hence, the executive committee of the association on Nov. 21 officially made arrangements for financing the work after Jan. 1, 1925. Effective that date, therefore, the Committee of 100 will stand dissolved.

"Coincidentally, the executive committee adopted a resolution thanking the Committee of 100 for the excellent work that it has done since its creation. To this I wish to add a word of appreciation. This committee doubtless has been of great service to the industry, and I thank you personally for the assistance that you have rendered."

Heavy Traction

A MEETING of the heavy electric traction committee of the Engineering Association was held at association headquarters, New York City. on Dec. 17. Members present were J. C. Davidson, chairman; A. H. Armstrong, J. M. Bosenbury, H. F. Brown, Morris Buck, H. W. Cope, J. H. Davis, J. T. Hamilton, Norman Litchfield, J. O. Madison, L. S. Wells and C. R. Harte, sponsor.

Mr. Wells was appointed chairman of a sub-committee to review existing standards. It was suggested that a representative of this committee review the subject of zinc coatings for steel, now under consideration by a sectional committee of the American Engineering Standards Committee.

Mr. Brown, chairman of the sub-committee on revision of the bibliography of heavy electric traction, stated that the work has been carried out by Prof. Warner. This work is now nearly complete as regards American references. A motion was adopted that the American portion of the work be completed. The subject of collection of data on branch-line electrification and self-propelled cars was continued, with A. H. Armstrong as chairman of the sub-committee. The study of train operation, with particular reference to articulated trains, was referred to a sub-committee, with A. H. Daus as chairman. A sub-committee was appointed to check up and revise the tabulation of mileage, car and locomotive data of electrified steam railroads, with Mr. Cope as chairman.

Valuation

A MEETING of the committee on valuation of the American Association was held at association headquarters, New York, on Dec. 15 for the purpose of organizing and laying out the work for the coming year. Those present were F. W. Doolittle, New York, chairman; Francis Blossom, New York; H. A. Clarke, New York; W. F. Downs, Philadelphia; J. A. Emery, New York; T. E. Francis, St. Louis; C. W. Gillespie, New York; L. R. Nash, Boston, and A. S. Richey, Worcester, Mass.

It was decided to continue the work which the committee has been carrying on for several years in clarifying the status of valuation work. Several new subjects were proposed and discussed. Their inclusion in the program for the year was left to the discretion of the chairman. The next meeting will be held in connection with the Midyear Meeting at Washington.

Power Generation and Conversion

A MEETING of the committee on power generation and conversion was held at association headquarters, New York, on Dec. 15. Those present were L. D. Bale, chairman, Cleveland; C. E. Bennett, Atlanta, Ga.; W. E. Bryan, St. Louis, Mo.; C. A. Butcher, East Pittsburgh, Pa.; H. W. Codding, Newark, N. J.; H. T. Connolly, Annapolis, Md.; N. R. Love, Denver, Col.; F. W. Peters, Schenectady, N. Y., and V. H. Mueller, representing G. W. Saathoff, New York, N. Y.

Discussion centered on the various subjects which had been assigned to the committee for consideration and report during the coming year. Plans were outlined for carrying on the work, and four sub-committees were appointed. In regard to automatic substations, it was decided to review last year's report and add new information, and also to devise a classification to take care of substations manually operated all the time or part of the time and to include substations having semi-automatic and full automatic protection. The subject of remote supervisory control is to be studied with a view of obtaining additional data in regard to systems used for recording and indicating loads. New developments in supervisory control are to be considered.

A program was laid out in regard to the subject of ventilation and noiseless operation of substations. It was decided that test data in regard to ventilation as affecting temperature were desirable, and the committee decided to lay out a system of tests that should be made so as to collect data. The intention is to have some very complete tests made at various railway properties. It was considered desirable to obtain a steel bolt specification, and the committee is to go over the field and obtain specifications where possible, in order to make definite recommendations.

G. W. Saathoff was appointed chairman of the committee to study existing standards and also of the committee to obtain steel bolt specifications; H. W. Codding was appointed chairman of the committee on automatic substations, and F. W. Peters was appointed chairman of the committee on ventilation and noiseless operation of substations. W. E. Bryan is chairman of a special committee consisting of members of the power generation and conversion committees and the power transmission and distribution committees to study and codify power failures.

Power Transmission and Distribution

THE organization meeting of the power transmission and distribution committee of the Engineering Association was held at the Engineers Club, New York, on Dec. 15 and 16. The following subjects were assigned to sub-committees for consideration:

Concrete pole design, F. McVittie, chairman; block signals, J. M. Waldron, chairman; catenary overhead construction, A. Schlesinger, chairman; composition and wear of trolley wire, H. S. Murphy, chairman; temporary connections to trolley wire, J. F. Neild, chairman; overhead construction for trackless trolley, F. McVittie, chairman; return circuit, J. Walter Allen, chairman; review of Manual sections, Adrian Hughes, Jr., chairman. D. D. Ewing, J. F. Neild and A. Schlesinger were appointed to represent the committee on the joint inductive co-ordination investigation.

It was decided to hold a meeting of the committee at Chicago some time in March and a final meeting in New York at the call of the chairman.

The first day's session was given over to a general discussion of the subjects for the year, after which the main committee meeting adjourned and the various sub-committees met to outline their work specifically.

Those present were C. H. Jones, chairman; J. Walter Allen, S. M. Day, J. H. Drew, Charles Gilman, H. W. Griffin, C. J. Hixson, C. L. Hancock, H. W. Cooke, F. McVittie, H. S. Murphy, W. J. Quinn, W. Schaake, A. Schlesinger, J. M. Waldron, F. J. White, J. C. Damon representing W. H. Bassett, M. B. Rosevear, sponsor, and G. C. Hecker, special engineer.

The News of the Industry

Atlanta Traffic Study Presented

Expert's Report Contains Several Unusual Suggestions—Moving Platform Among Them

Removal of all street car tracks on Peachtree and Whitehall Streets between Ellis and Mitchell Streets in the downtown section of Atlanta, Ga., and the installation of moving underground platforms for the transportation of pedestrians at an approximate cost of $2,500,000 are two of the principal items in the report of John A. Beeler, New York, who has been engaged for the past six months in making a traffic survey of Atlanta at the joint request of the City Council and the Georgia Railway & Power Company.

Other recommendations include the erection of viaducts over the railroad tracks at both ends of the old Union station at Pryor Street and Central Avenue; the rerouting of practically every street car line in the city; the establishment of a co-ordinated coach system to eliminate the jitney problem by operating buses in connection with the street car system; the widening of several principal streets and the creation of alternate trolley and automobile boulevards.

While exact figures on the recommendations have not yet been made public, it is understood that it will cost $10,000,000 to carry out all the changes recommended. According to Mr. Beeler his recommendations will, if put into effect, take care of Atlanta's traffic problem for at least 30 years.

The most unusual feature of the recommendation .is, of course, the proposed moving platform. The subway would be equipped with three continuous platforms. One set of platforms would run north on one side of the street and the other south on the opposite side. The inner walk would move at the rate of 6 m.p.h., the intermediate one at the rate of 4 m.p.h., and the outer one, or one nearest the stores, at the rate of 2 m.p.h.

According to Mr. Beeler it would be impracticable to widen either Peachtree or Whitehall Street. It is felt, however, that the elimination of the railway and the construction of the subway will not only solve the problem but will be a real advantage to merchants in the downtown section.

Mr. Beeler has also proposed the construction of alternate automobile and trolley boulevards. Present car lines would be rerouted on the adoption of this system, and the lines would go straight through town, some north and some south, looping in the suburbs to form a continuous system.

The four streets on which cars are to be operated would provide for one north and one south line on each of the principal thoroughfares, and this would do away with all of the loops, crossings and turnings in lines which make Atlanta's traffic situation a nightmare at present.

Another important recommendation is the operation of an auxiliary system of buses by the railway as the best means of meeting jitney competition. This section of the report contains a carefully worked-out plan for bus lines to supplement street-car lines.

The entire report is in eight sections. It includes recommendations on the moving sidewalk subway, the construction of the viaducts across the railway tracks, the creation of alternate automobile and street-car boulevards, the rerouting of car lines to form a simpler and more effective system, and the operation of bus lines to supplement street car lines and compete with jitney competition.

Business Will Be Improved by Reparations Settlement

Herbert Hoover and Owen D. Young Outline Results Expected from Adoption of Dawes Plan—Mr. Young Said Plan Could Not Have Been Adopted Without American Participation and Must Have American Co-operation to Succeed

COMMERCE will be restored, productivity increased and employment bettered as the result of the adoption of the Dawes reparations settlement. These results were predicted by Herbert Hoover, Secretary of Commerce, at a dinner held in New York City on Dec. 11 in honor of Owen D. Young, co-author and first administrator of the plan. This relief will apply not only to Germany, he said, but to the whole world.

The German reparations question had become one of the world's most dangerous inheritances from the war. The failure in its adjustment had poured an increasing stream of conflict into international life, carrying with it political jeopardy and economic demoralization. The wound to the present complex and intricate civilization was so deep and so vital that many had despaired lest statesmanship should be unequal to the task of curing the ills. Today there are many problems yet unsolved. None of them, however, is so dangerous as those that one by one have been met successfully in the six years since the armistice.

The payments provided in such settlements must find their substance from production and economic services rendered. These international obligations are huge burdens, but in the course of years burdens shrink as productivity grows. In a peaceful world international trade is doubled once in every score of years. It was contended that the world would break under the burdens of the Napoleonic wars, but about twenty years later they bore so lightly that their dangers were no longer discussed. The settlement to which Mr. Young contributed so much clears the atmosphere and the processes of industry and commerce will quickly provide strength to meet the burden, if the world keeps peace.

Manufacture and distribution on a vast scale, the foundation of present high standards of living, can be accomplished only through the development of great units of production, said Mr. Hoover. With their development have come innumerable problems of public relationship and public responsibility. A rapid evolution and perhaps a silent revolution are being witnessed to-day in the relationship of great business to the social system. The present struggle is to preserve the fundamental stimulus of action, of initiative, and competition, to hold open the avenues of opportunity. At the same time an effort is being made to gain the benefit of co-operative action. There is no greater responsibility than that imposed upon the headship of great industries, for from this leadership and vision must come not only great contributions to economic progress, but upon it depends the solution of the many social problems. Mr. Hoover said that Mr. Young has been the expression of this type of leadership.

The Dawes plan is strictly economic and has nothing military or political in it. This was emphasized by Mr. Young. He said the plan does not mean the completion of Europe's reconstruction. This is still in an initial stage. It begins to look, Mr. Young said, as if there were real hope of a new day in the world—a day in which human beings in all countries may live peacefully and develop and work and save. The plan could not have been created or adopted without America and it cannot succeed without the co-operation of the people of America. The agencies of American business must all co-operate in support of the plan. American men of commerce, industry, agriculture and finance must aid in the restoration of the credit and currencies of the principal commercial nations.

At one point in his speech, Mr. Young called for a definite foreign policy that would be free from "the horseplay of domestic politics." He said that such a policy would advance the peace of the world. As an alternative he suggested putting the State Department in a non-partisan position so that all citizens, including senators, could speak and act on foreign policies, "free from thought of the charge of being traitor to the political party of their affiliation."

The dinner was arranged by a committee headed by A. C. Bedford, chairman of the Standard Oil Company of New Jersey. Mr. Young was congratulated by Secretary of Commerce Herbert Hoover, Richard F. Grant, president of the Chamber of Commerce of the United States, and by the Prime Ministers of Italy, Belgium, Great Britain and France. Mr. Young's achievements as ad interim Agent General of Reparations Payments were recognized by the French Republic, which invested him with the cross of a Commander of the Legion of Honor.

George W. Wickersham, formerly Attorney-General, presided at the dinner to Mr. Young. A telegram was received from President Coolidge in which he said:

> The commission's work is now recognized as a great contribution to re-established economic order in Europe and the distinguished part which Mr. Young bore has earned for him the gratitude of people on both sides of the Atlantic.

Vice-President-elect Charles G. Dawes also sent his congratulations. Secretary of State Hughes telephoned his tribute from Washington. The remarks made by Mr. Hughes were relayed to the diners through a radio loud speaker.

Newspaper Misapprehension Corrected

Chicago Surface Lines Points Out Differences Between Chicago and Philadelphia Fares in an Effort to Correct False Impression Created by Editorial Comment

READERS of the Chicago *Journal* were advised in an editorial in the issue of Dec. 9 "to go back and walk around," a quoted passage from *Service Talks*, published by the Philadelphia Rapid Transit Company, "before they can be expected to grasp it." The passage was the one referred to in the ELECTRIC RAILWAY JOURNAL for Dec. 13 in which Mitten management and the 5-cent fare were discussed. The Chicago *Journal* suggested to its readers that "the spectacle of a street car management actually fighting for lower fares instead of high ones impresses the local straphangers as something fantastic—too good to be true." As the Chicago paper saw it, "Mr. Mitten was actuated by shrewd common sense as well as by regard for public convenience in taking the stand he did" on the 5-cent fare. Furthermore, the Chicago *Journal* said that the aid of the car crews in Philadelphia had been enlisted to such an extent "that Philadelphia got the street car habit more than any other city on earth."

G. A. Richardson, vice-president of the Chicago Surface Lines, felt that the editorial unintentionally gave a wrong impression and was extremely unfair to his company and to the riding public of Chicago. Mr. Richardson, who was vice-president of the Philadelphia Rapid Transit Company from 1919 to 1922, accordingly wrote to the editor to explain the situation. Mr. Richardson said in part:

> What Mr. Mitten wanted, to use his own words, was "a straight 5-cent fare with the elimination of all free transfers and 3-cent exchanges." You praise Mr. Mitten for this and apparently recommend it for Chicago.
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> The Chicago Surface Lines carried passengers last year at an average rate per ride of 3.88 cents. On the basis of a straight 5-cent fare, such as Mr. Mitten suggested, each passenger would have had to pay 5 cents every time he boarded a car, no transfers being issued. The earnings of the Surface Lines from passenger service last year amounted to $56,987,000. With the straight 5-cent fare which Mr. Mitten advocated for Philadelphia and which your editorial indicates would be welcome here, our gross earnings from this source, on the basis of total rides, would have been more than $71,285,000, or $14,000,000 more than we received, and as no transfers would have been required, we would have saved the cost of printing and handling them, amounting to about $200,000.
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> Your editorial also conveys the impression that the Philadelphia properties are paying enormous wages to their men, wages having increased 151 per cent. The Chicago Surface Lines pays its trainmen 75 cents an hour. At present the Philadelphia properties are paying 65 cents an hour, but a wage increase to 70 cents has been granted beginning Jan. 1, 1925, and in order to pay this wage increase Mr. Mitten applied for and secured from the Public Service Commission an increase in fare from 7 cents to 8, with tokens at 7½ cents.
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> You assert that Mr. Mitten opposed this last increase from 7 cents to 8 cents. On the contrary Mr. Mitten applied for the increase. In a letter to the Mayor of Philadelphia, July 21, 1924, he said: "Our present urgent need must therefore be now met by increasing the 7-cent cash, four-tickets-for-25-cents fare. A fare of 8 cents cash, two tickets for 15 cents is now required." A temporary order for the increase was issued by the commission on his plea and it was hastened by his assertion of an immediate emergency.
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> You also say that the riding per inhabitant in Philadelphia is more than in any other city on earth. There evidently has been some confusion in these figures. The issue of Mr. Mitten's *Service Talks* of Dec. 5, 1924, quotes a statement from the Boston News Bureau showing 381 rides per inhabitant in Philadelphia for last year. The same statement credits Chicago with 286 rides per inhabitant last year. The Chicago figure does not include the elevated system, which when combined with the Surface Lines brings the riding habit up to 356. The Philadelphia figure covering both elevated and surface lines includes 56,420,521 3-cent transfers and a number of zone fares, which are duplicate rides, and also some joint rate passengers. The true figure for Philadelphia on a comparable basis with Chicago should be 341 as compared with 356 in this city.
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> With the recent fare increase to 8 cents and tokens two for 15 cents, effective Sept. 25, 1924, the average fare per ride in Philadelphia in October was 5.40 cents. The average fare per ride on the Chicago Surface Lines is 3.88 cents.
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> It should be remembered that under the zone system in Philadelphia to ride, for instance, from the business district to Doylestown, a distance of less than 25 miles, a passenger must go through seven zones and pay a total of 38 cents. In Chicago on the surface lines it is possible to ride 35 miles for one fare of 7 cents.
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> It should also be remembered that it is impossible to transfer from one surface line to another in the downtown district in Philadelphia without paying a 3-cent transfer charge, and that in no case is a second transfer given. If one wants to transfer twice, the second time he must pay a full fare.
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> In Chicago a universal transfer system is in effect with practically unlimited transfers so long as the passenger is traveling in the same general direction.

New York Transit Inquiry Under Way

Justice McAvoy on the morning of Dec. 15 opened the hearing on transit matters in New York authorized by Governor Smith as a result of charges of neglect lodged with him against the members of the Public Service Commission by Mayor Hylan. The first witness called was George McAneny, chairman of the commission. He was on the stand all the first day of the hearing.

The second day of the hearing the special counsel for the Mayor withdrew, as did also the corporation counsel and the other attorneys for the city. This they did as a protest against the ruling by Justice McAvoy that they would not be permitted to cross-examine witnesses or to conduct examination of witnesses in an effort to sustain the charges against the commissioners. Later counsel for Justice McAvoy explained that the proceeding was an inquiry and not a trial and he cited as precedent for the action the cases of the investigation of the insurance companies and other similar proceedings.

At the opening session serious charges were made against the Mayor by the commission through Mr. McAneny. These comprised a brief signed by the three transit commissioners which reviews transit history since 1913, and particularly since the creation of the commission. It brings twenty-six charges, all showing alleged neglect, obstruction or deceit on the part of Mayor Hylan. The charges are specific, even mathematical. They allege a constant and expensive blocking of construction by the Mayor—construction of subway lines and subway car facilities. The failure of the city to fulfill its contracts for new lines, storage yards and repair shops is alleged to have held up $35,000,000 worth of facilities. In referring to the operation of buses under the jurisdiction of the city administration the brief of the commission charged that in "instances large payments have been made by the private operators to persons possessing political influence, through whose intervention such permits for operation had been secured."

On Thursday Commissioner Leroy T. Harkness testified in connection with the reorganization of the Brooklyn Rapid Transit Company into the Brooklyn-Manhattan Transit Corporation. It was alleged that the commission failed to compel the B.-M. T. and the Interborough Rapid Transit companies, operators of the city-owned subways, to set aside a proper amount of money for depreciation as provided for by the dual contracts.

John H. Delaney, chairman of the city Board of Transportation and formerly Transit Construction Commissioner, was another witness on Thursday. He disputed the testimony of Mr. McAneny that the transit companies were prevented from giving better service because of a lack of yards and declared it was not necessary to furnish "bedrooms" for all the cars. He added that he never had taken this defense of lack of yard facilities very seriously.

Strike on I. T. S. Settled

400 Miles Interurban Tied Up Six Days—Closed Shop Accepted, but No Hourly Wage Increase

Service was resumed on the lines of the Illinois Traction System, Peoria, on Dec. 13 at 5 p. m., following a strike which lasted six days. The men returned to work after a vote at which they approved the action of the executive committee of the union in agreeing to a compromise of the issues. The strike affected about 400 miles of railway. No effort was made by the company to operate trains.

The company maintained a conciliatory attitude throughout the entire proceeding. Business and civic organizations in several cities served by the company were unsuccessful in trying to persuade the trainmen's organization to submit the matter to arbitration. The company reiterated its willingness to settle on the basis of one of the original three propositions or to arbitrate the entire matter after the men had returned to work. These proposals were met with refusal in each case.

ARBITRATION PROVISION IGNORED

The committee representing the trainmen finally agreed to forego the demand for an increased wage. This left two points at issue—the closed shop and the question of time and one-half for overtime work. On the fifth day of the strike, a conference was again arranged by the trainmen's committee and officials of the Illinois Traction System, at which a tentative agreement was drawn up which included the provision that the trainmen drop their demand for increased wage but the company recognize the principle of the closed shop and agree to pay 10 cents an hour in addition to the regular pay for overtime work, and that in the future, pending negotiation and execution of a new contract, trainmen shall continue to work. This agreement, in the nature of a compromise on both sides, was referred back to the membership of the trainmen's organization for a referendum vote.

The strike followed action by the Amalgamated Association through its executive committee, issuing an order to the 350 motormen, conductors and brakemen employed to cease work at midnight on the morning of Dec. 7.

The contract under which the men had been working during the past year expired on Dec. 1. It provided for arbitration. Negotiations for a new contract began Nov. 26. The trainmen asked for an increase of 10 cents an hour in wages, a closed shop, time and one-half for overtime and a number of changes in the working conditions. The wage scale (in cents per hour) was as follows:

Motormen and conductors on freight runs	65
Motormen and conductors on sleeper runs	65
Passenger motormen and conductors promoted prior to Jan. 1, 1923	62½
Passenger motormen and conductors promoted after Jan. 1, 1923	60
Trainmen on branch lines	55 to 60

A nine-hour day prevailed in the passenger service and a ten-hour day in the freight service.

During the negotiations the company took the stand that business conditions and the financial situation in which the company found itself would not permit of a contract that would add to the expense of operation. The company also insisted that the committee of five men representing the trainmen be authorized to negotiate a contract.

The committee representing the men reported on Dec. 5 that the members of the trainmen's organization had taken a vote in favor of quitting work, if necessary, to uphold the demands of a new contract with increased pay and better working conditions. At the same time the committee notified the company that the men were ready to consider any offer the company saw fit to make, if made before midnight, Dec. 7.

A reply from the company on the morning of Dec. 6 followed in the shape of three different propositions:

1.—That the committee of five should have authority from the rank and file of our men to negotiate a new agreement; that pending such negotiations an agreement should be made continuing the last contract (except as to wages) until a new agreement should be made; that the wages finally agreed to should be retroactive to Dec. 1, 1924.

2.—While this company in its efforts to continue railway service in its territory has urgent need for reduced expenses and believes a new contract should carry with it lower costs, we are willing to co-operate to the extent of agreeing to the renewal of the recently expired contract for a period of from three to six months. This was later extended by the company to a full year.

3.—Believing that our position is fair and one that will stand honest examination we proposed that the committee and the company enter into an agreement to submit the entire matter to arbitration as arranged for in our last contract.

The trainmen's committee advised the company at 4 p.m. on Dec. 6 that none of the three propositions was acceptable and that unless the company agreed to the original demand by 10:00 p.m. the men would quit work at midnight. This was virtually a six-hour strike notice, taken by the committee without submitting the three company propositions to the members of the trainmen's organization for a referendum vote.

Track Changes Authorized in Mobile

Due to the fact that the Mobile Light & Railroad Company, Mobile, Ala., has been losing money for some time in railway operation, several changes in the trackage of its lines was allowed by the Alabama Public Service Commission at the meeting of that body held in Montgomery on Nov. 28.

The company was authorized to take up its track on the Wilkinson Street line and abandon service thereon. Permission was also granted to take up the tracks on old Government Street for a distance of three blocks. The commission's order also further provides that the company shall, in good faith, immediately take the necessary steps to operate cars over the Charleston-Beauregard and Cedar-Davis lines for the greater portion of the day on a 13-minute headway between cars.

The opinion of the commission was that when it was shown that a railway utility fails to earn a fair return on its investment, and such failure was not attributable to its fault, the utility should be allowed to make changes in its car tracks and rearrange and consolidate its service, if these changes would result in substantial reduction.

Resolution Urges Agreement on Cincinnati Loop

Fearing that continuation of a deadlock on the traction situation would jeopardize the success of the rapid transit loop of Cincinnati, Ohio, the Rapid Transit Commission passed a resolution, presented by E. W. Edwards, chairman, urging an early agreement with the city, the Cincinnati Traction Company and the Cincinnati Street Railway. In presenting the resolution Mr. Edwards stated that the time had come when it was necessary to negotiate a contract for the operation of the loop, in which $6,000,000 of the taxpayers' money had been invested. A large section of the loop would likely be ready for operation during the latter part of 1925, it was asserted.

Mr. Edwards stated that the commission had been led to believe that the controversy would have been adjusted long before now, so that there would be no obstacle in the way of making a contract for the loop. He also called attention to the fact that the car riding public, on the basis of the present rate of fare, was called upon to pay approximately $2,500,000 annually. If the controversy were taken into the courts, as the Mayor had threatened to do, the people would be deprived of the service of the loop for several years.

Baltimore Wage Increase Restores Peak of 1920

An increase of 2 per cent in the wages of its employees in operating departments was granted on Dec. 10 by the United Railways & Electric Company, Baltimore, Md. The increase, effective Jan. 1, will affect approximately 5,000 men.

The revised wage schedule briefly referred to in the ELECTRIC RAILWAY JOURNAL issue of Dec. 13, was announced at the annual meeting of company executives with representatives of the workers' organization, the United Railways Association of Baltimore. For platform men the increase will amount to about 1 cent an hour, making their minimum wage 47 cents an hour and the maximum 52 cents an hour, as compared with the present minimum of 46 cents and a maximum of 51 cents. The advance will add $155,000 to the company's annual payroll, officials said.

The wage question is but one feature of the working agreement under which the company and its employees operate, and the recent renewal of the agreement was the sixth since its inauguration.

An increase equivalent to the one just announced was granted last year. These increases restore wages to the peak point at which they stood in 1920, when 2 cents an hour was chopped off. They represent an increase of 18 cents since early in 1918, the last days of the 5-cent carfare.

Madison Company Files Increased Fare Petition

An application for an increase in fares to become effective Jan. 1 was made to the Wisconsin Railroad Commission on Dec. 5 by the Madison Railways, Madison. This application followed a meeting of a committee of the commission and the company which was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 6. The company asks for an average fare of 7 cents, although in previous meetings the plan of having an 8-cent cash fare with 17 tickets for $1 had been discussed.

The increase in fares is made necessary by the improvement plan which the company contemplates carrying out. In order to put through the present plan fully $700,000 is needed. Of this $700,000 it is estimated about $400,000 should be for replacement and $300,000 to capital account. Additional earnings of $80,000 are required for the completion of the program.

Part of the increase will be used to provide for an increase in the wages of the company's employees. It is planned to provide about $10,000 a year for this purpose. Several years ago the men accepted a wage cut of 3 cents an hour in order to keep the line in operation.

With an 8-cent cash fare and 17 tickets for $1 and taking into account the receipts of the company for last year, it was estimated that the additional revenues would range from $63,700 to $93,100, depending on the percentage of ticket sales. Last year the proportion of the gross receipts from cash fares was 60 per cent and that from tickets 40 per cent.

Cleveland Men Reject Stanley Offer

Motormen and conductors employed by the Cleveland Railway, Cleveland, Ohio, at a secret ballot box referendum, Dec. 18, voted down a proposition offered them by John J. Stanley, president of the company, as a means of terminating all differences existing between the company and the union. His offer included the following terms:

1. The term of the contract between the company and the union to be definitely fixed at five years and to extend from May 1, 1925, to April 30, 1930.
2. In case arbitration of grievances is continued, the appeal for arbitration must be taken from the decision of the general manager. In case grievances are still left to the president or vice-president for decision, this is to be final and not subject to the determination of a board of arbitration.
3. The scale of wages to be: 60, 63 and 65 cents per hour, with differentials as at present, from Jan. 1, 1925, to April 30, 1926.
4. The past records of all employees to be cleared as of Jan. 1, 1925.

This offer means a wage increase of 5 cents an hour to the men and makes definite for a period of five years the closed shop contract now existing for an indefinite period. Officials of the union agreed to submit Mr. Stanley's proposition to the men without recommendation on their part.

The Common Pleas Court some time ago threw out the award of a board of arbitration that granted the men a 12-cent an hour increase dating back to May 1 of this year. An appeal from this decision is now pending in the Court of Appeals. If the men accept Mr. Stanley's new offer, it means that the court action likely will be terminated.

Indicted Men in International Wreck to Stand Trial

Seven men who were indicted in January by the Niagara County grand jury in connection with the theft of dynamite alleged to have been used to destroy the Buffalo-Niagara Falls high-speed line of the International Railway at Ellwood Station on Aug. 14, 1922, will be placed on trial in Lockport on Dec. 22. Judge Charles Hickey of Niagara County has appointed Abner T. Hopkins as special attorney to prosecute the defendants, most of whom are former employees of the traction company.

Col. William J. Donovan, deputy attorney-general of the United States, who prosecuted the striking trainmen in the federal court at Buffalo, including former State Senator Robert Lacey, who pleaded guilty, will submit additional evidence in the dynamite case to the federal grand jury in Buffalo later this month. For more than a year Burns detectives and special agents of the United States Department of Justice have been investigating charges that high officials in the ranks of organized labor were responsible for the dynamiting. At least seven more indictments are rumored. Rewards totaling $100,000 are still offered by the International Railway for evidence in the case. Forty-two tourists were injured.

Providence Men Explain Wage Attitude

Union employees of the United Electric Railways, Providence, R. I., have explained in a letter recently delivered to E. J. Dickson, vice-president of the railway, their attitude on the wage controversy, especially on the manner of arbitration. The contents of the letter were not made known. The contract with the men expired on Oct. 31. Prior to that date the employees submitted a draft of a new wage and working agreement which called for a general increase amounting to 14 cents an hour. The present scale is 56, 59 and 61 cents. In a letter answering the demands of the union the company stated that in order to advance wages 14 cents an hour it would be necessary to raise the fare to 13 cents cash and suggested an agreement based upon a reduction of the wages of the platform men of 5 cents an hour or a rate of 56 cents. Following the rejection of this offer by the men the company made it clear that if arbitration were resorted to the award "should be determined upon the evidence presented by the company of its ability to pay a reduced scale, the present scale or an increased scale and such determination should be based upon the resources of the company as of Nov. 1, 1924." The demands of the men were referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 18.

News Notes

Advance Plan for Westchester Construction.—The Westchester County Transit Commission has proposed a $150,000,000 plan for rapid transit construction providing through trains from Westchester to lower Manhattan. The scheme would abandon the Grand Central Terminal for suburban passenger service.

May Electrify Line.—The Pittsfield-Maysville branch of the Wabash Railroad will not be operated by that road after Dec. 31, the date on which its present contract with the county expires. Engineers of the Central Illinois Public Service Company, Springfield, Ill., have been inquiring into the possible use of electricity.

Teamed for Seventeen Years.—*Surface Service*, the magazine of the Chicago Surface Lines, is promoting a contest to determine what conductor and motorman have teamed up together longest. The contest began with a challenge from one pair who have worked together for 17 years. They are Conductor Charles Levighn, 33 years in the service, and Motorman Maurice O'Connell, an employee since 1881.

Utility Courses at Oregon University.—Another university to adopt the plan of offering courses of study in public utilities is the University of Oregon at Eugene, Ore. This course is similar to those adopted by such Eastern universities as Harvard, Pennsylvania, Northwestern, Illinois and others. The courses are offered to provide modern instructional work for men and women who are looking for careers in the industrial world.

Fare Hearing Continued. — The application of the Oklahoma Railway, Oklahoma City, Okla., for a 10-cent fare, set for Dec. 6, was deferred to Dec. 8 over the objection of the company. On Dec. 8 Mayor Cargill declared the city would encourage buses on all streets occupied by the company if the increase were granted. The commission continued the hearing to Jan. 16. John W. Shartel, president of the company, then declared justice delayed is justice denied and said the bondholders must protect themselves. Early action is, therefore, expected in the federal receivership case which is now pending.

Turnstiles in Use.—Two automatic turnstiles were put into operation at the Sixty-ninth Street Terminal of the Philadelphia Rapid Transit Company, Philadelphia, Pa., on Dec. 14 in order to determine the adaptability of this type of equipment to the Market Street subway-elevated system. Two different types of turnstiles are used. They can be operated by inserting a 7½-cent token and their use is expected to speed up the service materially by expediting the handling of passengers at this location. General use of the new car-fare carriers by elevated passengers, eliminating the necessity of frequent change-making, will work still further to the advantage of the company's patrons because of this new development. One turnstile resembles the turnstile used by the Interborough Rapid Transit Company and the other that in use in the Brooklyn-Manhattan Transit Corporation's stations.

Seeks Amendment of Paving Obligations.—Anticipating renewed efforts at the coming session of the New Jersey Legislature to procure enactment of a law relieving street railways from the obligation to pave parts of streets in which they operate, Secretary Sedley H. Phinney of the State League of Municipalities has sent a communication to the New Jersey Board of Public Utility Commissioners asking that body to present to the Legislature a definite recommendation for modification of paving obligations. Mr. Phinney said that municipalities would be substantial sufferers if such a measure as proposed at the last session were to become a law.

One-Man Cars for Night Service.—One-man cars are planned by the Third Avenue Railway, New York, for its night service on its lines in Manhattan and the Bronx. The extent of the service with this type of equipment remains to be determined.

Wants One-Man Car Service.—The Boise Valley Traction Company, Boise, Idaho, has petitioned the Public Utilities Commission for permission to install one-man cars on the South Boise line. R. B. King, general manager of the railway, stated that unless such economy could be made, which would result in large savings in the cost of operation, the Boise Valley Traction Company would be forced to suspend business. He said further that on the South Boise line in 1920 there was a deficit of $4,255, in 1921 the deficit was $4,560, in 1922 it was $2,850 and in 1923 it was $4,589. For the first four months of the current year the line was running behind $1,088.

Early Morning and Owl Services.—The Grand Rapids Railway, Grand Rapids, Mich., has started an early morning service for the accommodation of factory workers. The service starts at 5:45 a.m. and is so routed as to enable men who formerly had to walk to work to go by street car. The service has been started on one route as an experiment. The plan will be extended to other lines as its success becomes apparent. It is also planned to re-establish owl service.

Ordinance Proposes Bus Lines. — Under an ordinance recently introduced by the City Council the Jacksonville Traction Company will be authorized to operate bus lines through the Riverside section, a portion of Jacksonville, Fla., not being served by street cars. The proposed line in this new territory will be between 4 and 5 miles in length and served by six buses charging a 10-cent fare. If the ordinance is adopted the company will purchase Birney safety type buses.

Paving Dispute Terminated.—The long controversy between the United Traction Company and the city of Albany as to the cost of the pavement of Western Avenue, on which the United Traction Company operates over a privately owned right-of-way, has been settled, it was announced by Mayor William S. Hackett of Albany on Nov. 19. The city of Albany will enter into an agreement with the United Traction Company whereby the latter will be granted a franchise extending over a period of years for the operation of trackless trolleys on Western Avenue, Allen Street, across Central Avenue and over Watervliet Avenue in return for feeing to the city the 33-ft. right-of-way in Western Avenue. Paving the deeded right-of-way will be started next spring, Mayor Hackett announced.

New Bus Lines Opened.—The Central Transportation Company, a subsidiary of the Trenton & Mercer County Transportation Company, Trenton, N. J., has opened up three new bus lines. One is running to Princeton and Kingston, a distance of 14 miles; another to Trenton Junction, 4 miles, and the third along the White Horse Road, 5 miles. The company has placed a luxurious motor coach in service between Trenton and Asbury Park.

"Service" as You Ride—Every two weeks, on Saturday morning, the Indiana Service Company, Fort Wayne, Ind., places in its street cars and distributes to its employees a folder known as "Service." In the premier issue of this paper, under date of Sept. 27, the company announced that it was dedicated "To Your Daily Journey, which we are trying to make safer and more comfortable." The folder is a four-page sheet of convenient size containing some valuable information on city and interurban service and offering a few jokes as entertainment for its readers while they ride. The pamphlet invites criticisms along suggestive lines to bring about a better understanding between the company and its patrons.

Want Employees Protected.—Protection of employees of the Kansas City Railways, Kansas City, Mo., will be sought in the offering of $200 rewards by the receivers for conviction and arrest of reckless drivers. As it stands now, $200 will be paid for arrest and conviction of drivers of motor cars who injure or kill patrons of the railways while they are about to board, are leaving cars or are assembled in safety zones waiting for street cars.

Higher Bus Fees Proposed.—Higher license fees for buses and jitneys are proposed in an ordinance just introduced in the Indianapolis, Ind., City Council in which the maximum charge would be increased from $100 to $250 annually. The ordinance provides that bus companies should not be required to file a bond with the city, but provide insurance policies of $10,000 to $20,000, depending on the size of the bus.

Electric Line Will Supplant Steam Railroad.—The Chicago, Burlington & Quincy Railroad has asked the State Public Utilities Commission for permission to discontinue the operation of passenger trains between LaFayette and Denver. Instead it will operate two trains daily between Louisville and Lyons and then transfer passengers for Denver and intermediate points to the "Kite" Route, the electric railway operating between Denver and Boulder via Louisville. LaFayette is an intermediate point on the steam railroad Denver to Lyons. The suggested change would give the citizens two trains daily between Lyons and Denver, instead of one. The Chicago, Burlington & Quincy Railroad has been operating for years between Denver and Lyons, Colo.

Gives Up Claims Following Payment.—The municipality of Peoria, Ill., has accepted $17,000 in settlement of its paving assessment claims against the defunct Aurora, Plainfield & Joilet Electric line and bondholders' representatives relinquish all claims to the tangible assets within the city's limits. This portion of the plant is to be removed by the city, and it is expected this will settle the involved financial affairs of the defunct traction line. The city has had negotiations with the Northwest Utilities Company of Montana to operate cars over the line, but these were fruitless. Bus lines are expected to be authorized to supplant the suspended lines.

Considering Bus Lines.—The Wisconsin Public Service Corporation, Green Bay, Wis., has under consideration plans for the establishment of bus and motor truck rapid transit lines to radiate out of Green Bay to reach each of the principal cities and villages in northeastern Wisconsin. If carried out, the plan will require an initial investment of between $200,000 and $300,000 for rolling stock, depots and other equipment for this business. Complete data are being collected and examined by the company's transportation experts.

Bus from Lansing to St. Johns.—A permit has been granted the Michigan Electric Railway, Jackson, Mich., to operate a bus line from Lansing to St. Johns over a new paved road connecting the two cities. Application from Wilfred J. Richards to operate a bus line from Lansing to Jackson was refused on the showing of the railway, which contended that its present interurban service between the two points is sufficient to care for the traffic. The railway also sought a bus permit. It contended that if a permit was granted it should receive preference and be allowed to run the buses in connection with its interurbans. The commission decided that traffic was adequately provided for by the railway.

Side Signs in Knoxville.—All cars of the Knoxville Power & Light Company, Knoxville, Tenn., will in the near future be equipped with signs on the sides as well as the front and rear in deference to public requests.

Must Submit One-Man Car Data.—The Public Service Commission, under an order adopted at a session in New York Dec. 15 and served upon the International Railway, Buffalo, will give a hearing at the Buffalo office of the commission on Dec. 29 in the matter of one-man car operation in the city of Buffalo. The commission's order directs the company to submit testimony covering regulations, practices and equipment in respect to the operation of one-man cars; the lines operated as one-man car lines in the city of Buffalo; the number of cars operated and the headway maintained on each line; the number of passengers carried; the number of accidents which have occurred since Jan. 1, 1924, and the cause or causes of such accidents.

Financial and Corporate

New Reorganization Plan

$296,000 Will Be Provided Under the Revised Scheme for Massachusetts Interurban

A new plan, dated July 16, 1924, has been prepared and is being forwarded to security holders of the Boston & Worcester Street Railway and the holding company, the Boston & Worcester Electric Companies. More than 90 per cent of the first mortgage 4½ per cent bonds of the Boston & Worcester Street Railway due Aug. 1, 1923, were deposited under the plan of reorganization formulated when they matured, but it was felt that the bondholders did not make the required response.

In brief, the new plan provides for the exchange of $2,460,000 first 4½s, 1923, and $60,000 Framingham, Southborough & Marlborough Street Railway extended 7s, 1923, for new first mortgage 20-year bonds dated Aug. 1, 1924. Bondholders who subscribe $140 a bond for 10 shares of additional common stock will receive 6 per cent bonds in exchange for their present holdings, non-subscribing bondholders will receive 5 per cent bonds. This subscription right will be subject to the subscription privilege offered preferred shareholders of the Electric companies of subscribing for one share of railway common at $14 for each two shares of Electric companies preferred held. By these subscriptions $296,940 cash will be provided for improvements.

In addition to subscribing for common stock for cash the Electric companies will exchange $47,000 of notes and $60,000 of preferred stock of the railway for common stock of the latter par for par. The banks which hold $115,000 notes of the railway will accept 10-year 6 per cent income bonds. Preferred shareholders of the railway will waive accumulated dividends and exchange their stock for a new issue of 6 per cent preferred stock which will become cumulative upon retirement of the income debentures. Bondholders will receive accrued and unpaid interest on their bonds at 4½ per cent to Aug. 1, 1924.

It is said that upon completion of a study of operating conditions of the property now in progress it is possible that one or more branches may be abandoned, or buses substituted.

Portland, Ore., Will Sell Car Line

The city of Portland, Ore., has announced that on Jan. 15 City Treasurer Adams will sell to the highest bidder the Kings Heights car line, for delinquent assessments and taxes, amounting to $11,669, dating from Dec. 6, 1913. The line is operated by the Portland Electric Power Company as an accommodation to the people of the district, without franchise or title to the property, and is declared to be daily losing money. It is doubtful if the company will want to put in a bid.

The car line was built shortly after the city granted the franchise to the Heights Trust Company on July 28, 1910, to operate until Dec. 31, 1932. The franchise provided that connections be made with the lines of the Portland Electric Power Company and transfers be made over both lines. The Heights line is to pay the city $500 a year as a franchise fee, and the estimated cost of construction of the line at the time of granting the franchise was $20,000. The Heights Trust Company met financial reverses and the Portland Electric Power Company finally took over the operation of the line because many of its patrons of other lines lived on Kings Heights.

Two Chicago Appraisal Engineers Selected

Major R. F. Kelker, Jr., Chicago, an expert in the service of many big cities and formerly in the employ of the city of Chicago, and William J. Hagenah, Chicago, another engineer well known nationally, have been selected as two of the engineers to make a valuation of the surface lines there. Major Kelker was selected by the city and Mr. Hagenah by the bankers acting for the owners. They will jointly select the third member of the board.

Eight-Cent Fare at Denver Upheld by U. S. District Court

Valuation $23,514,769 for Rate Making—Additional Value of $2,000,000 for Perpetual Easements in Streets Excluded from Rate Base—Court Holds "Ordinarily, Reproduction Cost New Less Depreciation Is the Dominant Factor in a Present-Valuation Inquiry"

JUDGE ROBERT E. LEWIS of the District Court of the United States for the District of Colorado on Dec. 13, 1924, handed down a decision in the Denver Tramway valuation and rate of fare case. He fixed the value of the property for rate-making purposes at $23,514,769 and made permanent the present 8-cent cash fare (with 7½-cent ticket fare) and approved the 7½ per cent rate of return allowed by the special master in chancery.

This is the first large street railway to conduct a confiscation case originating in the United States court that necessitated the presentation *de novo* to the court of all details of inventory and valuation with detailed testimony as to the principles of valuation adopted with respect to the basis of reproduction costs, depreciation and the cost of development as measuring the going concern value of electric railway properties. Usually the valuations are fixed by the Public Service Commissions and reach the federal court only on appeal.

The decision disposes of four important items of controversy between the municipalities and the street railway companes and gives judicial interpretation to points that have been

COMPARATIVE VALUATIONS OF DENVER TRAMWAY

Valuation as fixed by decision of United States District Court compared with A. L. Drum & Company valuation as of Dec. 31, 1922, based on unit prices as of Dec. 31, 1922, after deducting items specifically excluded by master and with D. F. Wilcox valuation based on normal reproduction cost for the city of Denver.

	D. F. Wilcox, Normal Reproduction Cost	A. L. Drum & Company, Dec. 31, 1922, Valuation Less Items Excluded by Master	Decision of U. S. District Court
Land and right-of-way (exclusive of water rights)	$428,016	$1,107,024	$992,795
Track	2,906,544	5,347,255	5,121,715
Bridges	478,258	856,231	810,963
Paving	725,632	1,412,005	1,342,524
Electrical distribution system	776,691	1,075,769	1,054,316
Rolling stock	2,365,644	4,445,233	4,198,258
Power station equipment	746,504	1,598,098	1,504,809
Substation equipment	184,015	256,138	249,412
Shop equipment, tools, etc	265,107	391,514	391,514
Buildings	1,520,361	2,510,803	2,356,000
Furniture and fixtures	82,584	174,716	144,918
Total inventoried property	$10,479,356	$19,174,786	$18,167,224
General stores	....	507,599	507,599
Working capital	....	239,394	239,394
Cost of franchise	....	284,100	100,000
Engineering and superintendence	355,605	998,325	970,783
Administration, organization and legal expense	818,569	953,010	839,760
Taxes	54,175	325,220	325,220
Interest	343,554	2,669,165	1,664,889
Total physical property	$12,051,259	$25,151,599	$22,814,869
Accrued depreciation deducted	4,836,031	2,436,915	2,250,000
Physical property less depreciation	$7,215,228	$22,714,684	$20,564,869
Intangibles:			
Cost of financing	....	1,301,455	.....
Water rights	....	290,622	49,900
Going value	....	4,000,000	2,900,000
Total value for rate making	$7,215,228	$28,306,761	$23,514,769
Value of right-of-way on streets under perpetual easement	....	$2,000,000	$2,000,000

seized upon by the representatives of municipalities in order to depreciate and lower the values of traction properties.

The decision clearly establishes:

1. That great weight should be given to reproduction cost at present-day prices.
2. That a fair allowance for general overheads should be made.
3. That accrued depreciation should be deducted only to the extent actually found existing in the physical property, by the inspection of the property.
4. That a definite going value exists in a street railway property and must be included for rate-making purposes.

The decision on these four important items is especially clear. The court said:

> Ordinarily, reproduction cost new less depreciation is the dominant factor in a present-valuation inquiry. S. W. Bell Telep. Co. vs. Pub. Serv. Comm., 262 U. S., 276; Bluefield Co. vs. Pub. Serv. Comm., 262 U. S., 679; Monroe Gas Light & Fuel Co. vs. Mich. Pub. Util. Comm., 292 Fed., 139; Van Wert Gas Light Co. vs. Pub. Util. Comm., 299 Fed., 670.
>
> Accrued depreciation is a fact to be ascertained by inspection.
>
> There remains to be added an amount for going concern value. . . . I am firmly of the notion that each of these witnesses knew much more than I do about what it would probably cost to put a skeleton street railway plant in successful operation. I am sure they each knew a great deal and I see no escape from accepting the lowest amount named in the testimony, $2,900,000, which, added, brings the valuation of the plant to $23,514,769.

ALLOWANCE FOR PERPETUAL EASEMENT

The court allowed additional value of $2,000,000 for perpetual easements or right-of-way in the streets under the Denver franchises of 1885 and 1888 as being property value. It stated:

> No one doubts that the easements, whatever their duration or terms may be, are property, and property of value, and that they inhere in and are indispensable to the other property rights of the company. They lie in grants and are the foundation of all other rights. They are of such import, both to the company and the public, that, having been put in issue, I think their duration and value should be now adjudicated, though it be finally held, as the master held, that their value cannot be brought into the rate base. . . .
>
> The terms used in both ordinances, 1885 and 1888, are appropriate to grants in perpetuity. There are no express limitations and no language is used from which an implication can arise that a less estate was intended than the general terms signify. The nature of the transaction, its purposes, its permanent character, and the investment required of the grantees repel an intention by either grantor or grantee that they were revocable licenses or easements at the will of the grantor, nor can any expression be found in either ordinance supporting a claim that the rights granted were to be for a term of years.

This comment has been interpreted to mean that in the event of condemnation for purchase of the property the company would be entitled to an allowance of $2,000,000 for the perpetual easements on the streets of Denver. The court, however, excluded this amount from the value for rate-making purposes.

The court sets forth at length in the decision the respective qualifications and practical experiences of Delos F. Wilcox, appraiser for the city of Denver, and A. L. Drum, valuation engineer for the Denver Tramway, stating as follows:

> I think it clear beyond question that there was a total failure to qualify this witness (Delos F. Wilcox) as an expert and that it was error in matter of law to permit him to testify as an expert.

A tabulation published herewith gives by classified items a comparison of the values of the property as found by the court, A. L. Drum, representing the Denver Tramway, and Delos F. Wilcox, representing the city of Denver.

It will be recalled that Judge Dubbs as special master fixed the value of the property at $20,105,707. His findings in the case were reviewed at length in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 13, page 406. In his review of the case the special master said that the burden of proof was on the company.

Ohio Traction Company Stock Active

A rise of ten points in the preferred stock of the Ohio Traction Company, Cincinnati, Ohio, has taken place during the last three weeks. This activity is attributed to heavy purchases by Eastern capitalists. The Ohio Traction Company owns and controls the stock of the Cincinnati Traction Company, which operates the system under lease from the Cincinnati Street Railway. The company pays a dividend of 5 per cent. The heavy buying of the stock is attributed to the fact that the Ohio Traction Company has wiped out its indebtedness and now is in a position to resume the payment of dividends, which were discontinued in November, 1915. At that time the preferred was quoted at 55 on the Cincinnati Stock Exchange. Such well known New York brokerage firms as W. H. Harriman & Company have been buyers.

It was stated that if the traction interests and the city of Cincinnati were unable to reach an agreement over a new franchise, the Ohio Traction Company was willing to pay back franchise taxes from the time it started to raise fares above the level of 7½ cents. This would amount to $437,500, which would include the year of 1924 and the last quarter of 1923. In the event that the city is unable to effect an agreement with the traction interests before the advent of 1925 it is possible that the traction company will make a proposition to the city which will embody the payment of the back franchise tax and the keeping of fares at their present level, 10 cents. On the other hand, should the city take the matter into the courts this would involve long litigation, permitting the traction company to control the system for an indefinite period. At the present rate of fare the traction company would accumulate a surplus in the course of time, which would react to the benefit of the car rider.

New Personnel for Oklahoma Property

Officers of Albert Emanuel & Company, New York, N. Y., have been elected to the Pittsburg County Railway, McAlester, Okla., following the purchase some time ago of that property by the Emanuel interests. At the same time that the railway was taken over the Emanuel people took over the Choctaw Power & Light Company. These two properties are now included in the holdings of the Southwestern Power Company, which operates in the Oklahoma district. The new officers are as follows: President, Albert Emanuel; vice-president, Victor Emanuel; vice-president, general manager and head of purchasing department, G. W. Skow; secretary, Floyd H. Harper; treasurer, C. B. Zeigler; assistant treasurer, F. R. Merris; superintendent of railway, J. M. Putnam; district superintendent, H. B. Harris; chief engineer, H. T. Asbury; head of traffic department, A. R. Goodner, and chief engineer of the power plant, M. P. York.

The new owners of the property have proceeded with the work of rehabilitating the Pittsburg County Railway and have carried out important replacements and reconstruction. The road is in a territory that affords considerable freight and is said to be doing very well from the standpoint of the freight earnings. The line is 26 miles long.

Chicago Probably Leads Country in Riders per Capita

Detailed figures on car riding habit in the leading cities of the United States compiled by the Chicago Surface Lines place New York, Chicago and Philadelphia in the lead in that order on a basis of actual passengers carried. An explanation states that a division of the New York revenue passenger figures, if available, would reveal that many of the fares paid represent a duplication of the same person changing from one line to another where there is no transfer privilege.

The figures stand as follows:

No. of Rides per Capita Daily:	
New York	1.21
Chicago	1.03
Philadelphia	0.89

The Chicago figure is based on the United States census population of 2 936,605 and the following monthly revenue passengers:

Surface lines	70,543,501
Elevated	18,154,400
Motor coach	5,029,875
Total	93,727,776
Daily average revenue rides	3,023,476
Excess of rides per day over population	83,871

For New York, the revenue rides of the last calendar year, 2,623,793,713, were divided into a daily average of 7,188,475 as against a population of 5,927,625, showing an excess of rides over population of 1,260,850.

In Philadelphia the revenue rides, exclusive of 3-cent transfers, zone fares and joint rate passengers, was placed at 53,870,920 for October, a daily average of 1,737,771. The population, 1,951,076, used as a divisor, shows 0.89 of a ride per day per capita, or 213,305 fewer rides daily than population. In these figures, 160,000 population outside the city was included. The number of passengers was arrived at by subtracting 56,420,521 3-cent transfers. By counting in 3-cent transfers as separate revenue passengers, Philadelphia is placed in the lead in the "riding habit."

The figures were based on research directed by J. V. Sullivan, assistant to the vice-president of the Chicago Surface Lines. They are sponsored by Guy A. Richardson, vice-president and general manager of the Chicago Surface Lines.

$2,700,000 of P.R.T. Equipment Trust Certificates Offered

Dillon, Read & Company, New York, offered for subscription on Dec. 16 $2,700,000 of 5½ per cent equipment trust certificates of the Philadelphia Rapid Transit Company. The certificates mature serially from 1925 to 1934 and were priced to yield approximately 4.75 per cent to 5.50 per cent according to maturity.

The bankers explain that the certificates are to be issued by the trustee in part payment for new equipment consisting of 100 standard double-truck vestibuled cars, 125 double-deck motor coaches, 77 single-deck motor coaches and 11 motorized service units. This equipment will be constructed at a total cost of not less than $3,772,000. The par value of the certificates represent approximately 75 per cent of the cash cost of the railway cars and less than 70 per cent of the cash cost of the motor vehicles.

Raleigh Company Reorganized

The Carolina Power & Light Company, Raleigh, N. C., recently acquired by the J. G. White Company, has been reorganized. The following officers were elected: P. F. Henderson, president; W. W. Muckenfuss, secretary; M. H. Hendee, treasurer, and Harry Sudlow, manager. The board of directors is composed of P. F. Henderson, W. W. Muckenfuss and Charles J. Hill of Aiken, and George T. Jackson and F. B. Culley of North Augusta.

Toronto Purchase Price Finally Settled

Final settlement has been reached between the city of Toronto and the Toronto Street Railway regarding the purchase of the latter's properties by the municipality. The cost to the city is $13,679,242. The award of arbitrators, as finally settled by the Privy Council, was $11,483,500. Interest on this is $1,550,000 and legal charges $700,000.

$7,000,000 North Shore Issue Offered for Subscription

First and refunding mortgage bonds of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., to the amount of $7,000,000 were offered for public subscription on the morning of Dec. 19. The offering syndicate was headed by Halsey Stuart & Company, Inc., and the National City Company, New York. The bonds are dated Jan. 2, 1925, and are due Jan. 1, 1955. They carry 6 per cent interest and were offered at 98 and interest to yield 6.15 per cent. The present issue is known as series A. It is explained that the proceeds from the sale of the bonds will be used to refund $3,500,000 of one-year notes due June 15, 1925, issued in connection with the construction of the first section of the road to Waukegan, for the retirement of $2,721,700 additional principal amount of the company's refunded obligations, and for other corporate purposes. In the letter of the railway to the bankers giving the facts with respect to the purchase of the bonds by them the point is emphasized that the railway won the Coffin prize in 1923 awarded for its distinguished contribution to the electric railway industry. The bankers, in turn, call the attention of the investing public to this fact.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week 100 shares of Helena Light & Railway Company, Helena, Mont., preferred, $10 per share, and 20 shares of preferred, $15 a share. Also 250 shares Third Avenue Railroad, New York, $14 a share.

Approves Issue for Refinancing.—The Public Utilities Commission has approved the application of the Washington Railway & Electric Company, Washington, D. C., to issue $1,850,000 of its general and refunding mortgage 6 per cent 10-year gold bonds made a short time ago. The issue is for the purpose of refinancing the utility's obligations, specifically a loan of $1,850,000 of Metropolitan Railroad Company first mortgage 5s which mature on Feb. 1.

Bonds Offered—A syndicate including E. H. Rollins & Sons is offering at 97 and accrued interest to yield more than 5.70 per cent $5,000,000 of the first and refunding mortgage 5½ per cent gold bonds of the Illinois Power & Light Corporation, Chicago, Ill. The bonds, known as series "B," are dated Dec. 1, 1924, and are due Dec. 1, 1954. The proceeds will be used to reimburse the treasury in part for expenditures on account of additions, extensions and improvements which have been made or are to be made to the properties and for the retirement of $157,500 underlying bonds.

Debenture Bonds Offered.—Bodell & Company, Providence, R. I., are offering at 91 and interest, yielding 6.70 per cent, $2,500,000 of the 30-year debenture gold bonds of the Federal Light & Traction Company, New York, N. Y. The bonds, known as Series "B," are dated Dec. 1, 1924, and are due Dec. 1, 1954. The proceeds of these debenture bonds will be used to retire any outstanding unconverted series "A" 7 per cent debentures which will be called for payment on March 1, 1925, and for extensions and improvements made or to be made to the properties of the operated companies.

Urged to Deposit Bonds.—The committee for the holders of first mortgage 6 per cent 10-year gold bonds of the Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., has announced that the time for the deposit of the bonds expires Jan. 10 next. The bonds became due Aug. 1, 1924. There is now on deposit a majority of the bonds.

Asks Revaluation.—When the petition for an increase in rates on the line of the Richmond & Petersburg Interurban Railway came up before the State Corporation Commission, on Dec. 3, counsel for the citizens who are opposing the Virginia Railway & Power Company's application insisted on a revaluation of the interurban line. The commission heard the motion to revalue the property and gave both parties ten days in which to file briefs. The present fare from Richmond to Petersburg is 47 cents and the fare sought is 60 cents.

Shareholders Made Offer.—A committee has been formed for the purpose of arranging a sale of the preferred and common shares of the New Hampshire Electric Railways, Haverhill, Mass., and has received an offer of $32 per share for the preferred shares and $3 per share for the common shares. The offer has been accepted by the owners of upward of 50 per cent of each class of shares and the committee recommends the acceptance of the offer by all shareholders. The shareholders desirous of accepting the offer must deposit their shares on or before Jan. 5, 1925.

May Abandon Cars.—Manager Harding of the Columbus Electric & Power Company, Columbus, Ga., submitted a statement at a recent meeting of the directors of the Chamber of Commerce and asked for a public hearing on his plan to abandon the railway line which runs through Wynnton as far as Wildwood Park. His idea calls for the substitution of a bus route under the management of the Columbus Transportation Company. He believes that this operation will be more economical than extending existing railway lines.

Cars Cease to Operate in Oldest City.—The St. John's Electric Company has abandoned service in the city of St. Augustine, Fla., but will continue to operate the line to Anastasia, the company planning to commence on the work of rebuilding its line to St. Augustine Beach within a short time. The company has been operating at a loss for some time now, but an agreement could not be reached until the company said it would rebuild the line to the beach and assume certain obligations with regard to street improvements. The ordinance was published about a month ago and no restraining order being filed the company began the work of dismantling.

Gross and Net Earnings Decrease.—The revenue of the Barcelona Traction, Light & Power Company, Barcelona, Spain, for the year ended Dec. 31, 1923, was $2,726,973, according to the ninth annual report recently submitted to the board of directors. The administration and general expenses were $154,476. There was a balance of revenue available for interest on first mortgage bonds of $1,123,511. The balance carried to the balance sheet for the year was $21,985. In the report to the shareholders E. R. Peacock. president, said that the operating results of the tramway showed a decrease in gross earnings of 1.3 per cent and in net earnings of 7.8 per cent compared with the previous year.

Property Sold.—The Sheffield Company sold its electric railway at Sheffield, Ala., on Dec. 8 to the Alabama Power Company. The consideration was not announced, but was said to be about $3,000,000. The property will be taken over by the Alabama Power Company directly. The Sheffield Company owned and operated the interurban railway, which served Sheffield, Florence and Tuscumbia. It also owned the power plant which distributes light and power, and the water plant which supplies Sheffield and Tuscumbia.

Personal Items

Mr. Langan Advanced in Westinghouse Service

T. R. Langan, recently appointed manager of the transportation division in the New York office of the Westinghouse Electric & Manufacturing Company, formerly was manager of the transportation section in the Buffalo (New York) district with headquarters at Syracuse. In New York Mr. Langan succeeds A. J. Manson, recently promoted to the position of manager of the heavy traction division of the railway sales department at East Pittsburgh.

After taking courses at Pratt Institute, Brooklyn, and while taking night courses at Carnegie Institute of Technology, Pittsburgh, Mr. Langan entered the employ of the Westinghouse Company in 1904 as an armature winder's helper and wireman's helper in the service department. His work from 1904 to 1906 was in connection with the earlier installation of multiple-unit control equipments on the Brooklyn Elevated and New York subway. In 1906 he began the special apprenticeship course at the East Pittsburgh Works.

In 1908 Mr. Langan took up construction work in the service department. Later in that same year he was made assistant general foreman of maintenance on the electric division of the New York, New Haven & Hartford Railroad with headquarters at Stamford, Conn. In 1910 he was back again at East Pittsburgh on special service and engineering work in connection with the development of the present line of Westinghouse HL control and railway apparatus.

Mr. Langan entered the sales department in 1913 and began his selling career at Baltimore. He won success and recognition at once. From Baltimore he went to Philadelphia, then to Buffalo and later to Syracuse. His present move to New York places Mr. Langan in charge of the largest district office transportation division of the Westinghouse Company.

F. C. Pratt a Vice-President of General Electric

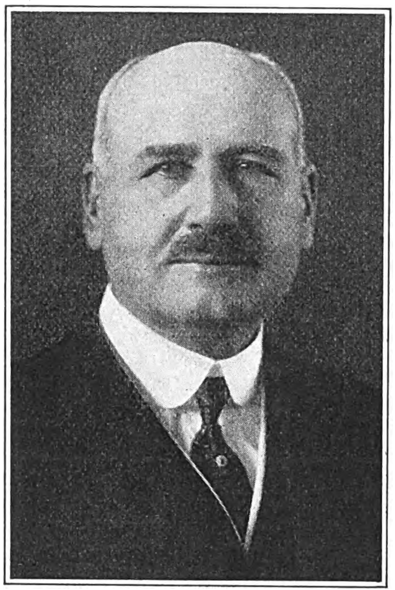
Francis C. Pratt, vice-president in charge of engineering of the General Electric Company, has been appointed to fill the vacancy caused by the resignation of G. E. Emmons as vice-president in charge of manufacturing and chairman of the manufacturing committee. Mr. Pratt's new title will be vice-president in charge of engineering and manufacturing.

In 1890 Mr. Pratt entered the plant of the Pratt & Whitney Company at Hartford, of which concern his father was president. He advanced to the vice-presidency and, in 1906, left to become associated with the General Electric Company as assistant to E. W. Rice, Jr. In 1912 he was appointed assistant to the president and in 1919 was elevated to the vice-presidency in charge of engineering. He was born in Hartford, Conn., Jan. 19, 1867. He was graduated with the degree of Ph.B. from the Sheffield Scientific School, Yale University, in 1888.

J. E. Hutcheson Honored

Montreal Tramways Manager Receives Recognition for Long and Able Service

Lieut.-Col. J. E. Hutcheson, recently elected vice-president of the Montreal Tramways, Montreal, Que., in addition to general manager, has been connected with that property since 1912. The new honors that thus have come to him are well merited. Colonel Hutcheson is a man of unusual ability and he has made a remarkable record in his handling of the operation of the tramway company. There have been several changes in the financial control of the tramway during the colonel's term of service with the property, but there has never been any question about his outstanding fitness for the post of manager, and now acknowledgment of his attainments in handling the property has come in his recent advancement to the vice-presidency of the company.



J. E. Hutcheson

Not the least of the achievements during his service as manager was the adoption of the service-at-cost plan. Some day, no doubt, the history of the negotiation of that agreement will be fully set forth, and it is unthinkable that Colonel Hutcheson's name will not be found written large in that work for the direct and indirect part which he took in helping to accomplish the passage of this measure. The terms of this contract are administered by a commission of three members, with whom the colonel has worked in close contact and with harmony. A measure of the success of the company under Colonel Hutcheson's direction is fortunately furnished by a recent offering of bonds of the company on a 5.45 per cent basis, in which it is divulged that the net earnings are more than 3⅓ times the annual bond interest charges. The colonel has also been in demand on numerous occasions to act in an advisory capacity in connection with the determination of railway and utility problems elsewhere.

Colonel Hutcheson entered the steam railway field in 1878 as a telegraph operator on the Grand Trunk Railway. In 1884 he joined the Canadian Pacific Railway as train dispatcher, and later became trainmaster and divisional superintendent. He left the service of the Canadian Pacific Railway in 1891 to take charge of the construction and later the management of the Ottawa Electric Railway. He remained in the service of that company until August, 1912, when he resigned to go to Montreal as general manager of the Montreal Tramways.

The colonel has had many years of service in the Canadian Militia, and for several years prior and during the great war served as a member of the committee on small arm development and manufacture in the Department of Militia and Defense. Despite his responsibilities he has not forgotten how to play. He is still very much the boy. He has always taken keen interest in military rifle shooting and was one of the leading rifle shots of the Dominion. He was a member of the Canadian Rifle Team which was sent to compete at Bisley, England, on several occasions and was adjutant and coach of the Canadian team in 1910. He was also a captain and coach of the Canadian Rifle Team that competed against teams from Great Britain, Australia and the United States for the Palma trophy in Ottawa in 1911.

Owen Young Suggested for Mayor of New York

Under the caption, "Another Job for You, Mr. Young," newspapers in New York City controlled by Frank Munsey carried on their front pages on Dec. 18 a summons to Owen D. Young, colleague of Brig.-Gen. Charles G. Dawes on the Dawes committee and later Agent-General of Reparation Payments, to permit himself to be drafted as a candidate for Mayor in next year's election. Mr. Munsey said that New York City, now grown so big, is an empire in itself and that it needed Mr. Young to reorganize it, quite as Europe needed him and General Dawes. Mr. Munsey said that Mr. Owen's part in the Dawes Plan and later as Agent-General of Reparations Payments gave the world an example of keen vision.

G. F. McKay has been elected secretary of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md. He succeeds Thomas Mason, who also served as assistant to the president. J. A. Mellor has succeeded E. E. Polglase as master mechanic. E. A. Gannon is passenger agent and I. E. Ballard freight agent.

H. A. Johnson on Important New Work

Former President American Electric Railway Engineering Association Selected by Steam Railroads to Direct Exhaustive Investigation of Power Brakes

HARLEY A. JOHNSON, assistant to the general manager of the Chicago Rapid Transit Company and superintendent of shops and equipment of the Chicago, North Shore & Milwaukee Railroad, was appointed director of research of the American Railway Association, effective on Dec. 1, to take full charge of an extensive investigation of power brakes for both passenger and freight trains. Announcement of the appointment was made on Dec. 18. His selection to fill this very responsible post is a marked tribute to Mr. Johnson's ability and integrity as an engineer, and reflects credit on the electric railway industry as a whole and on the companies with which he has been associated continuously since graduation from Purdue University as a mechanical engineer in 1905. Credit to the Rapid Transit and the North Shore companies is further reflected by an agreement between the A.R.A. and President Britton I. Budd, under which Mr. Johnson will continue in his present capacity with those companies while at the same time directing this new work for the A.R.A.

WILL DIRECT RESEARCH

This appointment of a director of research for the A.R.A. is the outgrowth of a report by the Interstate Commerce Commission pointing out the necessity for improvement in power brakes for passenger and freight trains, and laying down certain requirements that should be met by such brake systems in the interests of public safety. The A.R.A. was directed by the commission to prepare tentative specifications for brake equipment which would fulfill these requirements, and be suitable as the basis for negotiations leading to the formation of approved specifications and a formal order covering their adoption.

This decision in favor of undertaking a thorough investigation of the entire subject of power brakes followed a finding by the A.R.A. to the effect that the general principles of satisfactory brake operation adopted by the commission were at variance with what the railroads after their exhaustive investigations and extensive experience had thought safe and desirable. As a result the committee on safety appliances felt a grave responsibility involved in any recommendations which might be made. It thereupon cast about for a man to head this extremely important work. In the words of R. M. Aishton, president A.R.A., the following is an outline of the scope of the task to be undertaken:

> The appointment of a director of research required the retention of a man who would be a competent and practical engineer, of unquestioned ability and integrity, without railroad or manufacturing affliation. The director will be empowered and authorized to take any action he deems necessary to enable him unqualifiedly to concur in the results of the tests, investigation and conclusions reached, such as surrounding himself if he so desires, with a staff of his own selection, sufficiently large and sufficiently competent to arrange for tests and so conduct them that every opportunity for criticism may be eliminated as to the decision having been influenced in any degree by railroads, manufacturers, patentees, or from any other source.
>
> The exisitng machinery of the Mechanical Division, American Railway Association (Safety Appliance Committee), will be prepared to act as an advisory committee to the director of research, if he so desires, and will arrange for the services of other existing committees, or the appointment of additional committees of the association as may be considered desirable by the director of research.
>
> The suggested scope of the work will include: investigation into the desirability and practicability of all designs and suggestions of possible merit in connecton with brake operation, giving special consideration to safety of operation through the incorporation of the apparatus so tested, of such functions as may be in existence or be suggested, that in the judgment of the director are worthy of consideration. This may, and probably will, necessitate the installation of a plant to test devices and functions under all possible conditions of service, in addition to technical tests, or may necessitate establishing on a single railroad, temporary service of a special character to enable the director to reach conclusions as to the effect on moving trains of any functio nsuggested that he desires to consider.

H. A. Johnson

In proposing Mr. Johnson to head this work, Mr. Aishton made the following statement:

> I don't know of anybody in the United States who is better fitted than Mr. Johnson to do a thorough job in a fearless way, from both a technical and practical standpoint, or who would so thoroughly cover every phase of the situation. His standing in the engineering and commercial field is beyond any question.

Mr. Johnson obtained some of his early experience in the steam road field. Previous to his graduation from Purdue University, he was employed at various times as draftsman, locomotive fireman, laboratory assistant and helper in the locomotive erecting shop of the Chicago, Burlington & Quincy Railroad. He entered the employ of the Metropolitan West Side Elevated Railway on Aug. 26, 1905, and has been with this company and its affiliated successor companies to the present time. He started at the bottom, as a helper in the repair shops on the maintenance of car equipment. He went into the drafting room in November, 1905, to engage in work on car design, traffic studies and maintenance of way. In April, 1907, he was made engineer of car equipment, and in December of the following year was promoted to master mechanic of the Metropolitan West Side Elevated Railway. When the four elevated roads in Chicago were placed under one operating management in 1911, his duties were extended to include these four roads. In 1915 his title was changed to superintendent of shops and equipment and in July, 1916, he was also appointed superintendent of shops and equipment on the Chicago, North Shore & Milwaukee Railroad, which was awarded the first Coffin prize during the year 1923.

Mr. Johnson was made organization engineer on the Chicago Elevated Railroads in March, 1920, and remained superintendent of shops and equipment of the Chicago, North Shore & Milwaukee Railroad. During this time he analyzed operating methods, costs, etc., and prepared statistical information which was used as the basis of recommendations for improvement of methods, practices or processes in all departments. Again inherent ability and unusual personality resulted in rapid promotion. In December, 1921, he was made assistant to the general manager of the Chicago Elevated Railroads, but remained superintendent of shops and equipment of the Chicago, North Shore & Milwaukee Railroad. In this capacity he continued to be responsible for the design and construction of all new rolling stock.

AN ANALYST OF GREAT ABILITY

Mr. Johnson's keen mind and breadth of vision were recognized by the companies with which he was associated, and he was repeatedly called upon to make extended investigations of other proprties for the purpose of bringing to the Rapid Transit Lines ideas for improvements in service suggested by the practices of others. In 1920 he accompanied the local transportation committee of the City Council of Chicago on a trip of inspection of the transportation facilities in a number of large cities in the country. In 1921 he was vice-chairman of a committee appointed by Samuel Insull to study the electrification of steam railroads in the United States and in this capacity traveled over approximately 95 per cent of the electrified steam railroad mileage in the country. In 1922 he was chairman of a committee of operating officials of the Chicago, North Shore & Milwaukee Railroad who visited the Pacific Coast and Texas cities to get ideas for improvements in service.

While president of the American Electric Railway Engineering Association, he, James W. Welsh, executive secretary of the association, and Harry L. Brown, editor ELECTRIC RAILWAY JOURNAL, were appointed as a special committee on foreign operations to investigate local transportation in England, Scotland, France and Switzerland. This committee submitted an extended report at the last convention, which was published in full in the ELECTRIC RAILWAY JOURNAL of Sept. 20, 1924.

Mr. Johnson is a member of the American Institute of Electrical Engineers, the Society of Automotive Engineers, Western Society of Engineers, American Electric Railway Association and the Western Railway Club.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Chicago "L" Orders 100 More De Luxe Cars

Comfort Features Embodied in an Earlier Group of Cars Have Been Retained in New Vehicles

To give additional service on the elevated lines, 100 new cars have been ordered this month by the Chicago Rapid Transit Company. In their design and equipment these cars will be similar to the group placed in service last winter and described in detail in the Jan. 12, 1924, issue of ELECTRIC RAILWAY JOURNAL. They will duplicate all of the de luxe features incorporated in the former cars, which have proved very popular with the riding public. A marked preference for this type of car has been noticeable on the part of passengers boarding the trains. The use of spring upholstered plush seats is considered to be an important factor in this popularity and will therefore be duplicated in the new cars. These will be built by the Cincinnati Car Company.

Interior trim, seating arrangements and heating devices will be the same as on the first group. With a view to making the cars as warm and soundproof as possible, the practice of using double wood floors is repeated. A ½-in. layer of compressed hair insulating material is laid between the steel underframe and the lower wood floor. On the previous group of cars this construction proved to be satisfactory from the standpoint of insulating the interior of the car from noise. Sound-insulating material is used also inside the side plates and above the headlining.

SUITABLE FOR SUBWAY OPERATION

In the design of all cars built for this company since 1914, the possibility of future subway operation has been borne in mind. When this group of 100 cars are delivered there will be a total of 455 steel cars suitable for subway operation. The details of the steel framing are very similar to the previous group and provision has again been made to allow a center door to be put in if desired. Four sliding doors, two in each end vestibule, are operated by National Pneumatic electro-pneumatic equipment, similar in design and construction to the type used before. The door control is arranged so that a guard between the two cars may control the adjacent doors in each car, or may take control of all four doors on each car, permitting a train to be operated with one guard for each two cars.

In accordance with previous practice, each car will be equipped with one motor truck and one trail truck, with two motors on the former. Trucks will be of Baldwin equalizing bar type. The motor trucks are equipped with 34-in. rolled steel wheels and the trailer trucks with 31-in. wheels. Motor and control equipment has not yet been decided upon.

The new cars will weigh approximately 75,000 lb. complete. This will be divided so that the car body with control equipment will weigh approximately 43,700 lb. and the trucks and motors will run 31,300 lb. Specifications are given in the accompanying table.

Number of cars ordered	100
Name of road	Chicago Rapid Transit Co.
Date of order	About Dec. 1
Date of delivery	Starting July 1, 1925
Builder of car body	Cincinnati Car Co.
Type of car	Elevated, passenger
Seating capacity	52
Weight	
Car body with control equipment	43,700 lb.
Trucks Equipment	31,300 lb.
Total	75,000 lb.
Bolster centers, length	33 ft. 8 in.
Length over all	48 ft. 0 in.
Truck wheelbase	
Motor	6 ft. 6 in.
Trailer	5 ft. 6 in.
Width over all	8 ft. 10$\frac{7}{16}$ in.
Height, rail to trolley base	12 ft. 3 in.
Body	Steel
Interior trim	Mahogany
Headlining	Steel
Roof	Arch
Air brakes	Westinghouse AMU
Armature bearings	Plain
Axles	Heat-treated, Standard steel
Bumpers	Hedley anti-climbers
Car signal system	Conductor's hand bell
Car trimmings	Statuary bronze
Center and side bearings,	Stucki side, railway standard center
Conduits and junction boxes	Metallic
Couplers,	Automatic, Van Dorn and Stern & Ward
Curtain material	Double-faced Pantasote
Destination signs	Hunter
Door operating mechanism,	National Pneumatic electro-pneumatic
Hand brakes,	Blackhall handle and Peacock mechanism
Headlights	Crouse-Hinds portable
Journal boxes	Symington
Motors	Inside hung
Paint and varnish	Chicago Varnish
Seating material	Plush
Slack adjuster	Westinghouse Type J
Springs	Standard Steel Works
Trolley retrievers	Keystone
Trolley base	U. S.-13 F
Trucks	Baldwin equalizer
Ventilators	Railway Utility
Wheels	Rolled steel, 31 in. and 34 in.
Special devices, etc.	Rico coasting recorders, Rico No. 5 "Steelkar" straps

Extensive Program for 1925

The Grand Rapids Railway, Grand Rapids, Mich., is planning to spend nearly $750,000 on maintenance of way and new equipment in 1925. Approximately 11,179 ft. of double track will be reconstructed. This, together with the installation of considerable special trackwork, two railroad crossings and various other jobs, will cost $298,557.

Additional rolling stock which it is proposed to buy consists of 30 lightweight, double-truck cars to cost approximately $12,000 each and eight Fifth Avenue type J buses at approximately $7,000 each. Among the accessories included in the 1925 program are 50 Wood fare boxes, 27 Kuhlman type E slack adjusters and 11 U type automatic slack adjusters for Birney cars.

A portable Ingersoll-Rand air compressor will be purchased for the way department and also a steam-driven concrete mixer. For use as an emergency truck it is planned to buy a 3-ton truck chassis. Shop facilities will be improved by the installation of a thermostatically controlled babbitt pot, an oven for babbitting and a number of compressed air hoists.

Brill Gets Big Car Order

An order was placed this week with the J. G. Brill Company for 100 new cars for the Philadelphia Rapid Transit Company, Philadelphia, Pa. These will be of the single-end, front-entrance, center-exit type similar to the 385 cars ordered Jan. 22, 1923, and described in the ELECTRIC RAILWAY JOURNAL for March 10, 1923. One respect in which the new cars will differ from the first order is that they will be 3 in. longer, the added length being in front of the exit door. Delivery will commence in April, 1925. The cost of the cars will be in the neighborhood of $1,200,000, which, with the buses recently ordered by this company, will involve a total expenditure of nearly $4,000,000 for new rolling stock.

Uniformity of Details with Existing Motors Desired in New Designs

We hear so much of the advantages of new equipment that we are liable to assume that there are no disadvantages. One of the chief criticisms heard of new designs is in regard to the lack of interchangeability of parts with those of existing equipment. A recent order for car equipments specified a type of motor brought out 15 years ago. Inquiry as to the reason for this choice brought out the fact that this railway had but one type of motor, although it was operating 600 motor cars. The officials of this road considered that the advantages of uniformity outweighed improvements in design.

The large parts of railway motors such as frames and housings are seldom replaced and interchangeability

Metal, Coal and Material Prices

Metals—New York	Dec. 16, 1924
Copper, electrolytic, cents per lb	14.625
Copper wire base, cents per lb	16.875
Lead, cents per lb	9.30
Zinc, cents per lb	7.75
Tin, Straits, cents per lb	55.75
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.125
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.625
Central, Ill., screenings, Chicago, net tons	1.675
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.75
Weatherproof wire base, N.Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal.	$1.16
White lead in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.157
Turpentine (bbl. lots), N. Y., per gal.	0.84

with existing equipment is not a particular advantage. But repair parts such as armature coils, commutators, brushes, brush holders, field coils, bearings, gears and pinions must be kept on hand in considerable quantities for replacements and any reduction in the number of types that must be carried in stock is a great help to the railway. Several railways have rehabilitated their motors so as to reduce the number of bearings that must be kept on hand, others have made wholesale changes in gear ratio so as to provide uniform gearing. These are things that could have been incorporated in the original design without decreasing the number of new and valuable features.

There are also a number of things that may be considered as auxiliaries to the motors that are affected by motor design. Some of these are motor suspensions, connectors for motor leads, lengths of motor leads and the position on the motor where they are brought out. Uniform arrangement of these details by the motor manufacturers will do much to reduce the number of parts that must be carried in stock and also repairs. Railway officials are anxious to have improved equipment, but there is a strong feeling among the men responsible for maintenance that much can be done toward securing greater uniformity of detail parts.

Rolling Stock

Black River Traction Company, Watertown, N. Y., is remodeling its old two-man cars into one-man pay-as-you-enter type for use in Watertown, Brownville and Dexter.

Detroit United Railway, Detroit, Mich., has ordered 100 buses instead of 75 as was at first planned. Ten of these single-deck buses have been loaned to the Wolverine Company for service between Detroit and Mount Clemens to replace antiquated equipment, and some of the first new buses to arrive are now on the Wyandotte-Trenton division. Buses and interurbans are being alternated as far as Farmington on that line.

San Antonio Public Service Company, San Antonio, Tex., has placed an order for two more Reo model W pay-enter buses having a seating capacity for 21 passengers each.

Track and Line

Tri-City Railway, Davenport, Iowa, is spending approximately $15,000 to reconstruct and lay new brick paving between its tracks on Second Avenue from Fifteenth Street to Seventeenth Street, according to an estimate made by T. C. Roderick, general manager.

East St. Louis, Caseyville & Eastern Railroad, East St. Louis, Ill., has been granted a franchise by the St. Clair, Ill., Board of Supervisors for an electric line between Caseyville, Ill., and Washington Park, a suburb of East St. Louis. A clause provides that construction must start within one year. This is a new incorporation referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 18, 1924.

Harrisburg Railways, Harrisburg, Pa., has completed its program of track reconstruction for this year. This included the rebuilding of between 4 and 5 miles of single track at a cost of approximately $250,000. In general A. E. R. E. A. standard 7-in. grooved girder rail was used with bolted joints seam welded. On most of this work International twin steel ties were installed.

Chicago Surface Lines, Chicago, Ill., has extended the Belmont Avenue line from Cicero Avenue to Central Avenue.

Reading Transit & Light Company, Reading, Pa., in co-operation with the City Council and people of the northeast section has opened up a 3-mile electric railway known as the northeast loop to serve the residential section of the northeast. The line, constructed in four months, was built by the people of the territory which it serves. The company will operate the line under a 999-year lease.

Pittsburgh Railways, Pittsburgh, Pa., is laying new tracks and switches at Fifth Avenue, Grant and Diamond Streets in preparation for the short-looping of cars if the plan is given a trial.

Springfield Street Railway, Springfield, Mass., has expended about $40,000 in new track installations and other improvements at Elm Street and Park Avenue, West Springfield, preparatory to the opening of the new North End bridge across the Connecticut River. The company has also expended $15,000 on replacements and improvements at the intersection of Main and Lyman Streets in Springfield, near the site of the new Union Station.

Shops and Buildings

Philadelphia Rapid Transit Company, Philadelphia, Pa., has completed its carhouse on the block bounded by Twentieth, Johnson and Nineteenth Streets and Moyamensing Avenue. The finished terminal, which is modern in every respect, came within the estimated cost of $1,500,000. It has a capacity of 450 cars.

Birmingham Electric Company, Birmingham, Ala., will abandon the East Lake carhouse in a short time under a plan to centralize all existing railway repairs and storage operations in its Third Avenue carhouse. The reason for this movement is to increase the efficiency of the company, allowing the organization to maintain a smaller number of men in its shops department. Need of improvements at the East Lake carhouse and the paving of First Avenue are also factors in the move. J. S. Pevear, general manager, estimates that to equip the old carhouse would require an extra expenditure of about $40,000 in the paving project. Future use of the East Lake carhouse has not been definitely determined by company officials, but this property will not be sold at present.

Trade Notes

Johns-Manville, Inc., New York, N. Y., manufacturer of building materials, automotive equipment, asbestos specialties, fire extinguishers and electrical products, is to establish a factory in New Orleans. It has leased the building of the American Cotton Oil Company of Gretna. This has 50,000 sq.ft. of space under one roof, and is on a 5-acre site. The first unit will be in operation by April, it is announced.

Magnetic Signal Company, Los Angeles, Cal., has arranged with the General Railway Signal Company, Ltd., Montreal, to handle the magnetic flagman and accessories in the territory of Winnipeg and east thereof. Arrangements have also been completed with the Canadian Fairbanks-Morse Company of Vancouver, to act as agents for all the territory to the west of Winnipeg.

Conveyors Corporation of America, Chicago, Ill., announces the appointment of C. S. Price, First National Bank Building, Hazleton, Pa., as its district representative for northeastern Pennsylvania. Associated with Mr. Price in the sale of the American Steam Jet Ash Conveyor is E. E. Elliott, who has had wide experience in steam jet ash disposal engineering.

Glenn D. Evans has again joined the J. F. Buhr Machine Tool Company, Detroit, in the capacity of chief engineer. Mr. Evans has been chief engineer of the Climax Engineering Company of Los Angeles during the past three years.

New Advertising Literature

G. C. Kuhlman Car Company, Cleveland, Ohio has issued an illustrated booklet on the type G steel-frame bus bodies.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., in a publication called "Recent Developments in the Art," has recorded briefly some of the more important developments which this company has contributed to the electric railway industry during the past two years. This booklet was published for use as a guide reference in the Westinghouse booth at the A. E. R. A. convention last October, the new equipment or parts of equipment included in the exhibit having been marked with an orange star to indicate its newness, and the references in the book are similarly marked. The motive behind each development and advantages of its use over the previous part is briefly related for each subject covered. Another publication issued by the company describes the latest development in HL control, designed primarily for use on low-floor cars. Another leaflet contains application and performance data and construction details of the No. 333-V line of railway motors. An outline drawing with important dimensions is included. "The Trolley Bus—Its Application and Equipment" is the subject of the third leaflet.

New York, Saturday, December 27, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 26

Modern Cars Again Prove Their Worth

THE substitution of modern light-weight cars for older and heavier rolling stock on interurban lines of the York Railways and the Johnstown Traction Company in Pennsylvania is told of elsewhere in this issue. Not enough time has yet elapsed since the new cars were put in service to permit an exact calculation of the resultant savings in energy, maintenance, and track costs. But already it is evident that substantial reductions in operating expenses will follow from this modernization of equipment. In addition, the greater popularity of the new cars with the general public is an important consideration.

The experience of these railways is in harmony with that of a number of other interurbans, among which might be mentioned the Kentucky Traction & Terminal Company, the New Haven & Shore Line, and the Aurora, Elgin & Fox River Electric Company. In these and many other cases, modernization of equipment has resulted in reduced expenses and increased revenue.

Under the circumstances it is discouraging to observe the tenacity with which some other interurban railways cling to their old, heavy cars. Faced with rising costs as well as serious competition from the private automobile, they make a great mistake in keeping these antiquated vehicles in service.

"The public is used to these cars and prefers them to the modern, light-weight type," is a frequent argument. In reality, of course, the public would much prefer new cars. Something new always appeals to the popular fancy. That is a large factor in the popularity of the motor bus—it is new. The superiority of the modern car in appearance and comfort is so marked that it is sure to be appreciated.

Some interurban railways claim that they cannot afford to modernize their rolling stock. If it will mean reduced costs and increased traffic, however, such railways are the very ones that can least afford to neglect modernization—and such improvements can be financed.

Specialized Training Required for Publicity Work

A GOOD many laymen think that they understand thoroughly all the problems of the transportation business. In fact, some of them appear to believe they know more about it than do the men who have made it their life work. Yet experience has shown that very often the theories of the butcher, the baker and the candlestick maker fail when put to the test of actual performance.

Railway men are quite familiar with the fact that difficult problems require trained men to handle them. Probably in no other industry has there been a more pronounced tendency and need to utilize the services of specialists in their various lines. This necessity is hardly less compelling in railway publicity work than it is in the engineering department. The successful publicity man must be a specialist in human nature, and must understand the psychology of "the man on the street."

Often a slight change in the wording of a sentence will altogether change the impression it creates. A good example of this is furnished by a suggestion coming from Major J. S. S. Richardson, chairman of the Pennsylvania Public Service Information Committee. He urges that the phrase "educating the public" be avoided and in its place the phrase "informing the public" be used. The general public believes that it is already sufficiently educated, and does not want any more education handed out by the railway. The word "informing," however, causes no such unpleasant reaction.

While it might never occur to a railway executive whose mind is filled with operating problems, this suggestion is so reasonable that it is necessary only to hear it to realize that it is good. Coming, as it does, from an experienced publicity man, it serves to emphasize the value of having a specialist handle the work of that department.

Maintenance Shop Practices Will Bear Close Study

IN THE issue of last week was published an article describing some of the many dies and jigs developed by the Chicago Surface Lines to reduce the cost of frequently repeated operations in the shop. This is an excellent example of what can be accomplished by consistent development of such tools.

On many electric railways, along with the tendency to provide insufficient machine equipment, there is also an inclination to overlook the possibilities of applying modern production methods to maintenance work. In some cases special tools enable existing machine equipment to be utilized for a much wider range of work. A good example of this is the ingenious device described in the Chicago article, by means of which an ordinary punch press is made suitable for punching holes from center punch marks in light structural members.

Railway shop machines and tools should, however, not be diverted from the maintenance functions for which they were intended, to the manufacture of parts and equipment that can be purchased more economically from manufacturers specializing in the production of such parts. In most cases this practice of manufacturing parts in the shop is uneconomical. It frequently may appear that some saving is being made due to the use of machines which are already available, but manufacturing operations in the shop are likely to tie up these machines when they are needed for maintenance work. In addition, there is a decided tendency among electric railways to hold down the shop supervisory staff to a minimum. In general, therefore, the entire attention and available time of such men is hardly sufficient for the proper supervision and improvement of purely maintenance methods and practices. When their attention is diverted into purely manufacturing operations, maintenance is bound to suffer. Under such conditions, any small apparent saving in the cost of new parts is more than offset.

When repair parts for apparatus that has been discontinued by the manufacturer are required, the practice of making them in the shop sometimes is justified. Under these conditions the parts are usually used in such small quantities that the cost of having them made up special by the manufacturer who no longer carries these parts in stock is too high. As pointed out in the Chicago article, time of delivery also becomes an important factor in determing the procedure to be followed.

This phase of the subject will bear much more thorough study and analysis than it has been given in the past. There is an excellent prospect of reducing in a substantial degree the amount of such special manufacturing work done in the shop. This can be done by a consistently maintained practice of standardizing the many miscellaneous parts and fittings used on cars.

Desirable results can be obtained both in the purchase of new equipment and in the substitution of general standards for many different parts already on the cars, as they come through for repairs. In many cases there is abundant opportunity to eliminate many slight differences in sizes and types, which tend to result in small quantity purchase orders, delays in delivery, and high prices. Thus in many instances where parts are being manufactured in the shop because of high purchase prices, careful grouping and weeding out of obsolete types would result in a much reduced stock list and would allow the size of individual orders to be increased to a point that would command attractive prices.

Train Up a Child in the Way He Should Go

HABIT is stronger than nature, according to an old proverb, and it is a tremendous undertaking to try to change the habits of a nation. Yet this must be done if reasonable individual safety on the streets of our large cities is to be had. Automobiles have completely changed the conditions under which these streets can be used without injury to life and limb. With slow-moving horse traffic there was no call for drivers to be licensed, and there was no great risk when pedestrians crossed the street between corners. With swiftly moving motor vehicles in crowded streets, the need for both careful licensing of drivers and control of pedestrian movement is evident.

Naturally the question of the best way of educating the public to the modern needs of safety in the streets occupied a prominent place in the conference on street and highway safety, held in Washington the first part of last week. The greater part of the report of the committee on education was devoted to methods for teaching the rising generation what should be done. Some suggestions are given as to the ways for reaching adults, and newspapers, posters, movies and the radio are mentioned. But evidently, as pedestrians, adults are expected to know what to do or else to be beyond salvation. It is hard to convince a man who for many years got on and off moving street cars that the closed platform is a good thing, or that it is unsafe to thread his way between crossings through a maze of moving automobiles. But the case is more hopeful with children, to whom a horse is almost a relic of a past age. Proper stress is laid in the report on interesting youth in safety by active participation in it, as through schoolboy patrols and junior safety councils, just as physics and chemistry are taught by laboratory methods. With the children taught there is hope for the elders through precept and example, because in many cases it is very true that the child is father to the man.

Protecting Transportation for the Sake of the Public

SOMEHOW transportation service lies closer to the heart of the average man than does the service rendered him by any other utility. He is more jealous of his rights as a patron of the trolley company than he is of his rights as a customer of the electric company. For this reason, where railway rates or service are concerned, he is particularly critical of the work of the public service commission. Nevertheless, rising costs of labor and material, as well as the increasing competition of the private automobile and the bus and truck, have made the problem of maintaining the financial stability of the necessary transportation systems a grave one. Commonly, therefore, the public service commission is indeed between the devil and the deep sea.

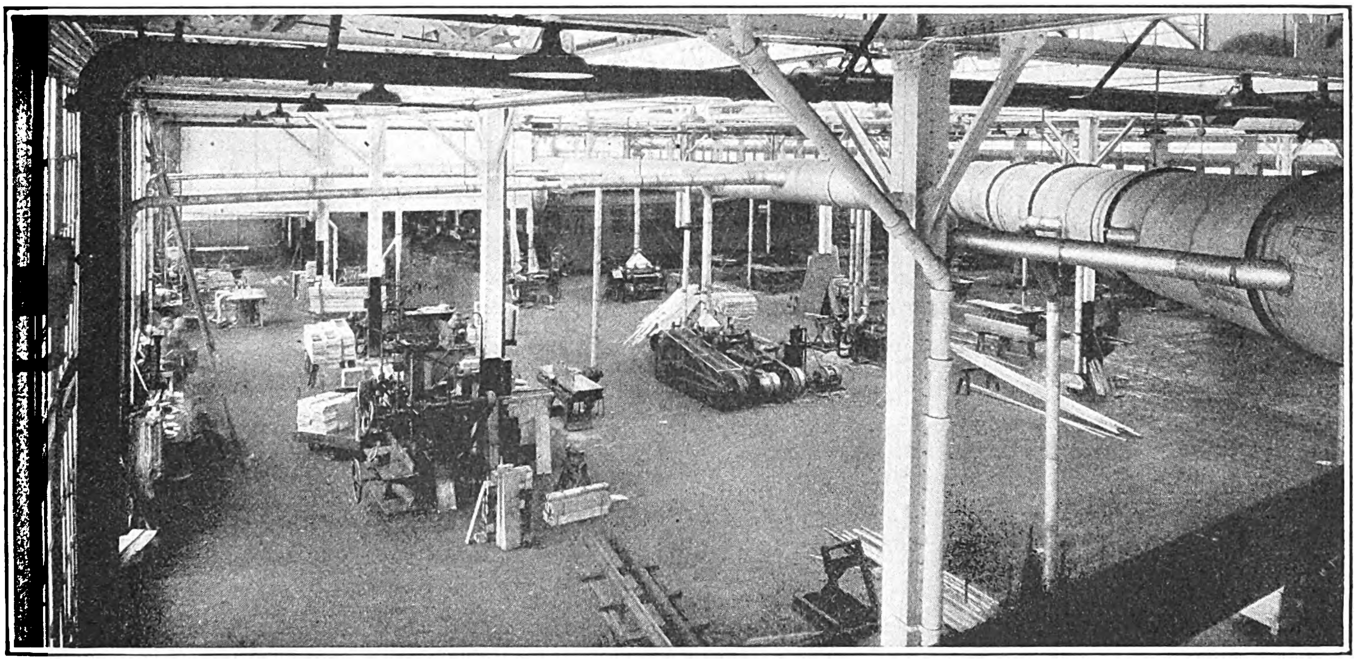
For example, if an application is made by an independent bus operator to run over a route where his service will duplicate that of an existing railway, a regulatory body would ordinarily refuse to grant it. But it is difficult for people to understand why the commission should thus deprive the people of a service which would be a convenience for them. They feel that if some one is willing to provide the service he should be allowed to do so, and they are inclined to regard the refusal of a permit under such circumstances as an act of favoritism to the railway. In order to attain the best results in the end, however, it is necessary often more or less to disregard the immediate effect on the public temper.

To the credit of the commissions it must be said that decisions are made after careful investigation by experienced men. If the outcome is sometimes displeasing to the railway, usually the company is nevertheless willing to admit that it was made in good faith. The public, on the other hand, is too ready to question the motive of the commission. This is no doubt due to a lack of understanding of the considerations upon which the decisions are based. When the people, through longer experience, become more familiar with the methods of regulatory bodies and realize that the latter must protect the transportation systems for the sake of the public as well as for the sake of the stockholders, they will probably come to repose a greater confidence in the wisdom of these decisions. This points to the need for more informative publicity along these lines.

Boston "L" Woodworking Shop Uses Individual Drive

Third Article

A Great Variety of Equipment Is Installed for Car Repair Work in New Everett Shops—Machine Shop Is Temporarily Housed in the Wood Shop—Method of Stripping and Rebuilding a Car Described



Noteworthy Features of the Wood Mill Are the Individual Motor Drives for All Tools and the Suction Dust Collecting System

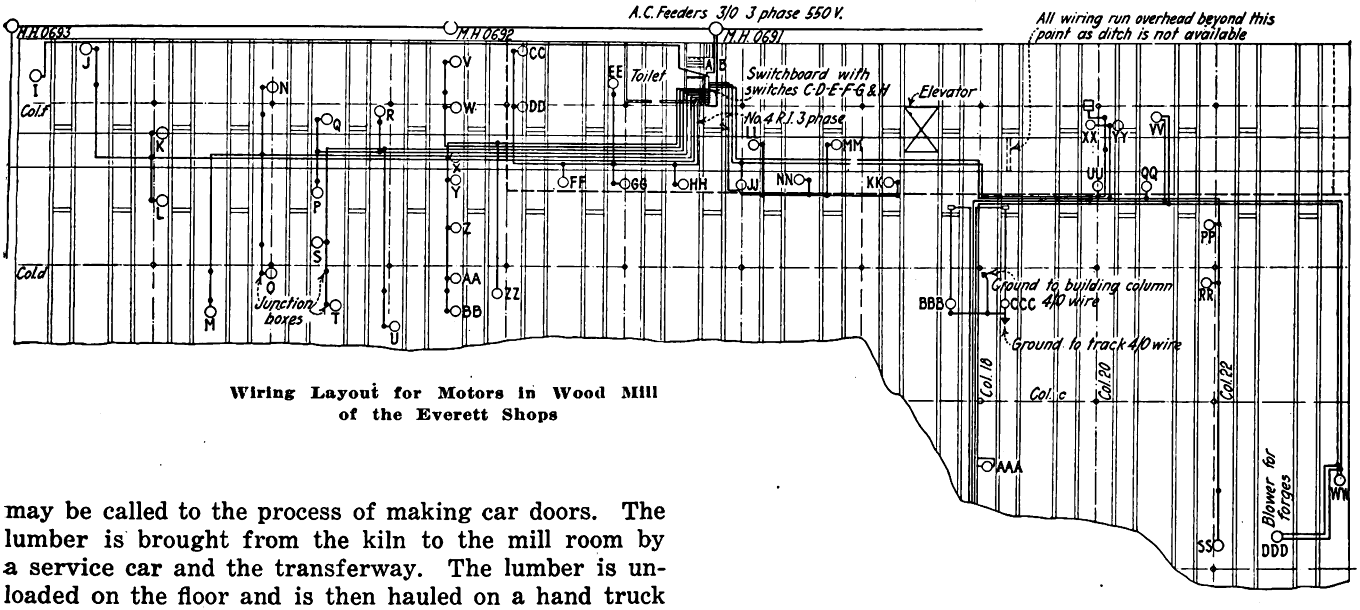
THE section of the new Everett shops of the Boston Elevated Railway now used as a carpenter shop and wood mill presents a good illustration of individual motor drive. Induction motors are used mainly, operating on a three-phase, 60-cycle, 550-volt circuit. The various tools installed also show advanced practice in safety engineering. The accompanying table, which lists the principal motor-driven machines in the shops, indicates that there is a greater variety of machinery than ordinarily has been available for car repair work on electric railways.

The many woodworking processes at the Everett shops can in general be divided into two classes: (1) Repair jobs on rolling stock, and (2) production of materials or parts used in quantity by the company in any branch of its service. Ample facilities for quick repair are afforded by the trackage in this building and its connection with the transferway. Most of these tracks are carried at least two-thirds of the way across the building. To facilitate the work until future craneways are available two body hoists built by the company and a jib crane are installed in the northern portion of the shop.

The latest types of equipment of the mill include a rip saw, doweling machine, belt sander, high-speed shaper and a disk sander. These embody various features of design which increase the convenience of operation, render the work safer and reduce obstruction to the movement of men and materials in the mill. Several of the motors are mounted inside the machine frames or above the floor level and out of the way of the user. Control equipment is located as a rule within easy reach of the machine operator, and a general scheme of screening these tools and their drives adds to the safety of the installation. All tools above 7 hp. have General Electric switches, by which the compensators can be "killed" in connection with repair work. While the operations performed by these machines and other equipment were carried on to some extent in the older shops of the company, with this later equipment more rapid production is possible through easier settings of cutting devices, more automatic regulation of processes, multiple cutting and higher powered tools.

Some of the articles regularly made in the wood mill are cross arms, third rail shoe beams, seats for trainmen, surface car life guards, feeder switch boxes, track switch parts, toilet sets for stations, office furniture, trolley planks, car flooring and car doors. Repairs to cars brought into the shop on account of collisions or other accidents naturally take precedence over routine manufacturing operations.

Illustrating the routing methods followed attention


A.C. Feeders 3/0 3 phase 550 V.
All wiring run overhead beyond this point as ditch is not available
M.H. 0693
M.H. 0692
M.H. 0691
Toilet
Switchboard with switches C-D-E-F-G & H
No. 4 R.I. 3 phase
Elevator
Col. F
Col. d
Junction boxes
Ground to building column 4/0 wire
Ground to track 4/0 wire
Col. 18
Col. 20
Col. 22
Col. c
Blower for forges
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z
AA
BB
CC
DD
EE
FF
GG
HH
JJ
KK
LL
MM
NN
PP
QQ
RR
SS
UU
VV
WW
XX
YY
ZZ
AAA
BBB
CCC
DDD

Wiring Layout for Motors in Wood Mill of the Everett Shops

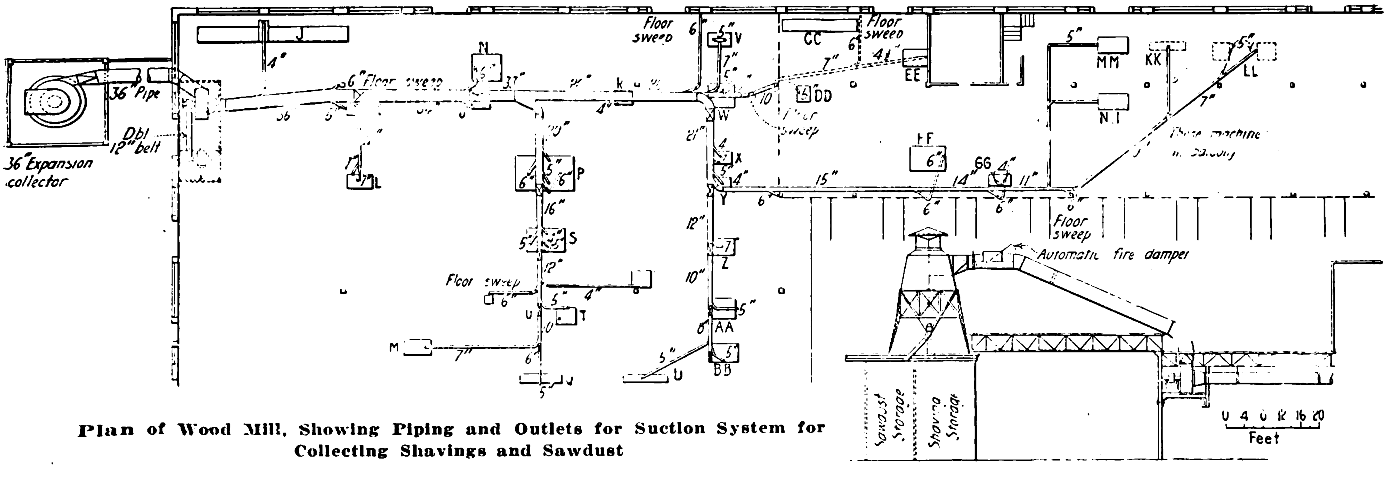
may be called to the process of making car doors. The lumber is brought from the kiln to the mill room by a service car and the transferway. The lumber is unloaded on the floor and is then hauled on a hand truck to the cut-off saw (*J*), where it is cut into lengths. It is next trucked to the rip saw (*K*) and cut into the desired widths. Thence it goes to the buzz planer (*Q*), where it is finished in two passes. The next machine used is the molder (*S*), which cuts the stock to the proper sizes. The stock then divides, the door stiles going to the mortiser (*Y*) and the rails to the tenoner (*X*). The stiles then pass to the shaper (*V*) for molding and thence to the carpenter shop in the balcony. The rails are also molded by this shaper and are then passed to the bevel saw (*AA*) for "relishing," after which the rails go to the balcony for assembly with the stiles. The door panels when glued together start with the cut-off saw (*J*) and pass through the buzz planer (*Q*) to the mortiser (*Z*), thence to the bevel saw (*AA*) for bringing to size, on to the sander (*FF*) and to the balcony for assembly. The doors are then taken to the mill room floor and edge-straightened in a buzz planer (*Q* or *U*). Next they are cut to the proper length and width on the bevel saw (*AA*), after which the sander (*FF*) is used, the edges are molded by the shaper (*V*), and the doors trucked to the paint shop. They are returned to the mill room for glazing. The beading is cut up in the rip saw (*J*), passes through the molder (*S*) to the paint shop and is returned to the mill for insertion at the time the glass is set. The completed door then goes to the paint shop for installation.

Window sash goes through practically the same operations as the doors. Steel paneling is largely replacing the wooden panels on the company's cars and this work is done in the temporary machine shop section of the wood mill, in the main.

DISPOSING OF WOOD WASTE

The mill building is equipped with a dust and shavings removal system by which all sawdust and other débris are drawn by suction through branch piping into a heavy discharge main leading out of the building and across a bridge to a separating hopper on the top of the extension of the lumber storage building. An accompanying drawing gives the sizes of the various intake pipes leading from the various woodworking machines to the main collecting duct. The piping is supported on the trusses and columns of the building by wire guys and straps. On a balcony in the southwest corner of the wood mill is an 80-in. Sturtevant exhaust fan, belt driven by a 50-hp. motor. A suction of 2½ in. of water is produced when the fan is running at full speed.

The dust and shavings are drawn from the machines and forced into a 36-in. trunk duct. They are discharged into a 36-in. collector with top and body of No. 18 and cone of No. 16 galvanized steel, carried on top of the baling house by structural steel supports. The hopper is about 18 ft. high and 12 ft. in diameter and is fitted with a ¼-in. mesh screen by which the sawdust and shavings are separated to discharge into compartments below where baling takes place in a 7.5-hp. Trojan baling machine. The bales of shavings,


36" Pipe
Dbl 12" belt
36" Expansion collector
Floor sweep
Floor sweep
Floor sweep
Floor sweep
Three machine
Automatic fire damper
Sawdust Storage
Shaving Storage
0 4 8 12 16 20
Feet
J
L
M
N
P
S
U
V
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Y
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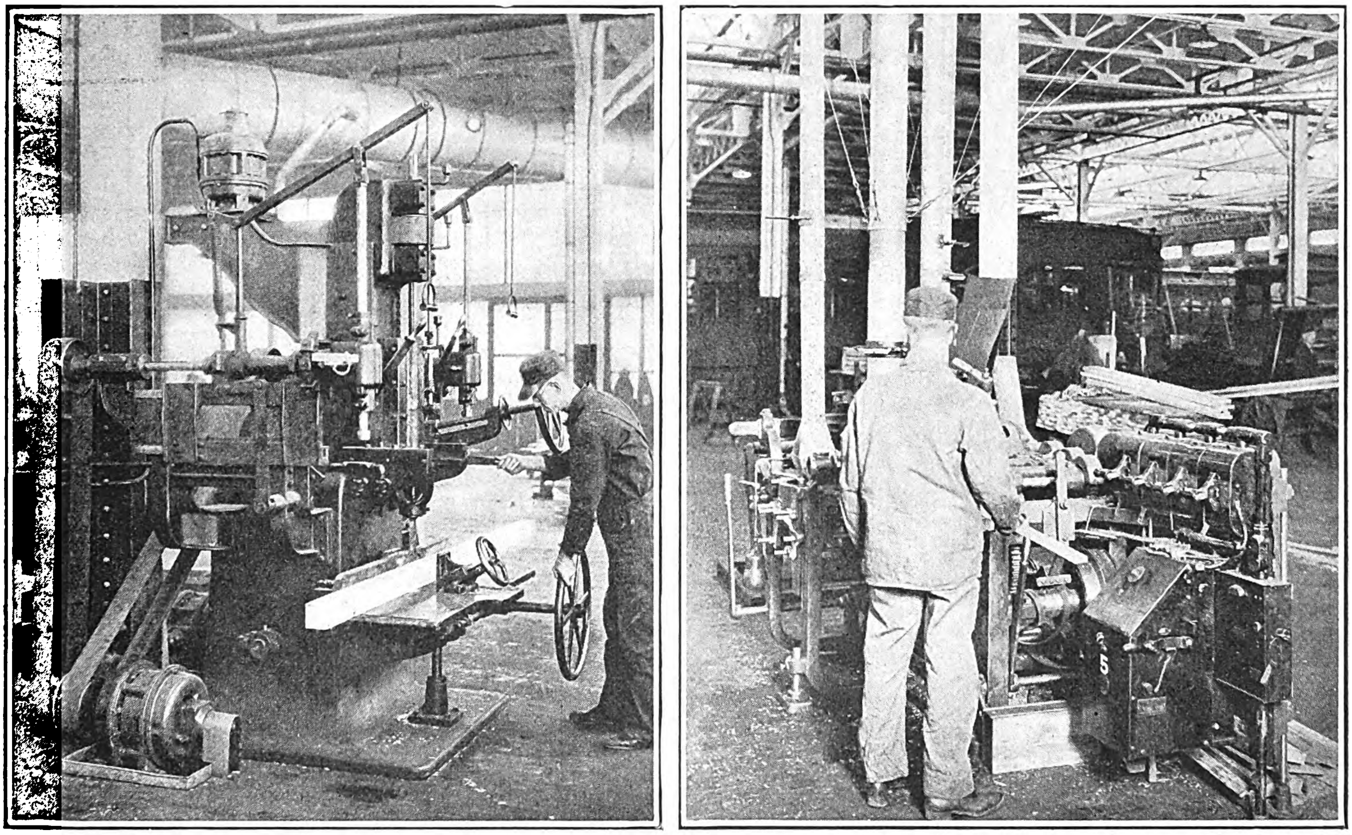
Plan of Wood Mill, Showing Piping and Outlets for Suction System for Collecting Shavings and Sawdust

weighing about 80 lb. each, are sold to jobbers. Sawdust is bagged and sold.

A feature of the dust removal system is the installation of floor sweeps with suction openings at the floor level. These connect with the exhaust piping by 6-in. risers having dampers to reduce power requirements when the sweepers are not in operation. Each sweep has an orifice 2½ in. high and 15 in. long. The arrangement is shown in Fig. 4, page 1066.

The wood mill balcony also contains an upholstery shop, cabinet shop and locker room. On the ground floor is a stockroom for miscellaneous hardware used in car repairs and in the temporary machine shop. A temporary brass room also has been provided in the machine shop beyond the stock room. The upholstery shop chiefly repairs curtains, automobile cushions and canvas, there being few if any cushioned seats in the Boston cars.



At Left—Boring and Mortising Machine (N). At Right—Molder Equipped with Five Motors (S)

CONSTRUCTION OF THE BUILDING

The shop buildings are of concrete construction up to and including the first floor, with brick walls and steel sash, steel-supported roof, wood plank and Pond type skylights. The foundations are laid in soft ground. In the design of the roof particular attention was given to secure the maximum amount of daylight. In general the construction of the mill building and paint shop is uniform, although the woodworking shop is somewhat narrower. The skylights were designed with the lower half stationary and the upper half movable to give efficient ventilation. The operating sides are movable portions, are motor-driven and controlled by push-buttons from the ground floor. A run of 150 ft. represents the maximum which can be conveniently handled in a single section.

The wood shop has 22 tracks and a capacity of 36 cars of 50 ft. length. Pits are provided for 17 tracks. The entire floor of the building is paved with treated wood blocks. The southwest portion of the wood mill is used for general heavy woodwork and the northerly portion of the building is temporarily utilized for blacksmith, tin and machine shops, pending the construction of the metal-working shop north of the present building.

The finished floor was laid over the foundation after the rails were installed and the pits were constructed with a reinforced-concrete foundation. The pits are 4 ft. 7 in. deep from the top of the rail to the pit floor, with offset walls. The pit tracks are laid on tie plates anchored to the concrete and spaced on 24-in. centers, the rails being fastened by standard rail clips spot welded. A small amount of heat is available in the pits, pipe coils being run in the offset on one side. Light outlets are installed on the other side, with extension cords hung up so that they will be out of the way when not in use.

The transfer table, which was built by George P. Nichols & Brothers, Chicago, has a speed of 6⅜ m.p.h. and a weight loaded of 100 tons. It was found that it would be a considerable undertaking to provide a suitable bumper which would stop the table without damaging it, and so the engineers of the railway company installed a so-called natural bumper, with a slope of 30 deg., built of cinders covered with 6 to 8 in. of crushed stone. This has proved satisfactory, as the table will run into it without derailing and apparently without injurious result, either to the table or to the end wall of the transferway.

An Elwell-Parker 3,000-lb. industrial electric crane truck is used for many services about the shops, particularly in handling electric motors and other parts to and from the temporary machine shop, in moving trailers on and off the transfer table and spotting cars on tracks.

At present 373 men are employed at the Everett shops.

ROUTINE OF HANDLING CARS NEEDING REPAIRS

When a car inspector, with the approval of a district supervisor, has sent a car to Everett it is placed on a side track to await inspection so as to determine just what repairs are needed. These often exceed the recommendations of the transportation department, as rotted sills and posts cannot be seen until the sheathing is stripped off and the frame exposed. When a berth in the shops becomes vacant, the next car scheduled for repairs is transferred from the yard to this berth.

As soon as a crew of men has completed another car, they are assigned to the one just placed in the shop. Their first duty is to strip the car unless it is one that has been painted comparatively recently and has just been involved in an accident. In this case the needed repairs are made, the paint is retouched and the car released. About 225 cars per year are sent into the shops on account of collisions.

When a car is stripped all window screens are removed, transferred to the machine shop for repairs and thence delivered to the paint shop for cleaning and dipping. Sash and doors are removed and sent to the sash and door department. The door-operating mechanism is taken down and thoroughly overhauled. Seats and backs are all put in first-class condition and sent to the paint shop for cleaning and repainting. The seat frames are all gone over and any found defective are removed and repaired. Metal and brass hardware is

MOTOR-DRIVEN WOOD MILL MACHINES IN EVERETT SHOPS, BOSTON ELEVATED RAILWAY

Ref. Letter	Description of Unit	Manufacturer	Motor				Control Information
			Hp.	Manufacturer	Type	Rpm.	
I	Plower, sawdust, 80-in.	Sturtevant	75	G. E.	KT 343	1,200	CR 1,034 G. E.
J	Cutoff saw No. 6	American	7.5	G. E.	KT 302	900	CR 1,034 G. E.
K	Rip saw No. 386	Fay & Egan	10	Watson	KH	3,400	D 3,783 Industrial Controller Company compensator
L	Double surfacer No. 140 A	Fay & Egan	10	L. Allis	KH	3,400	Louis Allis
			15	L. Allis	KH	3,400	Louis Allis
M	Band saw, 42-in.	Fay & Egan	10	G. E.	KT 752	1,800	Allen Bradley, KC, form E
N	Car mortiser	Greenlee	5	G. E.	Form C	1,800	Allen Bradley, auto starter
			10	G. E.	Form C	1,800	Allen Bradley, form E, KC
			3	G. E.	Form C	1,900	Allen Bradley, auto starter
O	Spindle borer	Greenlee	4	G. E.	Form D	3,600	CR 705 G. E., magnetic switch, push button
P	Inside molder, 13-in.	Rogers	25	G. E.	Form B	900	KC form E, G. E.
Q	Hand planer No. 506	Fay & Egan	5	F. & E.	Lightning	3,600	Westinghouse, WK 20
R	Band saw No. 50	Fay & Egan	5	G. E.		1,800	G. E., CR 1,038
S	Molder No. 600	Fay & Egan	5	Watson	KH	3,400	G. E., CR 1,038
			3	L. Allis	KT 730	1,800	G. E., CR 1,038
			3	L. Allis	CT form A	3,400	G. E., CR 1,038
			3	L. Allis		3,400	G. E., CR 1,038
			7.5	Watson	KH	3,400	D 3,783 Industrial Controller Co.
T	Universal saw No. 30	American	5	G. E.	Form C KT 731	1,800	CR 1,038 G. E.
U	Buzz planer, 16-in.	Rogers	3	G. E.	KT 715	3,600	Allen Bradley J 1,552, push button
V	Shaper No. 452 F	Fay & Egan	5	F. & E.	Lightning	6,800	CR 1,038, G. E.
			5	F. & E.		6,800	CR 1,038, G. E.
			10	G. E.	KT 751 form C	1,800	CR 1,034
			7.5 kw.	L. Allis	(Generator)	1,800	
W	Tenoner No. 2	Houston	5	G. E.	KT 752 form C		Allen Bradley, J 1,552
X	Tenoner No. 505	Fay & Egan	3½	F. & E.	KT 28 form D	3,600	CR. 1,038 G. E.
			2½	F. & E.	KT 16 form D	3,600	CR 1,038 G. E.
Y	Mortiser No. 510 A	Fay & Egan	5	F. & E.	CT form A	3,600	CR 1,038 G. E.
Z	Cabinet surfacer No. 156	Fay & Egan	10	F. & E.	KH form A	3,400	L. Allis D 3,783
AA	Bevel and miter saw No. 22	Pettingell	5	G. E.	KT 752	900	G. E., CR 1,038
BB	Universal wood worker	Fairbanks	5	G. E.	KT 731	1,800	
CC	Patternmaker's lathe No. 441	Fay & Egan	3	Wstn. Elec.	KT 730	1,800	G. E., CR 1,038
DD	Chamfering machine No. 294	Fay & Egan	5	G. E.	KT 731	1,800	G. E., CR 1,038
EE	Belt sander No. 6	American	2	G. E.	KT 731	1,200	G. E., CR 1,038
FF	Three-roll sander No. 393	Fay & Egan	1-7.5	Wstn. Elec.	KT 751	1,200	2 CR 1,034 2 CR 1,038
			1-7.5	Wstn. Elec.	KT 952	1,200	
			1-3.0	Wstn. Elec.	KT 750	1,200	
			1-5	Wstn. Elec.	KT 752	1,200	
GG	Disk sander No. 446	Fay & Egan	1.5	"Superior"		1,200	CR 1,038 G. E.
HH	Grindstone	American	1	G. E.	KT 711	1,800	CR 1,038 G. E.
II	Saw sharpeners						
	Circular and band saw	Wardwell		Robbins & Myers			
JJ	Knife grinder No. 101	American	2	G. E.	KT 713	1,800	CR 1,038 G. E.
KK	Buzz planer, 16-in.		3				
LL	Universal saw	American	5				
MM	Saw	Fairbanks	5	G. E.	KT 936	1,800	J 1,552 Allen Bradley
NN	Doweling and rod machine No. 7	Fay & Egan	5	G. E.		1,800	CR 1,038 G. E.
	MACHINE SHOP						
PP	Squaring shears 8 E.	Niagara	7.5	G. E.	KT 952	1,200	G. E. auto-compensator
QQ	Punch No. 36	Niagara	3	G. E.	KT 938	1,200	CR 1,038, G. E.
RR	Power rollers		3	G. E.	KT 732	1,200	CR 1,038 G. E.
SS	Hammer No. 1066	Nazel	7.5	G. E.	KT 952	1,200	CR 1,034 G. E.
TT	Circular shears No. 208 A	Niagara	3	G. E.	KT 938	1,200	CR 7,005 G. E., magnetic switch
UU	Emery wheel	U. S. Electric Tool Company	3	G. E.	KT 731	1,800	CR 7,005 push-button control G. E.
VV	Shop shafting		10	G. E.	RC-9	1,250	Type 2,102 monitor control
WW	Shop shafting		30			875	Old d.c. motor, 550 volts, trolley supply
XX	Buffer	U. S. Elec. Tool Co.	5	G. E.	KT 731	3,600	CR 7,005 push-button control G. E.
YY	Buffer	U. S. Electric Tool Company	5	G. E.	KT 731	3,600	CR 7,005 push-button control G. E.
ZZ	Saw	American	5				
AAA	Crane hoist	Shepherd 5-ton	6				D. C. motor
BBB	Car body hoist			G. E. 58			
CCC	Car body hoist			G. E. 58			
FFF	Emery wheel		¼	Westinghouse	ES 8,731		Westinghouse WK 10 starter

MISCELLANEOUS EQUIPMENT

16 Heater blower motors, G. E., 5 hp., type KT 731, conduit type N 4 control.
1 15-kw. Fairbanks-Westinghouse-Crawford electric oven in wood mill.
2 Pump motors, 3 hp., 900 r.p.m., 550-volt, conduit type I starting switches.
Window sash mechanism, 16 G. E., KT 22-hp. motors; Fairbanks-Morse RC 4 starters.
2 Salem electric elevators, each with 30-hp. G. E. MT 332 motor and Cutler-Hammer control.
1 32-kw. Crawford-Westinghouse electric oven, ½-hp. blower motor.
1 7.5 Crawford-Westinghouse electric oven, Westinghouse type F magnetic contactor.

all removed and sent to the brass room for cleaning, repolishing and lacquering. If the car is old and shows indications of rotten framing it is further stripped of all outside sheathing and possibly the floor is removed.

From this point the rebuilding begins. All rotten portions, such as posts and framing, are removed carefully and sent to the mill, where exact duplicates are made, this being found more economical and quicker, with the modern machine tools available, than the old method of trying to fit new parts to the car at the repair track. The original timbers are cut in many ways to fit the contour of the car and to allow clearance for rivet heads, bolts, angles, etc. Sheathing plates, if badly corroded or bent, are sent to the sheet-metal department to be straightened or duplicated. Bumpers, if badly bent, are taken off, reheated and are then reshaped.

Gradually every part removed is returned to the car renovated or duplicated, the framing is replaced and spliced, the car resheathed, the floor laid and every detail gone over and made good. The doors and windows are put in and the car sent to the paint shop. There the final trimming of hardware is replaced, seats are put in and window screens are attached, glass cleaned and the final trimming is done just before the car is sent out.

Boston-Lowell Buses Run Express

Parlor Car Service Recently Established by the Eastern Massachusetts Street Railway on this 27-Mile Route Supplements the Rail Service Between These Cities

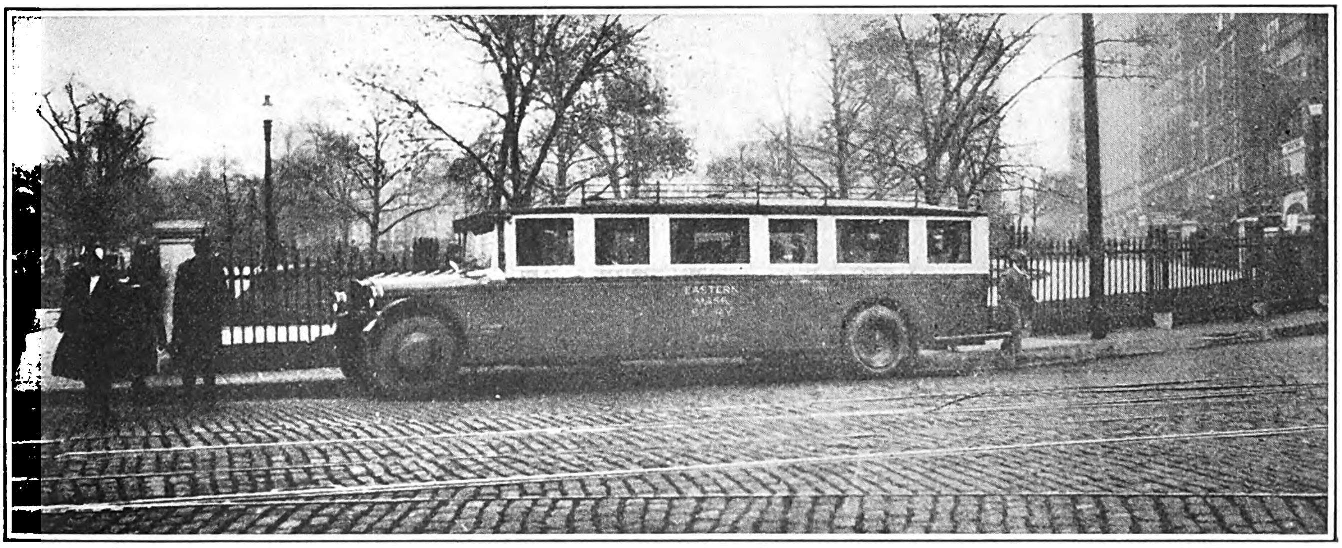
EXPRESS bus service or, as the railway prefers to call it, motor coach service between Boston and Lowell was inaugurated by the Eastern Massachusetts Street Railway on Oct. 1, 1924. To a certain extent this service takes the place of a street car route which was abandoned some time ago because of poor patronage. It serves also to supplement the service on an existing car route which is operated from Boston to Lowell via Chelsea. In order adequately to take care of local passengers it is necessary to make all stops along this line, and for that reason the company felt that it would be worth while to undertake express bus service for the through passengers between the two cities.

Park Square, Boston, is the southern terminus, and from there the route goes out Charles Street across the Charles River and then via Cambridge Street to Massachusetts Avenue, just beyond Harvard Square. Then it follows what is known as the "back road" to Lowell. This highway has recently been repaved by the State of Massachusetts. By following these streets from Boston through Cambridge the traffic congestion on the more popular streets is avoided and considerable time is saved.

The route is 27 miles long and the running time is approximately 1 hour and 10 minutes. This is slightly more than the ordinary running time of trains on the Boston & Main Railroad between these cities, and is considerably longer than the time of express trains. On the other hand, the fact that the buses start from the convenient Park Square terminus in Boston and reach a convenient point in the center of Lowell makes this service more attractive in that respect than the railroad service, which starts from and arrives at stations less centrally located. The fare on the bus is $1 and on the railroad 93 cents. At both ends of the line illuminated signs made of wire glass have been conspicuously placed on electric light poles to inform the public concerning the service.

TERMINALS ARE CONVENIENTLY LOCATED

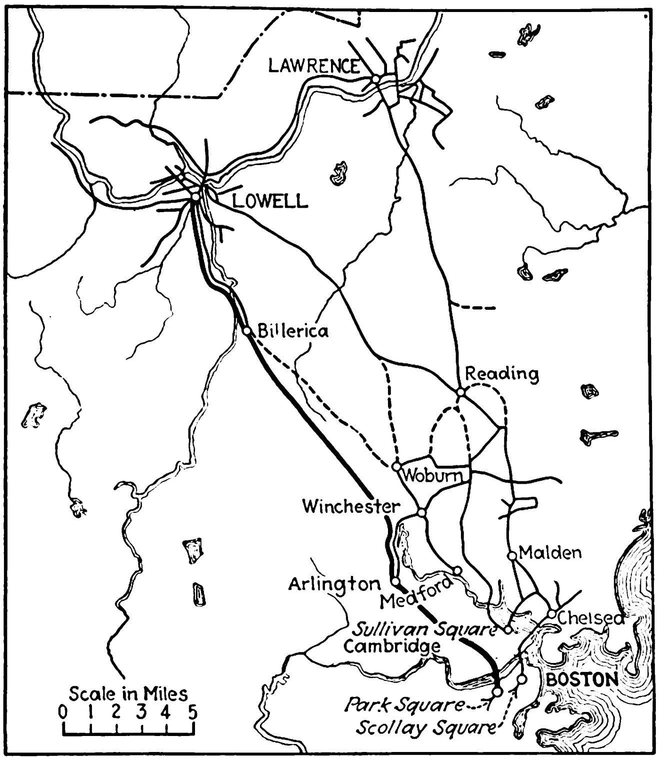
When this operation was first undertaken ten round trips were run per day, the first leaving Lowell at 7.30 a.m. and the last at 9.30 p.m. Leaving Boston the first trip was at 9 a.m. and the last at 11:15 p.m. Traffic has varied greatly from day to day, ranging between about 300-passengers as a minimum and 600 passengers as a maximum. For the first six weeks after the commencement of bus operation an uninterrupted period of fair weather prevailed. Saturday, Sunday and holiday riding has been heavy. Recently the increase in the number of passengers carried caused the railway to increase the service. On Nov. 8 an hourly headway throughout the day was established in both directions.



Express Bus Operated by the Eastern Massachusetts Street Railway Between Boston and Lowell Loading Passengers at the Park Square Terminus

Because the running time in each direction is slightly more than an hour, the company thought that it would be undesirable to try to operate an hourly headway with only two buses. For that reason three buses are now in service all day, with fairly long lay-overs at the ends of the line. By starting the trips from Lowell on the even hours and from Boston on the half-hours the lay-over time has been divided equally between the two places.

Five Fageol coaches are available for this service. On Saturday afternoons, however, when important football games were being played in Boston, it was necessary to augment the service by the use of street car type buses, borrowed from other routes operated by the railway. A plan is under consideration at present to increase the seating capacity of the Fageol coaches from 24 to 30.



Two Routes Are Operated by the Eastern Massachusetts Street Railway Between Boston and Lowell. Trolley Service Is Via Chelsea, While the Express Bus Service Operates Through Cambridge

The buses are maintained in a space specially set aside for that purpose in the carhouse at Lowell. An experienced automobile mechanic is employed to take care of them. Ordinarily each bus is inspected every third day, or at the end of approximately 600 miles of operation.

Part of the route, which is shown on the accompanying map, is on streets where the Boston Elevated Railway operates surface cars. Another part is on streets where the Eastern Massachusetts company operates. This will simplify the problem of snow removal in winter because the railway snow-fighting equipment can clear a considerable portion of the bus route. The stretch of road where the railway plows cannot operate is only a few miles in length. This being a state highway it is expected that the state will keep it clear. In an emergency, however, the railway is prepared to clear a path for its buses by means of snowplows on its heavy motor trucks.

In accordance with the laws of Massachusetts, the permit for the operation of this line is of only one year duration. Such short term license, however, is not the serious disadvantage to a bus line which it would be for a rail line. The company feels that there may be room for the establishment of similar routes in this territory. In general, however, it is thought that the replacement of railway lines by bus lines has already proceeded in Eastern Massachusetts about as far as it is likely to go.

Giving the Riders Somewhere to Go*

Charleston Consolidated Railway & Lighting Company Leased an Amusement Park and Made a Profit of Nearly 120 per Cent in Two Months

AT ONE time the comment was often heard concerning the street railway in Charleston, S. C., that "It doesn't take you anywhere." In other words, the various routes linked the business and residence districts together but they reached practically no amusement resorts. There are two parks for white people, but in spite of the great natural beauty which they possess, they have not attracted many pleasure seekers. The railway considered the possibility of converting these parks into sources of traffic for itself, but it was felt that a large majority of the frequenters of the parks were automobile owners and that it was not worth while to try to build up an amusement resort for white people.

With the colored people, however, the situation is different. A property known as Grant Park, located on a suburban line about a mile beyond the city limits, was successfully operated by the railway before the war. In the spring of this year it was decided to negotiate with the owner of this park with a view to its operation during the summer. An agreement was reached whereby the railway paid $250 toward the renovation of the buildings and agreed to furnish music and prizes for dances to be held at the park.

Tickets were furnished by the conductors to colored passengers alighting from the cars at Grant Park. On nights when dances, band concerts, or picnics were held, these tickets entitled the possessor to free entrance. All such tickets collected above 150 in number were redeemable, if presented by the owner of the park to the management of the railway, at 2½ cents each. The first 150 collected each day were used to reimburse the railway for its expense in furnishing music and other entertainment features.

During the first two months' operation the railway carried approximately 8,000 park passengers at 25 cents per round trip, making a total of $2,000. The largest single item of expense to the company was the extra service run to the park. This cost somewhat over $400 and the other expenses brought the total to slightly more than $900. The net profit of the operation was therefore in the neighborhood of $1,100. This experience has convinced the railway that it can profitably increase its park appropriation for another year. It proves, in the opinion of the management, that it pays to give the riders "somewhere to go."

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*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

Many Railway Improvements in Central Pennsylvania

New Cars, Extensive Track Reconstruction, Better Shop Facilities and Bus Operation Are Among the Recent Developments at Johnstown, Altoona, Harrisburg and York

By Spectator

The Center of the Square at York Is Reserved as a Loading Area for Trolley Passengers

PENNSYLVANIA is always an interesting state from an electric railway point of view. It has more individual companies than has any other state in the Union and its total electric railway mileage is exceeded only by that of New York. It is particularly interesting, however, on account of the number of up-to-date street railway systems in its moderate-sized cities. Johnstown, Altoona, Harrisburg and York are four such cities, ranging in population from about 50,000 to 75,000 and located comparatively close together in the central part of the state. In all of them important improvements have lately been made in track, shops and rolling stock.

Considering the size of Johnstown, which is credited with a population of only 67,327 by the census of 1920, a surprisingly large outlay has been made by the Johnstown Traction Company to improve its service during the last few years. Since the beginning of 1920 more than $850,000 has been expended for track reconstruction and paving. Every year the amount spent for this work has increased, as shown in the following table, which was published in a newspaper advertisment wherein the railway explained some of its problems to the public.

1920	$105,029
1921	140,721
1922	143,331
1923	222,869
1924	239,520

Installation of an extensive new system of sewers in the city has necessitated much of the track reconstruction. This new system is not yet completed and the railway is faced with the necessity of making similar large expenditures for some time to come.

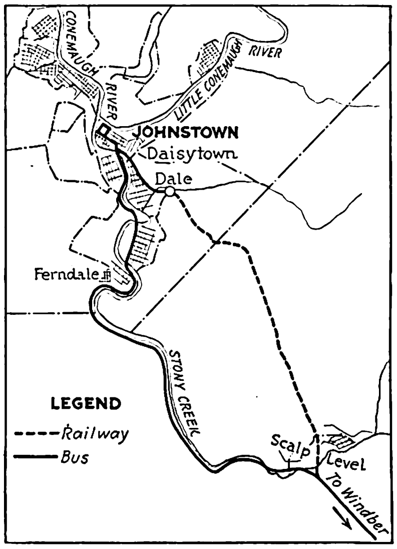
These heavy demands upon the company were one reason for an application filed in the fall of this year with the Public Service Commission for a slight increase in fare. This was put into effect in September. The ticket rate was increased from four for 28 cents to four for 30 cents, or, in other words, from 7 cents to 7½ cents per ride, while the cash rate was increased from 7 cents to 10 cents. There has been practically no opposition to this increase because most people realize the reasonableness of it. One interesting result, however, has been the greatly increased use of tickets. This has grown by leaps and bounds until now 98 per cent of the revenue passengers use tickets. In fact, strangers in the city are almost the only ones who pay the 10-cent cash fare.

The railway is gradually extending the use of one-man cars by rebuilding some of its older rolling stock. In the reconstruction of a number of double-truck cars for one-man operation, the seating arrangement has been altered with a view to encouraging passengers to move to the rear of the car. Formerly these cars had longitudinal seats and were operated with rear entrance and front exit. Now, however, five cross seats have been installed on each side at the back end and the heater has been moved from the middle of the car to the back platform. In place of the old rear entrance door a small emergency door has been provided. On the far side of the rear platform has been placed a semi-circular seat. By this means the total seating capacity of the car has been increased somewhat and it has been found that the universal desire to ride in cross seats causes passengers to move to the rear of the car.

Soon after the completion of a new concrete state road between Johnstown and Windber applications were made by a number of independent bus operators to run over this route. Windber is a mining town of about 12,000 inhabitants. The traction company, however, operates an interurban line between these places, and it was felt that competitive bus operation between the same points would be likely to affect its revenue seriously. Accordingly the railway itself made application to operate bus service over such portions of the route as were not conveniently served by its cars.

At some places the state highway is as much as 3 miles away from the car line and the bus route was laid out with a view to serving the people living in this district. The railway line goes all the way to Windber, a distance of approximately 12 miles. The bus line, however, stops at Scalp Level, about 9 miles from Johnstown. The company felt that bus operation between Scalp Level and Windber would be only a needless duplication of its existing service.

The bus route begins at the end of the city car line in Dale Boro, as shown on the accompanying map. The fare is 40 cents to Scalp Level, including the fare on the connecting city car line. Inbound a free transfer is given from bus to car. This rate is considerably higher than the fare on the electric line, which is only 30 cents through to Windber. A single bus is operated on a one-hour headway, covering about 200 miles per day. On weekdays the passengers number about 200, but on Saturdays more are carried. On account of the many severe grades in this territory bus operation is expensive and the line shows a considerable loss. Nevertheless this is to be preferred to having independent bus operation on the route.



Bus and Car Routes Between Johnstown, Scalp Level and Windber, Pa.

Two other short bus routes are operated by the company. These are feeder lines into districts not served by the cars. All these bus operations are carried on under the name of the Traction Bus Company. An interesting characteristic of the service is that each driver has his own bus. When a relief is made not only is the operator changed, but also the bus itself. This method, the company has found, results in the driver taking a greater interest in the care of the vehicle. In all, five buses are owned, three of which are in regular service while two are spares.

Railway service between Johnstown and Windber has also been improved recently. Three new light-weight interurban cars were purchased from the Kuhlman Car Company and placed in service during the summer. These cars are operated by two men and the headway is 40 minutes, or slightly shorter than the bus headway. The railway is now considering the purchase of some more new cars.

CHANGES AT ALTOONA

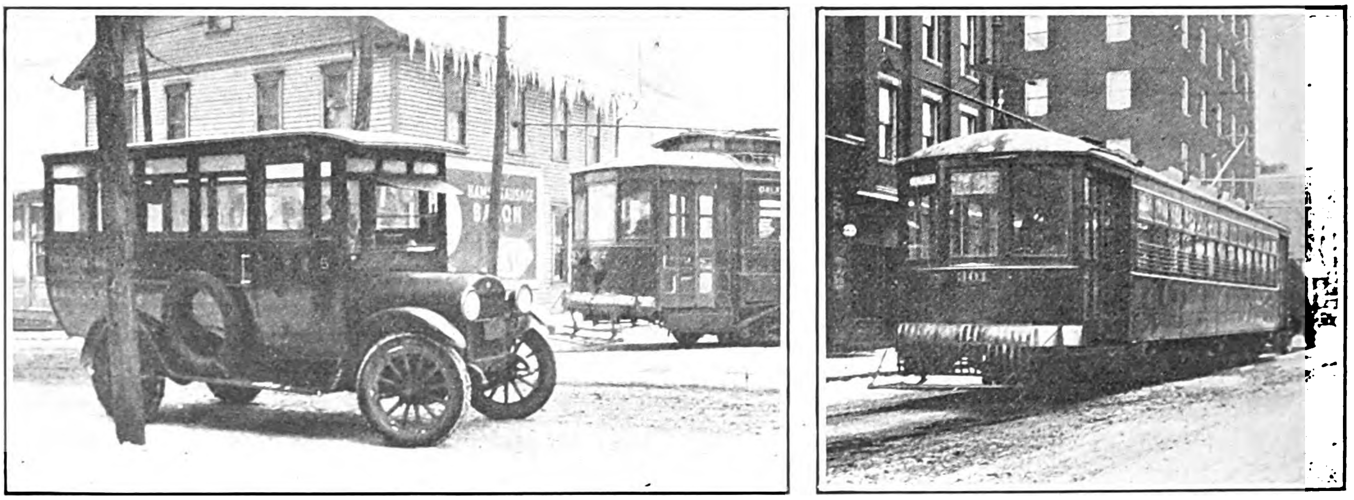
A striking change is soon to come over the railway situation in Altoona. The color of the cars is to be changed from dark green to cadmium yellow. This will be a great improvement and should have a distinct tendency to encourage riding. Due to climatic conditions and the fact that it is a great railroad center, Altoona often has a rather gloomy aspect. Despite the best efforts of the shop department to keep them fresh looking the dark green street cars blend altogether too well with the murky atmosphere.

In making this change the company is following the precedent which it set when selecting a color scheme for its buses. The buses operated by the Altoona & Logan Valley Electric Railway have a bright red body and a yellow roof. A yellow band encircles the body just below the window. On this the name "Logan Valley" is painted in blue letters.

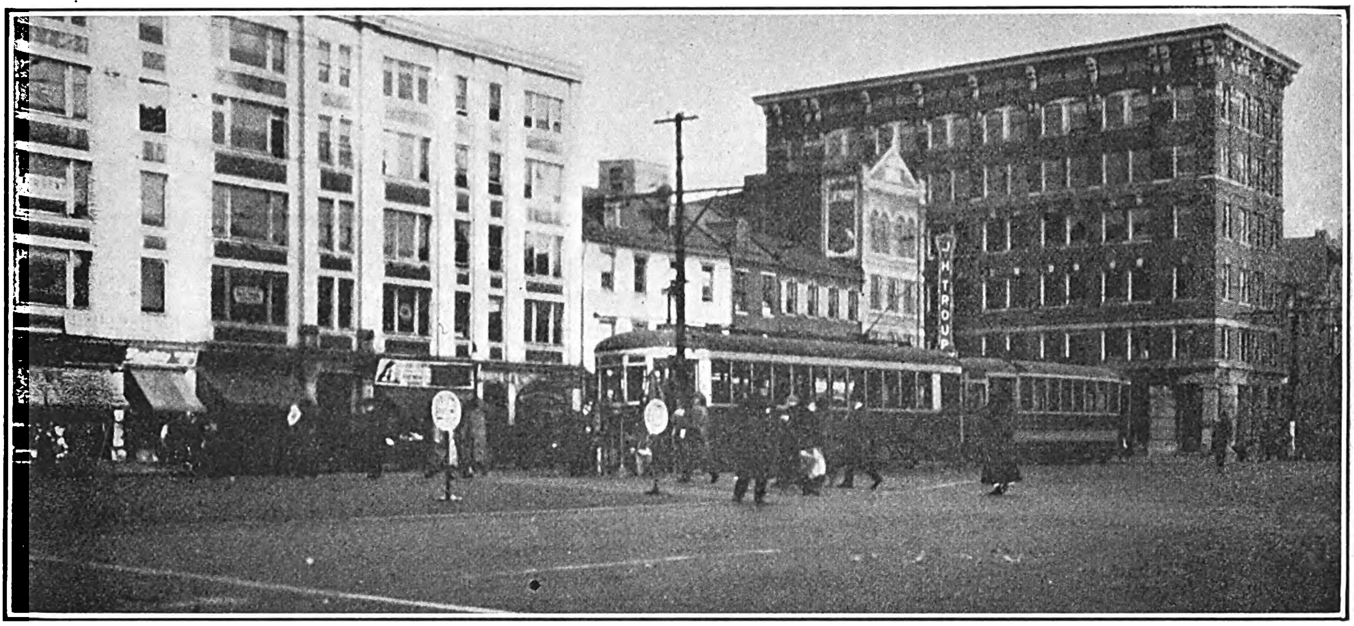
Like many other and bigger towns Altoona, which has a population of approximately 60,000, is worrying about traffic congestion. A survey of street traffic was recently made by the railway at one of the busiest intersections in the downtown district. This count was made from 8 a.m. to 6 p.m., and it was found that street cars comprising only 7.8 per cent of the total number of vehicles carry 74 per cent of all passengers. The figures for various types of vehicles follow:

	Vehicles	Passengers
Autos and trucks	6,401	12,802
Street cars	556	36,000
Motorcycles	18	18
Bicycles	162	162
Horse drawn	22	22
Total	7,159	49,004

Expressed in terms of lineal feet of street space occupied, 100 passengers in street cars require 60 ft., whereas the same number in automobiles require 750 ft. Even with the larger traffic carried, the street cars during the 10 hours of the survey occupied less than one-third the street area taken by the automobiles. These data have been presented to the police department for consideration in connection with their study of the traffic problem.



Left—The Scalp Level Bus Meets the City Car Line at Dale Boro. Right—One of the New Light-Weight Interurban Cars Operated on the Windber Line of the Johnstown Traction Company



The Square at Harrisburg. The Railway Here Is Fortunate in Having Rolling Stock of Uniform Appearance

A number of streets in the business district of Altoona are now restricted to movement in one direction. There is some talk of changing the direction of traffic on two of these streets. Such a change would involve rerouting of the cars and the installation of new special work. Along with this it is planned to install a system of interlocked traffic signal lights. Just why the city wants to do this is difficult to understand. The arrangement of streets and traffic conditions at the different intersections are such as to make it practically impossible that interlocked signals would facilitate traffic movement. On the other hand, they would undoubtedly be a considerable hindrance to the 74 per cent of the people who ride in street cars.

In its shops the railway is carrying out a number of important although not spectacular improvements. Some new machine tools that have been installed have given very satisfactory service and it is planned to purchase others. Improvements have been made also in the power house, particularly in the arrangement of switches and control panels. The railway buys power from the Penn Central Light & Power Company, but it maintains sufficient facilities of its own to operate in an emergency. Ordinarily its own power station takes care of the steady, all day load and relies upon the Penn Central to carry the peak.

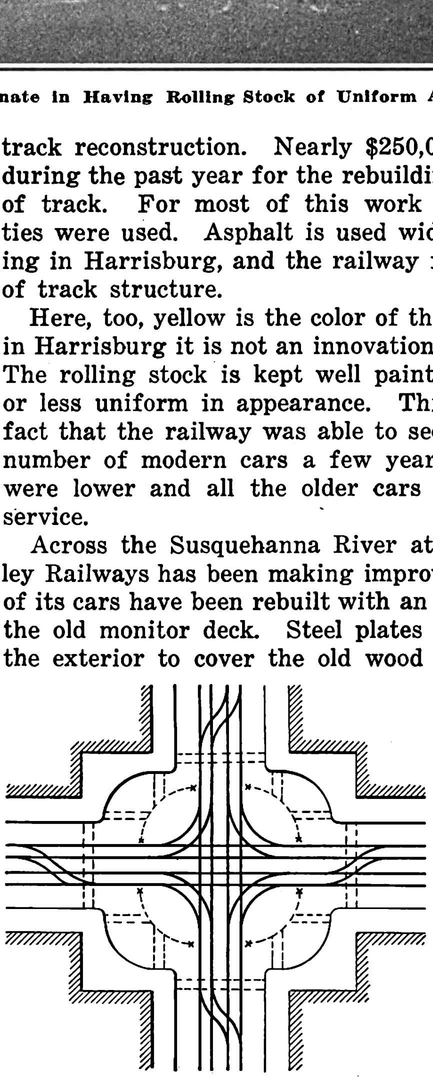
PULL-INS REDUCED AT HARRISBURG

Probably the most interesting thing which has recently been done by the Harrisburg Railways is the reduction in the number of pull-ins. Since the first of the year the average number of car-miles per pull-in has been increased from somewhat less than 3,000 to nearly 15,000. This has come about as the result of a systematic campaign to determine the reason for every pull-in and to eliminate those causes which were responsible for the greatest number. Much improvement has been effected since the installation of dipping and baking facilities at the shop. These will be described in a separate article in ELECTRIC RAILWAY JOURNAL. A change in the kind of waste used in packing journal boxes was another move which is thought to be responsible for the elimination of many pull-ins.

As at Johnstown, large sums have been expended for track reconstruction. Nearly $250,000 has been spent during the past year for the rebuilding of about 5 miles of track. For most of this work International steel ties were used. Asphalt is used widely for street paving in Harrisburg, and the railway favors a rigid type of track structure.

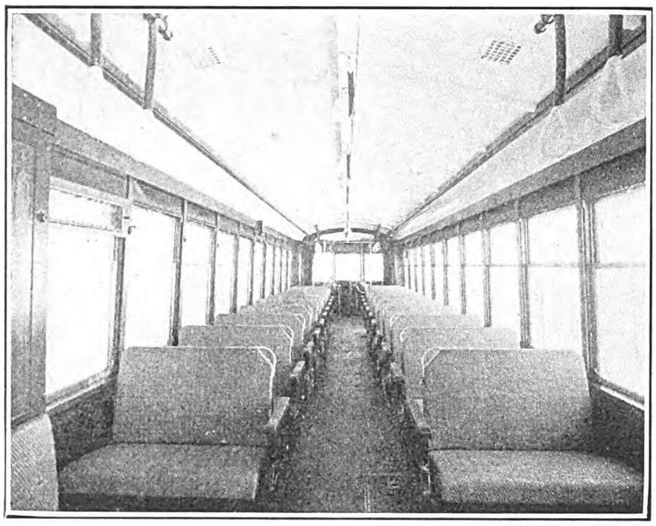
Here, too, yellow is the color of the car exteriors, but in Harrisburg it is not an innovation as it is at Altoona. The rolling stock is kept well painted and is all more or less uniform in appearance. This results from the fact that the railway was able to secure a considerable number of modern cars a few years ago when prices were lower and all the older cars were retired from service.

Across the Susquehanna River at Lemoyne the Valley Railways has been making improvements, too. Some of its cars have been rebuilt with an arch roof replacing the old monitor deck. Steel plates have been used on the exterior to cover the old wood sides and give the car a more attractive appearance. Rumors are afloat concerning the possible sale of this railway to a holding company, but no definite announcements have yet been made.



City Cars Leave the Central Square at York, Pa., on the Hour and at 5-Minute Intervals Thereafter

In the late fall the York Railways commenced the operation of new light-weight cars on the Red Lion and Windsor line. This is a 13-mile interurban line with single track and turnouts. The running time outbound from York is 46 minutes and inbound it is 52 minutes. There are two reasons for the difference—one being that the inbound route from Windsor to Red Lion is generally uphill, and the other that a 3-minute layover occurs inbound at Red Lion.



An Interior View of the New Interurban Car of the York Railways, Showing the Linoleum Floor Covering and Arm Rests

The cars were built by the J. G. Brill Company and one of them was on exhibition at the American Electric Railway convention at Atlantic City. As delivered by the manufacturer the car weighs 38,962 lb., but the actual operating weight is 39,400 lb. Four General Electric No. 247 motors are used per car.

In general appearance the new cars differ somewhat from any heretofore used by this company. The sides are curved and an arched window has been placed in each corner. The sides of the car are of Plymetl and the roof is of Haskelite. Special pains have been taken to make the interior of the car attractive. The floor has been covered with linoleum and arm rests are provided for the seats. The interior finish is light mahogany and an interesting feature is that all piping, etc., has been painted in accordance with the interior finish to make it as inconspicuous as possible. Seats are on 33-in. centers. Altogether seating accommodations for 52 passengers are provided.

These cars replaced older equipment weighing 55,000 lb. An important reduction has been effected in the energy used. Three cars of this type, enough to equip this line with one to spare, have been purchased. Two similar cars but of smaller capacity have been ordered for use in city service.

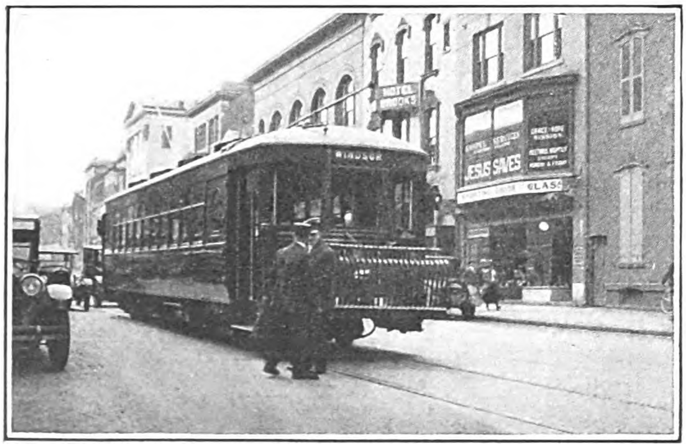
In common with many Pennsylvania towns the city of York has a central square, where the two principal business streets intersect. By painting white lines on the pavement and placing stanchions at intervals the city has laid off a circular area in the center where trolley passengers may wait for their cars. All vehicles other than trolley cars crossing the square must follow a circular path around the outside end of the loading area. Vehicular movements are controlled by interlocked electric light signals at each approach. These are so arranged that wheeled traffic stops and goes simultaneously, while pedestrians have the right of way on all crosswalks during the intervals between vehicular movements.

All the car routes of the York Railways reach this square. On one street two city lines operate on a 10-minute headway, giving a 5-minute joint spacing. On the other street three lines operate, each on a 15-minute headway, giving a similar 5-minute service. Schedules have been so arranged that connecting cars meet at the square. Cars discharge passengers before crossing the intersection and then proceed to the far side to load. On the hour and at 5-minute periods after the hour three or four cars leave the square simultaneously in different directions.

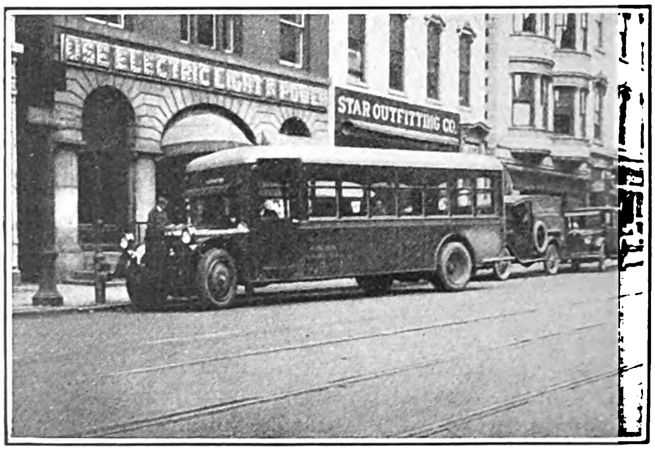
On account of the large number of railroad crossings at grade and also because of the comparatively high schedule speed of the street railway, two-man cars are operated on most of the lines. These are single-truck cars weighing 23,500 lb., built by the J. G. Brill Company in 1922. General Electric No. 247 motors are used with 26-in. wheels. The schedule speed is 10.3 m.p.h. and the cost of operation averages somewhat below 30 cents per car-mile. The present rolling stock on these city lines will soon be augmented by the new cars already mentioned.

An interurban bus line from York through Loganville and Shrewsbury to Turnpike has been operated by the York Railways for about a year. Bus operation is carried out under the name of the York Transit Company, a subsidiary of the railway. This company also operates two other bus routes, which have been so poorly patronized that application was made to the Pennsylvania Public Service Commission for their discontinuance, as told in the ELECTRIC RAILWAY JOURNAL for Nov. 29. The results on the Turnpike route, however, have been more encouraging, and up to the present this line has been paying a little more than its operating expenses.

The length of the route is 14.15 miles one way and through fare is 65 cents. For intermediate points, the fare averages between 4 cents and 5 cents a mile. Commutation rates are in effect for those who use the service regularly. On weekdays three round trips are operated, while five trips are made on Saturday and two on Sunday.



New Cars of This Type Have Reduced Energy Consumption on the Windsor Line of the York Railways



New Fageol Bus Loading in Front of the Traction Office at York Before Starting for Turnpike

A new 29-passenger Fageol bus was recently placed in service on this route. Cars of the railway are painted green, but the color scheme of the bus is orange and royal blue, with a gray roof. The reason for the adoption of these colors was the desire to give the vehicle a distinctive appearance and attract public notice. It is expected that with this new bus the operating cost will be lower and that the traffic will be increased.

An outstanding feature of the electric railway situation throughout the state of Pennsylvania is the freedom from cut-throat bus competition. The attitude taken by the Public Service Commission is an eminently fair one. No needless duplication of service is permitted, and the railways have thereby been enabled to improve their facilities to a greater extent than would have been possible if they had been constantly harassed by uneconomic competition. On their part the railways have done much to supply feeder service.

Work of the Baltimore Mileage Bureau[*]

New System Installed Obtains Mileage by Lines, Days, Individual Cars, Etc.—Automatic Tabulating Machines Make Calculation for Any Desired Classification Quick and Accurate

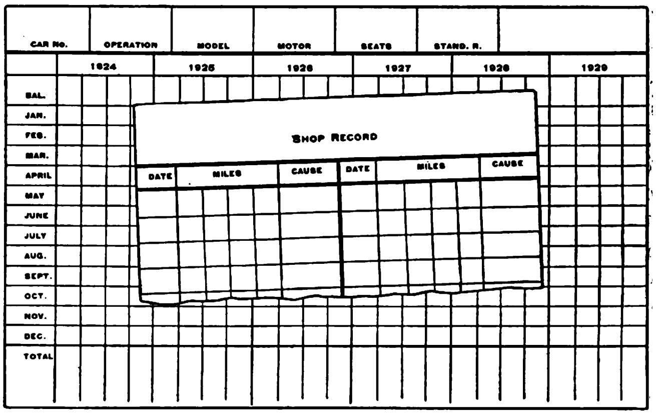
BEING dissatisfied with the accuracy and completeness of its car-mile figures, the United Railways & Electric Company of Baltimore, Md., installed a new system of recording mileage, beginning with Jan. 1, 1924. This was done with the idea of increasing the accuracy of its figures, reducing the bulk of the record, and at the same time making available to the operating department a larger amount of information than it had previously been able to secure.

This company operates approximately 1,500 cars over 35 lines. Each line, however, has a number of runs, a run being defined as a trip over a designated route between designated termini, so that, all told, the system must care for approximately 200 different runs. The total mileage for each of these runs must be determined daily and checked against the schedule requirements. There must also be a monthly and an annual summary of the mileage by runs, by lines, and for the system as a whole, as a general measure of the service that is rendered.

The true measure of service is not so much the car-mile as the seat-mile and also, though to a lesser extent, the standing room-mile or the product of the standing capacity in excess of the seating capacity into the car-miles run.

In addition to this service information, the mechanical department desires to know the total number of miles operated by each car, not only from month to month but also between any important alterations, such as a replacement of a motor, turning down or replacement of wheels, repainting or other important repairs. It also desires to know the total mileage run by each type of car, by each type of car motor, and by individual groups of cars having any one of a number of common characteristics. It is also necessary to distinguish between various types of operation. For example, the company runs unit motor cars, trains of one motor car with one trailer, trains of two motor cars, trains of two motor cars and one trailer, and trains of three motor cars. It is desirable to have an individual record of the mileage made by each car, in addition to the mileage of each type of train in such operation.

The system of recording mileage is based on the use of automatic tabulating machines. The basic information furnished by the line superintendents at the various carhouses is arranged to make the tabulating easy.



The Permanent Index Is on 5-In. x 8-In. Cards, Which Carry the Monthly Figures for 6 Years and on the Back a Record of Pull-Ins

Each run is given a code number, the first two figures of which indicate the line and the last two the particular run on that line. Each morning a report of the previous day's operation is sent in on a form which contains the code number, the number of each car operated during the previous 24 hours, whether motor or trailer, and the number of trips of each type of operation made on that particular route. The line superintendent totals the number of trips and signs the report.

Each line superintendent is furnished by the traffic department with a number of schedules corresponding to variations in service from day to day during the week. When it is necessary to vary the runs from the schedule, in order to give extra trips or to curtail the service, due to temporary conditions, it is reported on a single sheet for each line. The report slips of all the runs on a given line and the reports showing variations from the standard schedule for that line are placed in a single envelope 4¾ x 11 in., as shown in an accompanying illustration. This envelope is indorsed with the date, the number of the line, the number of the schedule operated and with check marks opposite the last two numbers of the run codes which are to be found within the envelope. The envelope is then signed by the line superintendent and forwarded to the mileage bureau.

At the mileage bureau the slips for the individual runs are first verified as to their coding and as to the total number of trips made. This is then checked with the schedule requirements for the day, to determine whether the report of extra and short runs is accurate.

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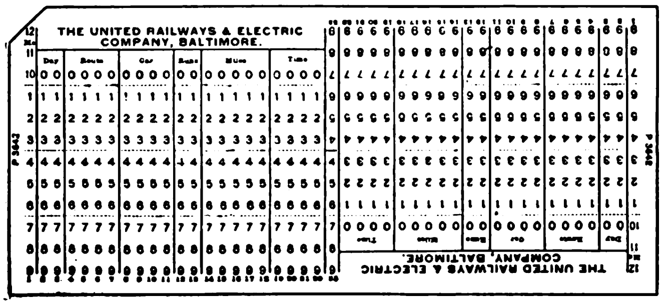
[*] This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

The slips are then passed to a punch operator, who punches a run master card of the ordinary type used with automatic tabulating machines. The punch card contains columns for the month, day, trip, car number, route, trips, card count, miles, and minutes. A line master card, using the same form, is then punched and the listing by lines, with a grand total for the system, is added to the previous listing. The completed listing, together with the totals of the reports on extra and short runs, is then forwarded to the traffic department for its records.



One of the Punch Cards for Tabulating Individual Car Records

Meanwhile the original report slips have gone back to the punch operators, who punch a card for each car operated on each run. This card, shown in one of the illustrations, contains columns for month, day, route number, car number, number of runs, number of miles, and time. In order to determine the number of miles and minutes operated, a series of mileage tables has been prepared covering any trip likely to be run by a car within the 24-hour period. A typical table of this sort is illustrated herewith. In practice, however, it is not necessary to punch the minutes on anything but the run master card. These cards are then listed and verified and compared with the totals for the individual runs and lines already completed.

Every 10 days cards for individual cars are sorted and filed by car numbers, and at the end of each month the entire list of cards for that month is listed and totaled by individual car numbers. This gives the total car mileage for each car during the month.

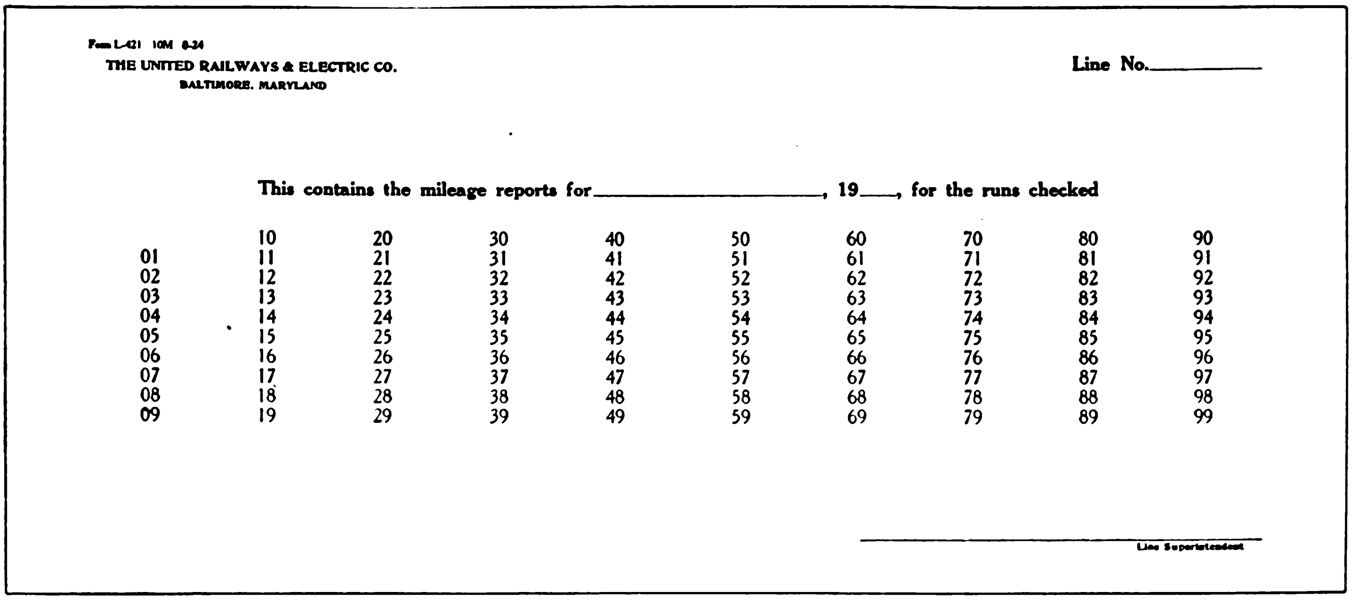
It will be noted that the car card is reversible and can be used a second time. The 23d column is divided. The half belonging to each end of the card is used to designate the type of operation. Before the cars are sorted by car numbers, they are first sorted for type of operation, so that the final record at the end of the month shows not only the mileage for each car, but also the type or types of service which the car rendered.

When the monthly listing is complete, the totals for each car are posted to the permanent index, consisting of a 5 x 8-in. card, illustrated herewith. The card is arranged to carry the monthly figures for a period of 6 years. For the sake of convenience, single-unit car operation is indicated by a white card, while the various other types of operation are shown on colored cards. It is obvious that by an inspection of this card, the total mileage of any individual car may be determined quickly from the beginning of the system down to the end of any particular month. It is not possible, however, to determine the mileage to any date other than the end of a month.

When car mileage is desired up to intermediate dates, it is invariably in connection with some shop operation. To prepare the record, the shop is required to report daily the car numbers of all cars entering the shop, and before the cars for that particular car are listed for that month, they are first listed and totaled up to the date on which they entered the shop. This record is entered on the back of the same card, together with the total mileage of the car from the beginning of the system up to the date when it entered the shop. Obviously, the mileage between any two shopping dates is the difference between the two figures opposite those

TYPICAL MILEAGE TABLE
EDMONDSON AVENUE LINE, FROM WINDSOR HILL
MONUMENT AND 11TH STREET

Runs	Miles	Minutes	Runs	Miles	Minutes
1	17.62	122	11	193.82	1,342
2	35.24	244	12	211.44	1,464
3	52.86	366	13	229.06	1,586
4	70.48	488	14	246.68	1,708
5	88.10	610	15	264.30	1,830
6	105.72	732	16	281.92	1,952
7	123.34	854	17	299.54	2,074
8	140.96	976	18	317.16	2,196
9	158.58	1,098	19	334.78	2,318
10	176.20	1,220	20	352.40	2,440



Form L-421 10M 8-24
THE UNITED RAILWAYS & ELECTRIC CO.
BALTIMORE, MARYLAND

Line No.__________

This contains the mileage reports for ____________________, 19____, for the runs checked

	10	20	30	40	50	60	70	80	90
01	11	21	31	41	51	61	71	81	91
02	12	22	32	42	52	62	72	82	92
03	13	23	33	43	53	63	73	83	93
04	14	24	34	44	54	64	74	84	94
05	15	25	35	45	55	65	75	85	95
06	16	26	36	46	56	66	76	86	96
07	17	27	37	47	57	67	77	87	97
08	18	28	38	48	58	68	78	88	98
09	19	29	39	49	59	69	79	89	99

____
Line Superintendent

Individual Mileage Reports for a Line Are Placed in This Envelope for Transmission to the Mileage Bureau

dates on the back of the card, and no necessity remains for preserving the original punched cards for that month.

At the end of the month a set of car master cards is punched, showing for each car its number, type of operation, car model, motor type, seating capacity, and standing room capacity. These master cards are sorted mechanically under each of the above classifications, listed and totaled. In this way, the total mileage made during the month in each class of service is determined for each class of car and each type of motor. The total number of miles run by a group of cars with a common seating capacity or a common standing room capacity is then multiplied by that capacity and the sum total of these products is the total seat-miles or the total standing room-miles furnished as a matter of public service.

SPECIAL CAR MILEAGE

A serious problem encountered was that of chartered cars or special or occasional trips that could not be coded as running over any particular route. The report made out by the line superintendent for such a car gives the car number and the description by streets of the route which it travels. The determination of the total distance in a complicated system, such as that of Baltimore, has involved in the past an amount of time altogether disproportionate to the value of the information.

In order to handle the problem, a special map of the system has been devised, in which the distance scale is entirely disregarded, the only effort being to indicate each line of track by a line on the map so as to be able to indicate by street names each piece of track and further to indicate all intersecting track by an intersection of lines on the map. All cross-overs, carhouses, or other terminal points are indicated by cross marks on the line representing a given stretch of track. The map is drawn in four colors, and the distances pertaining to each line are written thereon in the same color as the line. These colors are so distributed that no line of a given color at any point in its course meets another line of the same color. Each color stretch is treated as an individual piece of track, with a zero at one end of the line, and the distance is marked in the same color from this zero station to every carhouse or other terminal point, cross-over or connecting curve where cars could turn back or get off the route.

The movement of each special car is reported to the mileage bureau with a description of its route by streets. From this description it is easy to set down the distance from the zero station to the point at which the special car enters and leaves each individual color stretch, the greater of the two numbers being placed in the left-hand column and the lesser in the right-hand column. When the entire trip has been posted, the total in the left-hand column minus the total in the right-hand column gives the total mileage for the trip.

With this system it is possible to report to the traffic department before the close of each day's business the total number of trips, the mileage and the car-hours for the previous day on each run, on each line and on the entire system. The mail-car mileage, chartered car mileage, work-car mileage, and supply-car mileage are also computed. At the same time, there is given a list of all variations from the standard schedule, including the number of extra and short trips and the extra and short mileage.

Inspection Schedule Reduces Accidents

Specified Dates Each Month Used for Consideration of Certain Operating Points Reduced Number of Accidents in El Paso Remarkably in Two-Year Period

EARLY in 1923 the method of inspection of trainmen was changed radically by the El Paso Electric Railway, El Paso, Tex. The new plan was adopted as part of a campaign on the part of the company, under the leadership of Alba H. Warren, for the reduction of accidents. The campaign as a whole was described in considerable detail in ELECTRIC RAILWAY JOURNAL for Dec. 22, 1923, page 1047. Instead of having the inspectors make only general observations when watching the operators, they were requested to look for certain specified items on the various days of the month, according to the schedule shown in Table I. This schedule made it a requirement that particular attention be paid twice each month to each of the points listed, although of course the inspectors continually instruct the men in regard to all the requirements of the company.

TABLE I—MONTHLY SCHEDULE USED BY TRANSPORTATION DEPARTMENT INSPECTORS IN EL PASO, TEX.

Day of Month	Special Matter Under Investigation
1 and 16	Proper feeding.
2 and 17	Careful operation at railroad crossings and special trackwork.
3 and 18	Speed of cars, safety stops, junctions and slow signs.
4 and 19	Caution at "blind" corners.
5 and 20	Courtesy, personal neatness and cleanliness.
6 and 21	Car spacing.
7 and 22	Passing automobiles and care in traffic.
8 and 23	Gong ringing.
9 and 24	Reports, car defects, accidents.
10 and 25	Power consumption.
11 and 26	Warning signs to autoists and maintenance.
12 and 27	General inspection of overhead, slow signs, etc.
13 and 28	Railroad crossing signs or markers at danger points.
14 and 29	Signal lights, headway recorders and electric switches.
15 and 30	Condition of track and landings.
31	General review.

The result of the new method of inspection was that all the men were kept constantly on their toes to observe and to report anything that could improve the service or reduce accidents. By maintaining this system of bringing out the points which an operator should be observing at all times, the men were prevented from losing interest in their work.

The result has been a material improvement in the operation. That it has been a big factor in reducing accidents is shown by Table II, accidents having been reduced from 1,462 in the first ten months of 1921 to 495 for the corresponding 10 months of this year. The record is improving steadily, the best record being that for October of this year, with 34 accidents, as compared with 87 last year and 74 two years ago.

TABLE II—ACCIDENT RECORD BY MONTHS, 1921-1924, EL PASO ELECTRIC RAILWAY

	1921	1922	1923	1924
January	152	164	101	73
February	133	144	98	62
March	163	162	98	47
April	177	119	98	41
May	173	150	116	39
June	147	105	89	47
July	147	109	49	55
August	122	84	63	49
September	128	89	56	48
October	120	74	87	34
November	141	98	69	..
December	164	103	98	..
	1767	1401	1022	*495

*Ten months.

The Readers' Forum

Comments on Report of Committee on Foreign Operation

MOUNT VERNON, N. Y., Dec. 1, 1924.

To the Editors:

It may seem rather late in the day for a discussion of some high lights in the report of the A.E.R.A. committee on foreign operation, but surely such discussion is warranted by the importance of the subject. The fact that this splendid report was the last feature of the last day of the 1924 convention was unfortunate. However, the publication of the report in itself has already proved of great value, notably with regard to the true status of the motor bus. Such a report was needed, for even its wide publication has not prevented repetition in the Detroit *Times* during November, 1924, of the well-worn fable that the bus has replaced the tramway in London!

The committee rightly stresses the difficulty of international exchange of good practices in full. Yet where there's a will, there's a way. We may reject the use of ticket inspectors to check over-riding, but we are accepting the differential fare principle of Europe just the same. San Diego is an early successful example; Public Service Railway, a later convert. On the other hand, although the manager of the Amsterdam Municipal Tramways was delighted with our safeties, he had no air compressors to permit electro-pneumatic control, but he did find a way to apply the same principles with electro-mechanical equipment.

The committee has done full justice to the fact that while the foreign tramcar is less comfortable and perhaps 10 per cent slower, it is cleaner, quieter, lighter and better maintained than our cars. Part of that quietness is due to a high standard of track upkeep. During a British visit directly after the war, almost every manager apologized for his track. Although I rode often on the upper decks of the cars, I certainly did not observe shocks, nosing or other defects severe enough to have elicited like apologies here.

FRANK TALK ON THE BUS

Those who read my studies on "The Place of the Bus" published during 1920 in the ELECTRIC RAILWAY JOURNAL will recall that the arguments for the coordinated use of bus and car were drawn almost entirely from British practice. American street railways then held bus operation in horror. But while the Britisher started first we have been moving so fast during the last two years that now he can learn from us in equipment, if not in applications. That is because we are both a richer and more hysterical people. The very railways that fought the bus most flopped the hardest once they were convinced.

The committee has used no gloves in handling the problem of buses for big-scale transport. Some extreme bus advocates may even feel a brass knuckle or two. Its outstanding statement is that "whatever street congestion there is . . . is caused almost entirely by motor buses and taxicabs."

It is a fine thing for the prospective rider to board a vehicle at the curb, but it does not speed up general vehicular movement if great, hulking double-deck buses are constantly cutting across the lines of faster automobile and truck traffic between the street center and the curb. If other traffic has no rights, why not build the car tracks alongside the curb?

The committee was told by Lord Ashfield, managing director of the Traffic Combine, that the present billion a year tram riders could be carried by buses "in the event that sufficient street space . . . were provided." He did not suggest that the motor bus should pay for said widening. On the other hand, the London County Council Tramways account in respect to "Cost of street improvements" shows that up to March 31, 1922, £809,295, or about $3,883,200, had been assessed against the street railway for such widening, exclusive of paving. Had the motor bus been saddled in this manner, there would have been little or no profit. Therefore, one of the big advantages of bus over tram in London is that it has enjoyed a subsidy out of the public funds via the street car rider.

The committee was impressed with the apparent recklessness of British riders in boarding or leaving cars and buses. Its comment that this nevertheless has not been reflected in damage claims is borne out by reports of these tramways for fiscal years ending in 1924: Bradford "accident insurance and compensations" account, 0.7 per cent of traffic revenue; same account Manchester, 0.6 per cent; Glasgow "third party accident" and "employers' liability" combined, 1.9 per cent. Glasgow's higher figure is due partly to its heavier traffic and possibly, also, to a provision that calls for trial of accident suits at Edinburgh.

With regard to the trackless trolley or "railless," the British have several special reasons for favoring it. First, the cost of energy is no higher if not lower than ours, but gasoline sells for 25 cents per American gallon against our range of 11 to 20 cents, with 15 cents preponderant; second, British cities operating tramways usually own the central station and don't want to lose trade; third, where the replacement of a trackway is concerned, it is much easier from a franchise viewpoint to replace with trackless trolley than seek motorbus rights from Parliament. For all that, motor buses far outnumber trackless trolleys, as here.

In discussing Bradford, the committee notes that nearby towns were unwilling to have Bradford routes extended their way, and it thinks that "this was a rather interesting sidelight on municipal ownership." This feeling has nothing to do with municipal ownership, but is simply the fear of the little communities that such extension of the big communities' utilities is the first step in their political annihilation. This handicap has been foreseen in Detroit by a provision in the state charter which permits the Department of Street Railways to operate for 10 miles beyond its boundaries.

LESS CONGESTION OF POPULATION IN LONDON

The committee is not quite correct in stating that London is uniformly built up to four or five stories. The greater part of London's housing consists of small houses for one, two or three families, but many downtown areas and sections alongside of the main highways seen by the chance visitor are of the apartment type. The facts are revealed by the statistics on population per acre. In 1920, inner London had 60 inhabitants and inner New York (Manhattan Borough) 123 inhabitants per acre. Greater London had only 17 per acre, while all New York had 28 per acre. The center of flat-fare New York is 125 per cent more densely settled than the center of zone-fare London, while New York as a whole is 65 per cent more densely settled than London.

The committee's adventures on the most heavily traveled city routes in the world led it to include that one-man operation is "virtually impossible" with zone fares. These are strong words when we consider that there are already in use a number of distance-fare routes in America and Europe with one-man cars or buses. It is true that many are light cross-country lines, but San Diego with two zones in the city and more on the suburban extensions has already advanced from one-man single-truck to one-man double-truck cars.

Again, of the 35 managers who answered a questionnaire of the International Street & Interurban Railway Association, 14 did consider operation of one-man cars practicable under zone fares and 12 more agreed it was all right for light lines anyway.

There are many two, three and more zone properties abroad where one-man operation will be feasible if the managements can find the money for automatic appliances, wider platforms, vestibules, fare boxes, ticket-issuing machines and other Americanisms, although it may never be possible to carry such operation to the same degree as under a single fare.

The mystery of "Why do the British keep double-decking?" brought no more satisfactory reply than that they have always done so. America used to double-deck in a small way in horse-car times, but today there are less than ten double-deckers in all. Continental Europe has practically discarded double-deck cars, yet Berlin and Vienna have double-deck buses. Paris, which had double-deck buses in horse days, has since standardized on single-deckers, although the bus is not yet capable of using a trailer to secure increase of unit capacity.

DOUBLE-DECK CARS LOSING CASTE

But at recent British conventions there have been rumblings against continuing the double-deck car, which necessarily must run at a lower schedule speed than single-deckers owing to greater standing time and high center of gravity. London no longer attaches single-deck trailers to double-deck motor cars because the County Council Tramways are out for greater speed through use of interpole motors and other improvements. Before the war, speed did not bother operators because there were almost no standing loads. Post-war conditions brought the 8-hour day, which piles up the peaks very sharply. No later than September, 1924, General Manager Wilkinson testified, in arguing against a cut in workmen's fares at Bradford, that 37 per cent of the total load was carried between 8 a.m. and 9 a.m. Formerly, the laborer was on the cars at 6 or 7 a.m. Now one of the most common fare petitions is for the privilege of having the workmen's half fares apply as late as 8 a.m. or 8:30 a.m. The committee's reference to the new Edinburgh cars is proof that this approach to American loading is bringing American ideas of passenger interchange, viz., separate doors for entrance and exit.

The committee may not have had the doubtful pleasure of riding the Paris solid-tire single-deck buses over the cobbled by-ways of that wonderful city. The Paris company may think pneumatics still an experiment, but the Michelin Tire Company is of another opinion. In a recent advertisement, headed, "Parisians—A Scandal," Michelin presents this deadly parallel: On the left, pigs ride softly to slaughter on pneumatic-tired trucks; on the right, the worthy fare-paying Parisians are being jounced on hard-tired buses.

With increased familiarity, the public is as critical of bus equipment as of the longer known trolley. It wants no slat seats in cars or hard tires under buses. The 15,000,000 soft-cushioned automobiles of America have set a high standard for vehicle comfort, no matter what the rate of fare.

As to gas-electric buses, it was my privilege to study in great detail the costs and operations of the Birmingham & Midland Motor Omnibus Company, which operates some 250 of these buses as standard. Comparison with the straight gasoline buses of other companies in the same syndicate did not disclose any marked economy in fuel and upkeep, but it was obvious that the gas-electric bus was easier to ride and far less noisy.

Supplementing the committee's notes on "Noise of Operation," be it noted that the Amsterdam and Malmö tramways have done something on their one-man cars worth copying the world over on any kind of car or bus. They have substituted passenger stop-lights for the noisy bell or irritating buzzer. How much more pleasant a ride would be if signal and register noises could be eliminated forever.

PROPORTIONS OF SHORT-HAUL RIDERS

Under the heading "Kinds and Rates of Fare" the committee notes that in Britain the one-zone riders tend to make up 35 to 50 per cent of the total traffic. It is not entirely correct to assume that "this reflects the closely built-up nature of most of the European cities" because like percentages occur in widespread cities like San Diego; Melbourne and Adelaide in Australia and Christchurch, New Zealand.

In San Diego, with only 2.5 inhabitants per acre of all its area and but 13 per acre on built-up ground, the number of one-zone and two-zone riders is almost exactly the same. In this case, the inner zone rider averages 1.3 miles per ride and the outer zone rider about 3 miles.

At Melbourne the cable system operating in the older section carried only 31 per cent at the minimum fare of 1.5d., whereas the electric system operating in the suburban areas carried 47 per cent at the minimum fare during the year ended June 30, 1923. Although Adelaide fares go to 12d., the average of 2.5d. indicates a very high ratio of short-haul riders. The Christchurch report for the year ended March 31, 1923, shows that more than 60 per cent of the traffic was at the minimum adult fare of 2d. or 4 cents.

These figures show that the proportions of rides at different rates of fare are affected just as much by the scale adopted as by the distribution of population. Through juggling the rates you can get anything you want.

Since the committee's table showing average bus and tram rides for given fares had to omit the London bus, it is worth adding that London bus fares vary by 30 per cent just according to the presence or absence of tramway competition, and that they include no workmen's rates. As the buses have a much higher seat-use factor than the trams, they naturally do not favor any off-peak reductions such as the "tuppeny all-the-way" concession of the London County Council Tramways. The gains from this concession, as mentioned in the report, refer of course only to the tramway business of the mid-day hours. In the fiscal year ended March 31, 1924, 28 per cent of the passengers rode at mid-day rates and 13.75 per cent at workmen's rates.

The British zone fare is found in many varieties. Glasgow and Leeds tend to work toward the same average length of ride for each increment in fare. Manchester seeks to give the longest possible ride for the minimum fare figuring from the downtown center. The London Underground fares, like American steam railroad commutation, give more and more per penny the farther one rides. No one dreams of rigidly interpreting the legal limits of 1.5d. or 2d. per mile. These may be the average rates per mile, but the stages themselves are never laid out in geographical miles. They are laid out chiefly according to traffic intersections and may vary greatly not only on the system as a whole, but on individual portions of the same route.

In connection with fares, the report remarks briefly that the actual wages in Europe generally are but one-third to one-half of ours. The state of the continental coinages makes a comparison impossible for all European countries except Britain. As regards Britain, it would be more correct to say one-half to two-thirds. The comparison cannot be made on the basis of hourly rates or even weekly earnings because the men receive uniforms and overcoats free, vacations with pay for a week or more, longer time allowances, higher overtime rates, etc. It is true that British platform men do not live so well as ours, but this is also due in part to the fact that luxuries cost more, whether movies or flivvers. The platform man's standard week is 6 days, totaling 48 hours.

The committee correctly assumes that there is loss from over-riding under the zone fare prevalent abroad. There is also a loss due to the fact that a passenger on a loaded double-decker may have already ridden a stage before the conductor gets around to him. However, these losses are not inherent to the zone-fare system. If the passenger had to give up his receipt upon departure instead of throwing it away where he pleased, there would be no more over-riding than on our own distance-fare routes. The use of closed prepayment areas or of street collectors at heavy boarding points would also minimize the second kind of loss mentioned. One of the crying needs of the busy British tramway has been a car that will permit entrance on one platform and exit on the other. The double-deck design is largely to blame because the stairways leave so little room on the platforms.

THE WEEKLY PASS AT HULL AND BRADFORD

Last, but not least to me, is the final paragraph in the report giving some of the experiences with the weekly pass at Bradford, also used at Doncaster and Hull. There is some humor in the fact that the weekly pass, derived from the foreign season ticket, should return to its home clothed with transferability and a 7-day period instead of 3 months or so. When A. H. Wilkinson, general manager, requested counsel in the matter, I suggested the pass as a means of speeding up fare collection and of putting off the then threatened reduction of the base fare from 1.5d. to 1d. If it did not make money, you will observe that the report states it has been saving money at the rate of £95,000 a year. It was not expected that the pass would have much sale among workmen because the latter get a lower rate anyway and have less money for off-peak diversion, but the sales actually have been much higher than I expected because some of the better-paid riders have given up their workmen's rates in favor of the pass.

WALTER JACKSON.

Association News & Discussions

Features of Second Convention of Central European Street Railways

At the September Meeting of the International Street and Interurban Railway Association Many Features of Equipment and Track Design, Maintenance Methods, Fares and Employment Problems Are Discussed

THE second convention of the Internationaler Strassenbahn und Kleinbahn Verein (International Street and Interurban Railway Association) opened at Homburg von der Höhe on Sept. 3-5, 1924. This organization of central and northern European electric railways was founded in 1920 at Nürnberg and its first big meeting was held in Vienna in 1921. In opening the 1924 sessions, President Ludwig Spängler, general manager Vienna Municipal Tramways, noted that the 1923 meeting scheduled for Budapest had been postponed because of the continuance of unsettled economic conditions. He was sure that the participation of 330 delegates and 100 women visitors presaged better times. The association has now more than 400 members.

A paper on one-man cars was presented by Messrs. van Putten and Hultman, respectively general managers of the Amsterdam and Malmö systems. This was abstracted in this paper for Nov. 28, page 926. In Europe, the dominant desire for such cars was saving in labor cost by bringing wages to say 36 per cent of the revenue or 41 per cent of the operating expenses. Twenty-five systems were operating one-man cars and 14 more contemplated doing so.

General Manager Geiser of the Schaffhausen Tramways discussed the growing competition due to cross-country automotive lines. In 1907, Switzerland had only 3,837 motor vehicles; now there were 40,116. Regulation of this rapidly growing means of transport was certainly in order. The Swiss railways have therefore demanded of the government that (1) railway regulation should be moderated; (2) special rebates for mail carriage should be eliminated; (3) tariff on rails and special work should be removed; (4) taxes should be imposed on automotive transport to pay for their use of the highways; (5) general service and tariff regulations covering automotive transport, including restricting the over-all weight of vehicle to 5 metric tons (11,020 lb.) should be enacted. The speaker recommended that the railways take up and co-ordinate motor transport with rail transport.

General Manager Norregaard, Copenhagen, followed with his paper on the efficiency of transportation personnel as judged by mileage output, placing stress on the need for separating city and cross-country roads in making comparisons of relative net speeds, etc. This was abstracted in the issue of this paper for Nov. 1, page 775.

Alexander Patz, acting general manager Budapest Tramways, then discussed methods for securing better spacing of cars; and also means for judging the relative efficiency of the different depots from both transportation and maintenance viewpoints. (See ELECTRIC RAILWAY JOURNAL for Nov. 15, page 856.)

ANTI-FRICTION BEARINGS—TRACK

Two papers were to have been presented on anti-friction bearings. Dr. Vidéky, Budapest, based his paper largely upon a discussion of design, classification and material. However, General Manager Pforte of the Hagen Tramways refrained from presenting replies to the questionnaire for discussion because the answers had been given for the postponed congress of 1923 and they therefore no longer gave a fair picture of progress. (Abstracted in the issue of this paper for Nov. 1, page 774.) General Manager Hubrich, Essen Tramways, who spoke for Mr. Pforte, stressed the importance of more exact tests, such as having different cars run to their coasting limit with and without anti-friction bearings—aside from the use of watt-hour meters. It was resolved to continue the questionnaire as a feature for the next convention.

Chief Way Engineer Goetz, Leipzig, followed with his paper on track and its upkeep. (Abstracted in the issue for Nov. 15, page 854.) At his suggestion the meeting adopted resolutions calling for fewer curves with longer radii, for preferential specification of standard rail sections and for the elimination of concrete sub-structure in favor of well-drained broken stone foundations accompanied by welding of all joints.

General Manager Hausmann, Coblenz, presented an interim paper on standardization of grooved rails in three classes, viz.:

DIMENSIONS OF PROPOSED STANDARD RAILS FOR CENTRAL EUROPEAN TRAMWAYS

Section Number	1	2	3
Height, mm.	180	180	160
Base, mm.	180	160	160
Tread, mm.	56	50	48
Width of groove, mm.:			
Tangent track	31	31	31
In curves	34	34	34

The standardization study is to be continued by the Technical Commission of the Verbandes schweizerischer Secundärbahnen (Swiss Secondary Railways Association), of which Dr. Zehnder, general manager Montreux-Oberland Railway, is chairman.

MAGNETIC BRAKES—POWER-CHECKING PLANS—SELF-VENTILATED MOTORS

The second business session, held on Sept. 5, opened with the paper on magnetic brakes by General Manager Barth, Christiania (issue of Nov. 15, page 855). He was followed by General Manager Pforr of Berlin, who discussed current saving without the use of checking devices (issue of Nov. 1, page 776).

The paper on self-ventilated motors by Mr. Nier, engineer of the Dresden system (abstracted in the issue of Nov. 15, page 854) was discussed by Dr. Zehnder of Montreux, Switzerland. Ventilated motors had made good on his line, which is 76 km. (47.1 miles) long, meter gage (39.37 in.) and in difficult country. On other narrow-gage lines there were difficulties in drawing air directly from the trackway, so that car-body or roof intakes were preferable in such cases. The temperature difference of ventilated and closed motors increased with the increase in stop spacing. With stops only 180 m. (590 ft.) apart, there was no difference, while for long runs the difference might be in the ratio 2: 3.

Mr. Paap, retired government engineering councilor, Berlin, then gave a talk on couplings.

August Winter, executive staff Vienna Municipal Tramways, in presenting his paper on fares in municipal areas (issue of Nov. 29, page 924), observed that the proportion of weekly wages which a workman paid for a single fare, averaged as follows:

Scandinavia	0.0020 to 0.0025
Holland	0.0024 to 0.0029
Switzerland	0.0015 to 0.0023
Austro-Hungarian succession states	0.0030 to 0.0038

The total annual expenditure for carfare may reach a sum equivalent to four weeks' wages.

The meeting closed with a demonstration lecture on wireless telephony and radio by Prof. Leithäuser, Berlin, and the possibilities it offered in railway service for communication with moving vehicles, using rails, wire and vehicles as part of the transmission system.

NEXT MEETING AT BUDAPEST

The association decided to hold its next convention at Budapest in June, 1925.

At a suggestion made by General Manager Ruijs, Enschede, it was planned to ask the Union Internationale de Tramways, de Chemins de fer d'Interêt local et de Transports Publics Automobiles to use its good offices to intercede for German street railway managers who had been exiled in the course of the military occupation.

Tramway Men Attend Colorado Utilities Convention

About 100 delegates, including many electric railway men, from Colorado, Wyoming and New Mexico, attended the second annual mid-winter conference of the Colorado Public Service Association and the Rocky Mountain Division of the National Electric Light Association held in Denver on Dec. 18.

E. A. West, general superintendent and chief engineer Denver Tramway, who was one of the principal speakers, pointed out that in regulating the traffic on the streets of the cities, insufficient attention is given to the tramway, whereas it should be one of the principal things to consider when planning new regulations.

A.E.S.C. to Hold Conference on Line Materials

A conference has been called by the American Engineering Standards Committee as the result of proposals for the standardization of overhead line materials made by the American Electric Railway Association. This will be held at the Engineering Societies Building, New York City, on Jan. 13, 1925, beginning at 10 a.m. The purpose of the conference is to determine whether the unification and extension of specifications for overhead line material, such as pole line hardware, cross-arms and pins and strain insulators shall be undertaken.

At the conference the present situation in regard to specifications for overhead line material and the suggestion of general policies as a basis of discussion will be presented by M. B. Rosevear. The question will be taken up as to whether there are any overhead line materials for which specifications should be unified, and if so, whether it is desirable that the unification shall for the present be limited to materials used by two or more branches of industry or whether specialized materials for specialized industries should be included. The inclusion of materials and dimensional data, and nomenclature will also be discussed.

Work on the following subjects is already in the hands of representative sectional committees under A.E.S.C. procedure: Wood poles; tubular steel poles; conductors; insulated wires and cables; annealed, medium and hard-drawn copper wire; zinc coating of iron and steel.

Kentucky Utility Meeting

The annual meeting of the Kentucky Association of Public Utilities will be held at Louisville, Jan. 15 and 16, 1925. About 300 public utility executives from Kentucky and surrounding states are expected at the meeting.

Convention rates of one and one-half times regular one-way fare have been arranged for by the Southeastern Passenger Association and the Central Passenger Association. These rates apply on all tickets costing 67 cents or more one way. The selling dates are Jan. 12 to 16 inclusive, and the last honoring date, Jan. 20.

American Association News

Subjects and Meetings

The committee on subjects and meetings met in New York Dec. 19 for the purpose of more definitely drawing up the program for the Midyear Meeting of the association to be held in Washington on Feb. 17. As tentatively outlined, in addition to certain outstanding speakers, the program during a portion of both the morning and afternoon sessions is to take the character of an old fashioned "town meeting." In the morning the discussion will be somewhat in the nature of checking up of the electric railway business with comments from the point of view of the manufacturer, car rider and railway. In the afternoon the subject of when, where and how to use buses will be discussed from the point of view of manufacturers and railways. The committee also determined upon the speakers to be invited for the two business sessions and the banquet in the evening.

Members of the committee present were Chairman W. H. Sawyer, H. D. Briggs, Harry L. Brown, Charles H. Clark, F. W. Doolittle, C. R. Ellicott, C. W. Kellogg, E. F. Wickwire and J. H. Hanna.

Maintenance of Equipment

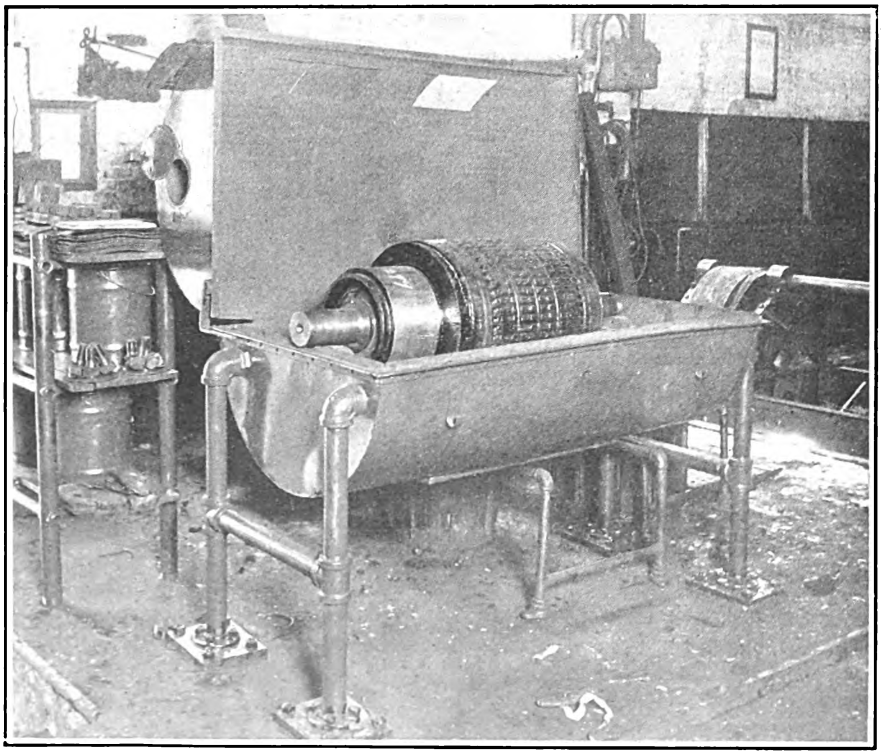
Efficient Method of Cleaning Armatures

THE usual method of removing loose dirt and dust from armatures when they are removed for overhauling is to direct a spray of compressed air on the equipment. To blow off the dirt efficiently, and at the same time to prevent dust from flying off during the process, inconveniencing adjacent workmen, the equipment shown in the accompanying illustration is used in the 39th Street shops of the New York Rapid Transit Corporation, Brooklyn, N. Y. It consists of a sheet-steel drum whose upper section is hinged so as to permit the insertion of the armature. The armature is supported on two sets of rollers, so that it can be rotated easily. The end brackets are arranged so that the weight of the armature is carried directly by the 1½-in. pipe framework on which the drum is mounted.

With an armature in position the top is closed down and compressed air is turned on through two pipes passing into the bottom of the drum. At the back of the lower section is a 4-in. exhaust pipe. An exhaust blower in this line draws off the dust as it is blown from the armature and the dirt is carried to a receptacle on the outside of the shop. The armature can be rotated by a workman inserting his hand through a hand hole in the end of the upper section of the drum. By the use of this equipment armatures are cleaned efficiently and all dirt is confined so that it does not fly off in the shop and interfere with other work.

Fiber Covered Rods for Brush Holders

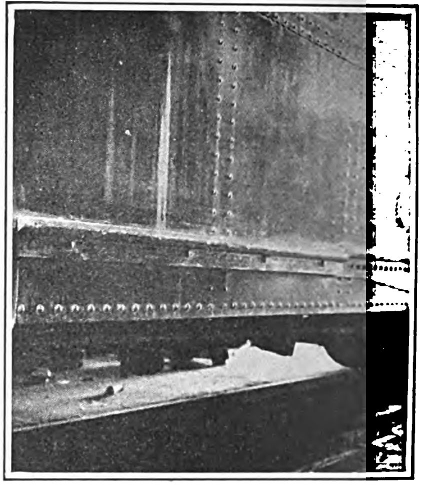
AS THE result of trouble which had been experienced with metallic bracket arms on brush holders, the Eastern Massachusetts Street Railway is replacing these parts with fiber-covered metal rods. The appearance of the modified brush holder is substantially the same as before, as is shown in the accompanying illustration. It has been the experience of the railway since undertaking this change that there have been fewer short circuits. Ordinary fiber tubing is used to cover the metal rod.



This Cleaning Drum for Armatures Has a Suction Attachment for Removing the Dirt

Counteracting Corrosive Effect of Acids

DIFFICULTY has been experienced by the Boston Elevated Railway on account of damage to the exterior paint of its new rapid transit cars operated through the East Boston Tunnel. This tunnel was built many years ago and has always been somewhat leaky. Salt water seeps through and drops down on the roofs of the cars. From there it runs down the sides, checking the varnish, eating the paint, and corroding the metal. The nature of the defacement caused in this way is shown in an accompanying illustration. The company is using Wilson's Imperial Paint Restorer to counteract the corrosive effect of the salt water.



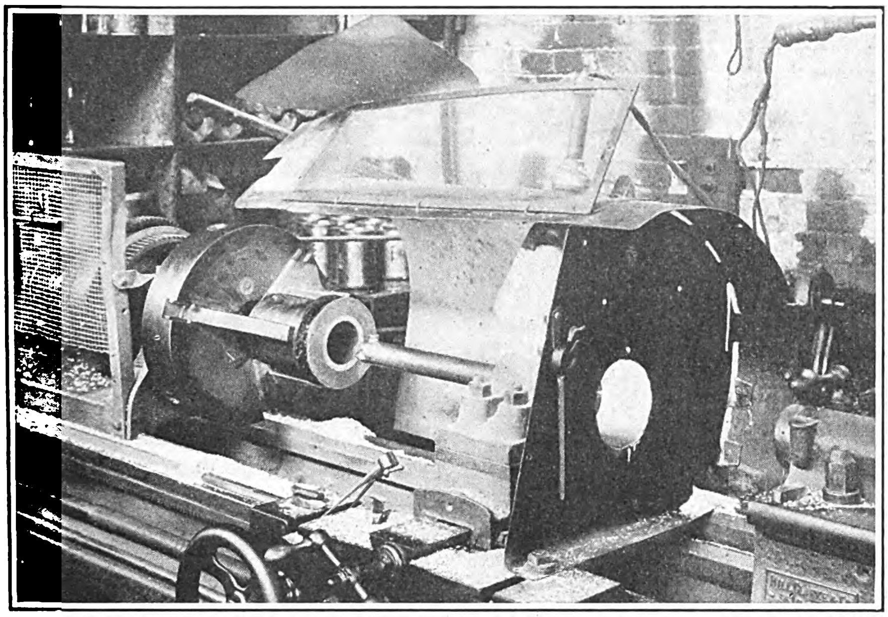
Defacement of East Boston Tunnel Cars Caused by Salt Water Dropping on Roof and Running Down the Side

Self-Centering Chuck Facilitates Bearing Machining

BY W. L. BRIAR

Foreman Kansas City Railways

IN THE shops of the Kansas City Railways bearings are bored in a self-centering chuck having special long jaws that grip the bearing securely and hold it firmly in place during the operation. This chuck is manufactured by the Union Manufacturing Company and is known as No. 153 Class D.



A Special Long Jaw Type of Self-Centering Chuck Facilitates the Work of Machining and Boring Bearings. Complete Protection to Workmen Is Afforded by the Almost Totally Inclosed Housing that Is Set Up Around the Work

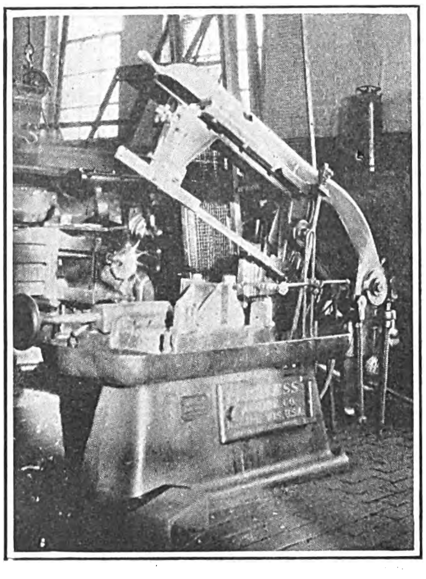
Although the bearing turning and boring operations are usually carried out in a large Gisholt lathe, the work may also be done efficiently in an ordinary engine lathe with the set-up shown in the accompanying illustration. In this case the boring bar is held in a special clamp on the tool post, and is readily fed into the work. For boring babbitted bearings to final size for fitting to worn shafts, this set-up is particularly useful since it avoids tying up the Gisholt lathe for this work.

Another interesting feature of the bearing finishing work as it is carried out in the Kansas City shop is the complete guard that is built around the work, for the purpose of conserving scrap brass and babbit and also to protect the operator and adjacent workman from flying bits of brass. It will be noted that a hinged brass shield on the front of the guard is arranged so that it can be lowered into a position that completely protects the workman's eyes, and at the same time allows him clearly to see the work in progress. An additional flexible flap on the bottom of the shield helps to confine the scrap brass to the pan provided for its collection.

High-Speed Saw Makes Saving

A SHORT time ago the Altoona & Logan Valley Electric Railway, Altoona, Pa., replaced its old power-driven hacksaw by a Peerless high-speed saw. This change in the shop equipment has effected important savings in two ways. A great deal of time has been saved, and the labor cost thereby much reduced. It now takes only 15 minutes to cut a 5-in. axle instead of 2½ hours, which was required formerly. Moreover, the number of blades required has been much diminished. Whereas it used to require four or five blades to cut an axle, now one blade will do several jobs of this kind.

In addition to the ordinary work of the mechanical department, rails are cut for the track department. The greater speed of operation of the new saw has saved money for the company by eliminating much of the waiting time of track men while this work is being done.



This Saw Does a Job in 15 Minutes that Formerly Required 2½ Hours

New Equipment Available

Electric Hoist

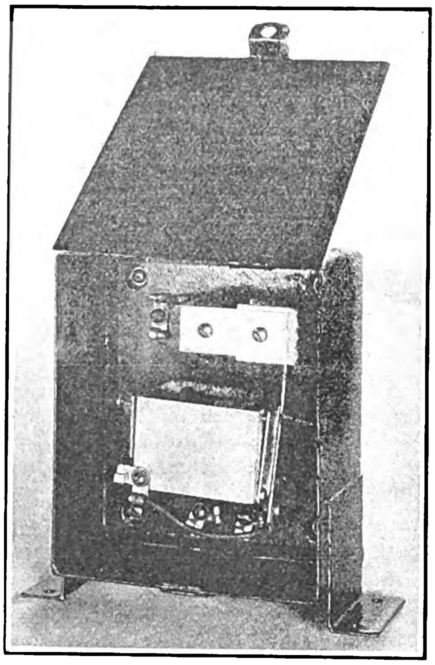
A NEW electric hoist designated as type R and available in capacities from 500 lb. to 4,000 lb. has been recently added to the line of the Roeper Crane & Hoist Works, Inc., Reading, Pa. The hoist is worm geared, the worm being placed above the gear to reduce wear. The worm shaft is equipped with end-thrust ball bearings. The motor is mounted directly upon an extension of the hoist frame. This is a one-piece casting that contains all bearings so that shaft and moving parts are kept in alignment. An automatic stop provides top and bottom limits. Controllers are of the single-speed drum type, although push-button control can also be furnished. The moving parts of the hoist are entirely inclosed and operate in a bath of heavy grease or oil.

Improvements in Signal Light System

THE signal light system, as ordinarily used by electric railways, provides a visible indication for the motorman or operator to show when all doors are closed. Additional features incorporated provide that the doors cannot be opened until the car is stopped and that the car cannot be started until the doors are fully closed. A number of improvements in the various detail parts which constitute the signal light system have been made recently by the Consolidated Car Heating Company, Albany, N. Y.

The latest door switch, Type 397, which breaks and completes the signal light circuit as the doors open and close, has contacts thrown in or out by a toggle mechanism. The brass rollers now used for the movable contacts provide a wiping action as the contact is made, which eliminates trouble due to dirt or dust. A bakelite insulated base supports the movable contacts. The rear of this base is provided with two recesses for the springs which hold the switch in one or the other of its two positions. The contact studs are also imbedded in a bakelite base.

Where the control is interlocked with the doors in addition to provid-



The Type 700 Control Relay Has Magnet Coil in Series with Signal Light Equipment

ing a door closing signal, the Type 398 door switch is used. This has double sets of contacts, one set for the signal light circuit and the other for the interlocking control circuit. This type of switch is also used for making contact where variable load brake equipment is used. The box which houses the mechanism is of cast iron, about 4 in. square, and has a sheet metal cover. Contact is made by means of a copper disk with molded insulation on either side. The plunger which operates the contact disk has two springs, one for holding it out and the second for providing pressure on the disk. The new form of contact base is of bakelite canvas, with brass contacts. This type of switch can be arranged for operation either by the door itself or by the arm of the door engine.

The new motorman's starting signal light is smaller and neater than the previous design. It has a condulet mounting and a porcelain base for the lamps and contacts. As in the older type, two signal lamps are connected in parallel, but a resistance is in series with one of them, which prevents the lamp with which it is in circuit from lighting normally. When the right hand lamp fails the one at the left lights automatically without the mechanical action of any moving parts. When the burned out lamp is replaced it again gives the signal light as before. The resistor is mounted surrounding the porcelain base of the spare lamp, making the unit very neat and compact. Bayonet type lamps are used, as it has been found that these do not work loose through vibration.

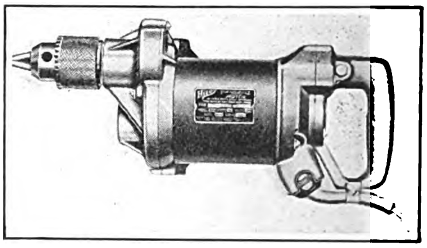
Some improvements have also been made in the Type 700 control relay, the magnet coil of which is connected in series with the signal light equipment. Compression springs are now used to open the circuit when the coil is de-energized. When all doors are closed, the magnet coil is energized and the relay contacts are closed. These contacts being in series with the magnet coil of the main line switch or contactors in the control circuit the car cannot be started until all doors are closed.

Elevating Platform Truck

AN ELEVATING platform truck which has a height of 17½ in. from the floor when the platform is down and 22 in. when the platform is raised has been placed on the market by the Crescent Truck Company, Lebanon, Pa. The rear wheels have a diameter of 15 in., which gives 6 in. clearance underneath the platform. All the tires are 5 in. wide and the truck has been designed throughout for heavy service, with a lifting capacity of 6,000 lb. The wheels are equipped with Timken roller bearings, the driving unit is carried on SKF ball bearings, the controller is built by the Cutler-Hammer Manufacturing Company and the motors are of General Electric manufacture. All working parts are accessible and readily adjustable. The loading platform is 70 in. long and 26 in. wide.

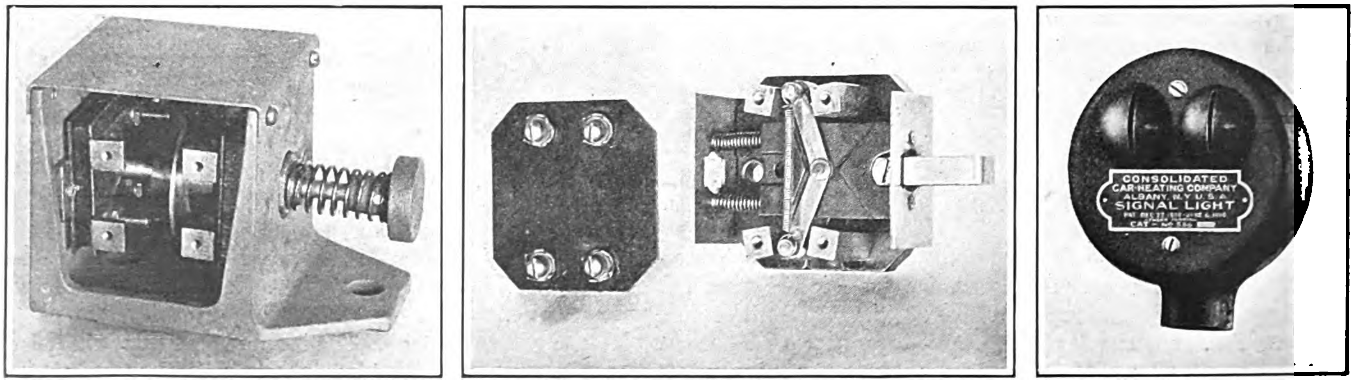
Low Speed Electric Hand Drill

THERE are some materials, including slate and marble, which can only be drilled at a very low speed. To provide for this class of work the Hisey-Wolf Machine Company, Cincinnati, Ohio, has recently brought out a low speed electric drill. This operates at a no-load speed of 110 r.p.m. and has sufficient power for drilling holes up to ½ in. diameter. This drill is equipped with a universal motor which can be operated on either alternating or direct current. Ball bearings are provided throughout. A new feature is a quick cable connector, which permits cable repairs and renewals without dismantling the machine.



An Electric Drill that Runs at 110 R.P.M.

For drilling slate and marble the manufacturers recommend ordinary carbon steel twist drill ground with a straight chisel face. A drill ground straight across with the cutting edge at right angles with the sides will bore true to size. By grinding the cutting edge on a slant the drilling size of any bit can be increased, depending on the slant or angle at which it is ground.



Improved Apparatus for Car Signal Circuits

At left, Type 398 switch interlocks control with doors in addition to signal lights.

In center, switch used for door control of signal lights.

At right, signal light to indicate to motorman when all doors are closed.

The News of the Industry

Mayor Hylan a Witness

Presiding Justice Has to Remind Auditors that Hearing Is Not a Show —Delaney Questioned

Mayor Hylan was the star witness of the week at the transit inquiry being conducted in New York as a result of charges filed with the Governor by the Mayor himself. A statement had been prepared by the Mayor in advance, but he was refused permission to read it. The statement, published in full by some of the newspapers, ran to the extent of a full newspaper page. Justice McAvoy said it could not go into the record unless presented under oath, but he would give the Mayor's brief consideration when he came to write his report.

Counsel for Justice McAvoy, who is to the subject of the questions. Most of the time the spectators were tittering. There were frequent raps of the gavel to restore order. At one point Justice McAvoy said:

> This is not a show, gentlemen. It is an endeavor to find out what the trouble is with the various situations confronting the transit authorities.

Here are some samples of the Hylan sallies:

> You don't have to be a transit engineer to have just ordinary common sense.
>
> I wouldn't take up anything with McAneny (chairman of the New York Transit Commission). Not on your life. I don't trust him.
>
> I have ridden on the subways and the elevated lines, and for many years I was a locomotive engineer and know something about service.
>
> I am not going to let you lead me into a trap.
>
> I am not an investigator. I am just endowed with ordinary common sense that God Almighty gave me. We are entitled to better service on the existing lines and until the end of my office I am going to fight for better service.
>
> I am made the defendant instead of the prosecuting witness.

Mr. Sherman finally brought from the Mayor that the city's position regarding improvements in service had been presented to the commission "in a general way."

Mr. Sherman persisted in asking whether the Mayor had consulted any engineer in regard to how service might be improved and the Mayor finally said he had consulted Frank J. Sinnott, secretary of the Board of Transportation and brother of the Mayor's secretary and son-in-law, John F. Sinnott. The Mayor presented a memorandum, prepared by Mr. Sinnott, as to how service on existing lines might be increased.

Examination of the Mayor showed that this memorandum had been prepared very recently. The Mayor declared that he had done everything he could think of to compel "McAneny and the State Transit Commission" to give better service on the existing lines.

Certainly the hearing was productive of little that was constructive. The Mayor's brief, however, made plain the fact that he stands for these things:

> Construction of new independent subway system to be operated at a 5-cent fare.
>
> Establishment of an adequate motor bus service.
>
> Proper service on existing subway, elevated and surface lines.
>
> Advocacy of passage by Legislature of proposed constitutional amendment to exempt from the city's debt limit the $275,000,000 expended in the original subway as self-sustaining, and use of the credit that might be thus released in the future to borrow money to help pay the cost of the proposed independent subway system.
>
> No connection of new subways with either the present B.-M. T. or Interborough system, and no perpetuation in that way of what the Mayor calls "a bad business bargain for the city" in the dual subway contracts.
>
> Condemnation of and promise of continued opposition to the Transit Commission's plan for the reorganization of the transit companies of the city into a unified system, which the Mayor characterizes as "a scheme to loot the public" by making the riding public pay for lines "about to be scrapped."

The two previous days John H. Delaney, chairman of the Board of Transportation and Mayor Hylan's chief adviser in transit matters, was on the stand. Mr. Sherman's questions were directed particularly toward bringing out the salient points of the connection of Mr. Delaney with transit matters, first as transit construction commissioner, later as adviser to Mayor Hylan and more recently as head of the city Board of Transportation under the Mayor. Mr. Delaney simply would not permit himself to be jockeyed into a position of criticism with respect to saying anything that might be interpreted as a direct reflection upon the Mayor. He said:

> The Mayor makes so many statements I can't keep track of them all. Please do not ask me to comment on the Mayor's action. He was free to do as he chose, and as he is able to speak for himself, I do not want to criticise any one.

Bitter Words Over Cleveland Bus Proposal

Ohio Commission Hears Objections to and Arguments for Bus Lines to Compete With Cleveland Railway—Expert for Bus Applicant Severely Grilled—Manufacturer Denies Connection With Applicants

HEARINGS have been conducted during the last two weeks before the Ohio State Public Utilities Commission at Columbus on the application of the People's Motor Bus Corporation, Cleveland, for a certificate of convenience and necessity to operate buses in Cleveland. The application was opposed by representatives of the city of Cleveland, the Cleveland Railway, the Cleveland Chamber of Commerce and other civic and commercial organizations. All these interests took the position that if buses are to be operated in Cleveland they should be run by the Cleveland Railway. The Clevelanders also contend that under the home rule provision of the state constitution the right to grant permission for bus operation in Cleveland lies with the City Council rather than the State Utilities Commission.

Two years ago, however, the State Legislature passed the so-called Collister-Freeman law, which gives the State Utilities Commission control over bus applications. The commission contends that under this act it has the right to grant permission to bus operators in Cleveland. Cases now pending in the State Supreme Court, however, may determine whether the state commissions or city councils have the right to control bus operation within municipalities.

Representatives of the city, including City Manager W. R. Hopkins, Mayor Clayton C. Townes and members of the utilities committee of the City Council, are attending the hearings in Columbus opposing the application of the People's Motor Bus Corporation. They claim that if a company other than the Cleveland Railway is allowed to operate buses in Cleveland, it will mean financial ruin for the Cleveland Railway.

Joseph L. Rhinock, Cincinnati, and E. F. Sims, St. Louis, are the principal backers of the People's Motor Bus Corporation. They were represented at the hearings by Attorneys John Campbell, Cincinnati, and R. W. Sanborn, Cleveland. Messrs. Rhinock and Sims were also the backers of the People's Motor Bus Company, St. Louis.

Henry M. Brinckerhoff, New York, appeared as an expert witness for the Cleveland People's Motor Bus Corporation. He was subjected to a severe cross-examination by Attorneys Harry J. Crawford and City Councilman Fielder Sanders, former city street railway commissioner.

The Cleveland *Plain Dealer's* staff correspondent, W. M. Tugman, tells of this cross-examination partially this way:

> Challenging the reliability of the engineer, Mr. Crawford defied him, in the light of past statements recommending unified management and control of urban transportation facilities, to answer this question:
>
> "Is there any public convenience to be served by the granting of a license for bus operation in Cleveland to the Cleveland People's Motor Bus Corporation?"
>
> Opposing counsel objected, and the commissioners ruled that this question as stated was one which they would answer in their own way in due time. Mr. Crawford made the question the general one of a permit to any competing company.
>
> "I want the answer, 'Yes or No.'" he said.

"Object! Object!"

The commission ruled the witness should answer in his own way.

"You have two questions," said Mr. Brinckerhoff. "I have said I believe buses would supply a convenience the street railways do not now supply. The rest is a matter for the city and this commission to determine."

There was turmoil as Mr. Crawford demanded the answer be stricken out.

"Should a license be granted to any competing company? I don't care to whom. I want your opinion, as the expert of the $36,000 report."

"On which we made nothing," retorted Mr. Brinckerhoff.

"Perhaps it was worth nothing."

Followed a bitter argument in which Mr. Crawford pleaded with the commission to compel Mr. Brinckerhoff to give him a specific answer.

"This man doesn't dare to answer my question," said Mr. Crawford. "In view of his reports he's got to say that two competing systems would be ruinous. He's got to admit that if we let this concern in we sooner or later will have to buy them out at 100 per cent profit."

The commissioners said they didn't think the witness should be unnecessarily embarrassed. Mr. Crawford said he thought the importance of the situation demanded a stretch of the usual decorum.

"If this man says 'yes,'" shouted Mr. Crawford, "I'll hang him on his own reports. If he says 'no' he ruins his previous testimony. I don't care which he does, but I do want to know how far he'll stultify himself because his credibility is in question."

"Overruled."

Mr. Crawford went back to his questions from Mr. Brinckerhoff's past recommendations on unification of service and reshaped his question to read:

"Do you know of any reason why buses should not also be included in unification of service which you say you still advocate for rail systems?"

Again and again and again he thundered the question in a dozen different forms, the witness declaring that a multitude of circumstances made positive expressions impossible.

"Let's turn back to the high-priced report," said Mr. Crawford. "In 1919 you said: 'Unification of all transportation systems cannot be too strongly urged.' Do you stand by that now?"

"Yes."

"Do you know any reasons why bus operations should be excluded from that recommendation?"

"No."

YELLOW COACH MAKES STATEMENT

It has been talked around Cleveland that the Yellow Coach Manufacturing Company was behind the People's Motor Bus Corporation. This was denied in a telegram to J. J. Stanley, president Cleveland Railway, by John Hertz, chairman of the board of the Yellow Coach Manufacturing Company, Chicago, as follows:

> I should like to have the Public Service Commission of Ohio, the city authorities, the press, the citizens of Cleveland and your good self and associates understand that neither I personally nor anyone associated with me in the various enterprises which I have the honor to represent is in any manner morally or financially identified with or interested in the activities of Messrs. Rhinock and Simms in their present efforts in Cleveland to procure the necessary legal rights for the installation of a motor coach service. On the contrary, we are wholly out of sympathy with what they are attempting to do there and I sincerely regret and resent the inference which apparently they permitted to get abroad without emphatic denial that we were associated with them in this undertaking. This applies not only to Cleveland, but to their activities in Toledo and any other city in America where they may be engaged in similar undertakings. Messrs. Rhinock and Simms are minority stockholders in the People's Motor Bus Company, St. Louis, the management of which recently came under our control. Other than this I have not now or have I ever had any business dealings or business interests in common with either Mr. Rhinock or Mr. Simms.

It was announced on Dec. 24 that the State Public Utilities Commission has continued until Feb. 11 further hearings on the bus applications of both the People's Motor Bus Company and the Cleveland Railway.

Survey of Transportation to Be Made at Yale

An extended study of the transportation problem in its engineering and economic aspects is to be conducted at Yale, beginning early next year. Official announcement to this effect was made on Dec. 5. The purpose is to determine what program of graduate studies in transportation at Yale is best adapted to the needs of the country and to the personnel and facilities at the university's command. The instruction and research done by other universities and technical schools will also be examined. The survey will be under the direction of Winthrop M. Daniels, professor of transportation; Charles J. Tilden, professor of engineering mechanics, and Samuel W. Dudley, professor of mechanical engineering.

The announcement also said that there will be regularly five Strathcona fellows in transportation at a stipend of $1,000 each, whose appointment is made possible by the fund received by the university in 1914 under the will of Lord Strathcona and Mount Royal. From this fund, which has already provided for two professorships, the Yale Corporation has also established two undergraduate scholarships, each of $600, payable to students showing efficiency and promise in the economic or engineering phases of transportation.

All branches of transportation, on water, land and air, will be considered in this survey, and special attention will be given to the study of their relationship and possibilities of their correlation.

Strike and One-Man Car Suit Are Problems in Dayton

The six street railways of Dayton face a complex situation at present. Five of them are encumbered by litigation arising from the ordinance against the one-man car passed at the referendum election in November, 1923. The status of the litigation is indeterminate as regards the continuance of the injunction in force at present against enforcement of the ordinance, but it will probably be dragged out for some time no matter which side scores first in the fight now in the federal court.

Victory for city attorneys will bring a situation that means barring off the streets about $90,000 worth of rolling stock, which, under the present financial conditions of the companies, will deal them a heavy blow. Victory for the companies will permit them to continue operation of one-man cars but with yet other troubles to combat.

One of these is the labor problem. A strike exists now on the Dayton Street Railway. The road is being operated, but the loss of 30 skilled operators was a blow. Though cars are running on regular schedule, the effect of the strike is to divert considerable travel from this state. The People's Railway employees, belonging to Union No. 810, did not go out but the threat will always exist unless some settlement is made with them.

These two roads were the only ones under union organization. Both locals took a strike vote for use as a weapon by their executive committees. The specific demands were for an increase of pay and for adoption of an association contract, which virtually meant a "closed shop" condition. The men had been getting 55 cents an hour and wanted 75 cents.

Union men say that organization is proceeding also on the City Railway, Oakwood line and the Dayton, Springfield & Xenia Southern. At present, these roads employ their men under individual contract binding them not to organize or join a union.

One of the roads, the D. S. & X. S., is operating under a receivership. Technically, Dayton has a 6-cent fare in cases where a transfer to another line is used. One cent is charged for a transfer. The cash fare, however, for a single ride is 5 cents.

The one-man and wage issues in Dayton have been referred to previously.

Chicago Attorneys Prepare Ordinances for February Ballot

Skeleton ordinances providing for transportation referendums in Chicago in February are being drawn by city attorneys as a legal step toward getting a purchase proposal on the ballot. The ordinances will be completed in detail by Jan. 15, next, for passage by the City Council and a campaign probably will be made to get the voters to agree to a purchase of the Chicago Surface Lines at a figure around $162,000,000. All figures will be in blank until the completion of the surface lines appraisal.

The administration announced that in the event the appraisal is not satisfactory to the Mayor, an alternate ordinance will be submitted, but in either case a subway will be provided for. The main ordinance will call for issuance of around $400,000,000 municipal traction notes, to be known as Schwartz certificates, which will pay for the surface lines, a downtown subway and outlying extensions. The estimated price of the elevated, $90,000,000, also is included but no steps have been taken to get an appraisal of the lines.

Wisconsin Commission Has Jurisdiction Over Proposed Road

New developments have taken place in connection with the proposed plans of C. D. Smith, Fond du Lac, president of the Southern Wisconsin Railroad, to build an electric railway from Madison to Sturgeon Bay, via Fond du Lac and Manitowoc.

The Wisconsin Supreme Court on Dec. 9 upheld the Wisconsin Railroad Commission in its decision requiring this line to obtain a certificate of convenience and necessity in spite of the fact that a charter for the line was obtained from the Legislature in 1897 before the commission came into existence. Mr. Smith maintained in his appeal from a lower court that the charter was a sufficient substitute for the certificate required. The commission will have to approve the certificate of necessity before it authorizes the line's proposed bond issue of $5,700,000.

Work has started on the line near Manitowoc. Future progress depends upon action taken by the commission.

Massachusetts Business Body to Demand Bus Regulation

The Association of Chambers of Commerce of Western Massachusetts has voted to instruct a committee to draft a resolution which will express a demand for legislation regulating bus operation and tending to increase taxes levied on buses.

B. A. Hapgood, secretary of the Springfield Chamber of Commerce, said the failure of railroads to take advantage of their opportunities was encouraging travel by automobile. Ray Baker of Boston, secretary of the Massachusetts Auto Dealers and Garage Association, said the bus owners were willing to co-operate in every practical way with the electric railways and the railroads and that they were ready to pay their proportionate share of taxes for highway maintenance. He said buses should be regulated.

Clark V. Wood, president of the Worcester Consolidated Street Railway and the Springfield Street Railway, said the buses were taking the most profitable short-haul business and that they were so increasing street congestion as to interfere with efficient operation of electric railway cars. He declared that any marked increase of bus service would entail intolerable congestion in the centers.

P. R. T. Offers Ground

The Philadelphia Rapid Transit Company has offered to the city as a gift the Burd tract at 65th and Market Streets as a suitable location for the construction of the Municipal Stadium. The acceptance will rest with the City Council. The Mayor has under consideration an alternative proposal from the Philadelphia Rapid Transit Company for the entire tract on condition that the city accept it subject to a $300,000 mortgage.

Aurora Line to Expand Following Shift in Population

Migration of Chicago's downtown workers westward has resulted in the need for the expansion of the facilities of the Chicago, Aurora & Elgin Railroad, which operates a system of third-rail lines of more than 100 miles connecting Chicago and many populous villages in Cook and Page Counties, Ill. In order partially to meet the cost of new work the company has arranged to sell $775,000 of two-year notes to be offered publicly by the bankers after Jan. 1.

Thomas Conway, Jr., president, said part of the money would be spent to build an artistic brick station in Glen Ellyn, where citizens enlisted the electric line in a city beautification program after seeing what the line had done for Wheaton. The Wheaton station is said to be one of the handsomest in the country and is the first of several by which the line hopes to set a new standard for interurban stations.

New block signals will be installed and there will be flash signals for crossroads. A new freight station will be erected in Elgin. The railway has purchased a 1,300-ft. frontage on Broadway, Aurora, and plans to take tracks off the streets inside the city and relocate them along the bank of the Fox River.

Records kept by the railway for 1921-1924 show that the main towns served have doubled in population in three years and that the number of houses in all communities served has increased 79 per cent.

Reconstruction Program in Oakland Progressing

In fulfillment of part of its construction program, recently entered upon, the Key System Transit Company, Oakland, Cal., expects to receive soon 12 new cars intended for use in its service to the ferries. These are the first cars purchased by the company in two years. The previous purchase was of 55 cars of the one-man, two-man car type. It was intended to operate these cars by a single man, but owing to protests against their operation the cars were never used as originally intended. They are now in service under two-men operation.

The new cars are to be used mostly in two-car trains to replace others which are in need of repair. The traffic in the East Bay cities is growing so fast that during the rush-hour periods of each day practically every bit of rolling stock of the Key System is called into use.

Recently the company has been overhauling, repairing and repainting its cars. This work is still going on, but has proceeded slowly owing to the fact that the demands of traffic make it essential to keep as many cars as possible in service.

The Key System's construction program was undertaken in conjunction with the traffic survey instituted six months ago at the instigation of the city of Oakland. This survey has borne much fruit. As a result of it, buses have been purchased and placed in operation in Oakland and Alameda. It is now proposed to establish an additional bus line in West Oakland, linking that center with the manufacturing sections of Alameda and the estuary area, now inadequately served.

It also appears likely that the Oakland City Council will amend the Key System's franchise so as to give the company more favorable terms than are now enjoyed. This is still a matter of future action, but it is understood that the ground has been laid for a move of this kind and that the railway will make extensions and route changes that will greatly improve service.

A new loop system has been proposed for the business section of Oakland and several lines are likely to be extended to outlying sections of the East Bay if there is favorable franchise amendment action.

One of the changes in the franchise desired by the company relates to street paving. The present agreement specifies that the company must keep the space between its tracks properly paved. In accordance with this agreement the company is now making extensive track repairs and paving various streets, but it is pointed out by traction officials that these charges are unfair and really redound to the detriment of the car rider.

Proposed Indiana Road Renews Application for Right to Build

An application for a further hearing on its petition for a certificate of public convenience and necessity to build an electric railway from Owensboro, Ky., to Elnora, Ind., with a bridge across the Ohio River midway between Owensboro and Rockport, Ind., has been filed with the Interstate Commerce Commission by the Owensboro, Rockport & Chicago Railway, a Kentucky corporation with headquarters at Owensboro.

The renewed application was filed following a report to the commission by C. E. Boles, attorney examiner, and E. Gray, engineer examiner, recommending that the application for a certificate be denied. The examiners reported that the company's estimates of anticipated traffic and revenues appeared to be excessive and that its estimates of cost of construction and of cost of equipment, particularly electric locomotives, appeared too low.

The hearing was held before the Indiana Public Service Commission at Indianapolis last September, at the request of the Interstate Commerce Commission. Officers of the company now state that they did not go more deeply into their estimates at that time because they misunderstood the purpose of the hearing. The Indiana commission recommended that the I.C.C. issue the certificate.

The proposed electric railway would be 84 miles long. The bridge across the Ohio was authorized by Congress last April. The company estimated its construction and equipment costs at $6,767,096, of which $2,125,000 would be for the bridge. It proposed to sell $2,500,000 common stock and $6,000,000 bonds to finance the project. E. T. Franks, Owensboro, is president of the company and Major Thomas H. Hazelrigg, a consulting engineer of Indianapolis, is chief engineer.

Unexpected Answers to Appeal for Service Suggestions

That the use of the bus as a feeder to the lines of the Altoona & Logan Valley Electric Railway, Altoona, Pa., is appreciated by the patrons of the Logan Valley Bus Company, a subsidiary, is shown in the hundreds of answers received to a questionnaire sent out recently by S. S. Crane, general manager. The questionnaire sought suggestions from bus patrons.

The company now maintains eleven buses. Five are operated on regular schedule and six make special trips to relieve the railway during the congested hours. Patrons were almost unanimous in asking for extensions of the five bus routes, faster schedules and more buses.

Complaints were of minor details. One critic protested the "heavy odor of gas" inside the cars, another protested "speeding." One 8-year old, riding the school bus, wrote, "We think it lots of fun, especially the bumps." An afflicted individual wrote that the "steps were too high, especially for a rheumatic person."

The many ideas and suggestions received will be carried out as far as practicable.

New Haven Against Buses

Court Orders Sought by Railroad and United Electric Railways to Protect Their Rights

Action was taken on Dec. 20 by counsel for the United Electric Railways, Providence, and the New York, New Haven & Hartford Railroad before Judge Chester W. Barrows in the Superior Court at Providence with bills of complaint against twenty corporations and persons operating bus lines in Rhode Island. The two transportation companies seek preliminary and permanent injunctions and restraining orders against the bus lines. A hearing on the preliminary injunctions was set for Dec. 29 in the Superior Court.

RAILWAY OR BUS

In the bills of complaint the petitioners allege that if the buses are allowed to run it will mean a cessation of railroad facilities. The petitioners claim that the buses are under no regulation, and have asked for no certificates of public necessity and convenience; that the machines are not bonded and not inspected, that no one has control over the fares and the routes and that the buses should not be allowed to continue operations unregulated.

The basis of action is similar to that in a recent case in which William M. Oakley, doing business as the "Overland Limited" between Fall River and Newport, was enjoined from further operation of the line on the prayer of the Newport Electric Corporation under a rescript filed by Judge Barrows.

A. P. Russell, vice-president of the New Haven, said:

> The New Haven cannot longer stand by and see its property jeopardized by this sort of competition. The railroads and electric railways have been authorized to provide transportation for the people of New England. Under that authority the railroads have made an enormous investment.
>
> There may be room for a third transportation agency in New England, but not in the field covered by the railroads and electric railways. The New Haven management feels that any new forms of transportation should be adapted to the use of those existing organizations. Acting on that principle, it will leave no stone unturned to eliminate unfair and unwarranted competition.

Much interest attaches in transportation circles everywhere to the announcement made on Dec. 20 of a plan by which the Boston & Maine Railroad would undergo a physical and financial readjustment, discontinue approximately 1,000 miles of track, obtain $13,000,000 cash for improvements to the lines retained and organize its own motor bus and motor truck service to cover the territory where rail lines are abandoned. Of the 2,450 miles of road more than 1,000 miles handle only 3 per cent of the business. The plan was advanced as part of a general scheme of financial reorganization.

ONLY PROFITABLE LINES TO BE RETAINED

Homer Loring, chairman of the executive committee of the railroad, is the author of the plan. It will be recalled that it was under Mr. Loring's direction that the Eastern Massachusetts Street Railway was rehabilitated. He cut off practically all of the unprofitable lines or those that give very little promise of soon becoming profitable, and then devoted his energies to the intensive development of the remaining lines with good results.

Leavenworth Gives Railway Bus Franchise

The municipality of Leavenworth, Kan., delivered a bus franchise to the Kansas City, Leavenworth & Western Railways on Dec. 17. Conway F. Holmes, president, considered the terms of the franchise favorable, and believed the company would accept them.

An investment of $50,000 or $60,000 is contemplated, to place in service six 29-passenger buses, to operate over the same routes as covered by the railway tracks, which were in need of expensive renewals. The six buses will equal in number the cars that have been in service.

The Kansas City, Leavenworth & Western interurban line between Leavenworth and Kansas City is in better form than in several years, the freight business thriving and the passenger service not having shrunk more than one-fourth in the recent months of interurban bus development.

Contracts Planned for Washington Heights Subway

Following a public hearing on Dec. 17 by the Board of Transportation of New York City on the terms and conditions of the contract for the construction of the Washington Hights subway, which is to be a part of the Manhattan trunk of the city's new subway system, it was announced that the contract drawings for two sections of the line from 111th Street to 131st Street had been completed and that invitations to contractors to bid on the construction would be ready for advertising during the week which will end Dec. 27.

One small section of the line has been under construction since last August.

The construction will be divided into fourteen contracts.

Insurance Fund Impaired by Peculations

Caleb S. Jackson, for many years treasurer of the Eastern Massachusetts Street Railway, has resigned because of irregularities in his account with the Eastern Mutual Insurance Company, of which also he was treasurer. His resignation from both concerns has been accepted. Robert B. Stearns, vice-president and general manager of the Eastern Massachusetts, has been designated by the trustees to take temporary charge of the financial department of the railway.

From a careful examination of the accounts and securities of the Eastern Massachusetts it is learned that they are not impaired, or in any way affected, by the handling of the funds of the Eastern Mutual. Present information indicates an unlawful use of $48,000 of the funds of the Eastern Mutual, which is a subsidiary of the Eastern Massachusetts, organized wholly for the purpose of handling the workmen's compensation claims of the employees of the Eastern Massachusetts.

Free Bus Restrained

Future of Community Buses Up to California Commission—Electric Railways Seek Rights

After the close of a two-day hearing before Commissioner W. J. Hanford of the California State Railroad Commission in Los Angeles, the Community-Merchants' Bus Service now awaits a decision from the state body as to its future existence. The operators of the free bus system have been defying the orders of the court by operating their buses from Los Angeles, Culver City and Venice without a certificate, but after they had been fined for contempt of court they decided to cease operations and apply for a permit to continue operations. They have also decided to offer no further resistance to the courts until the Railroad Commission has decided the matter.

RAILWAY OPPOSES PLAN

The application of the Merchants' Bus Service, formerly known as the Community (Free Buses) Bus Line, was considered at a hearing based on an application of the Pacific Electric Railway. That company sought permission for a franchise to operate a bus line from Los Angeles to Culver City and Venice, but over a slightly different route from the one outlined in the application of the Merchants' Bus Service. The railway proposed to run its buses so as to connect with its electric cars at Los Angeles and operate along Washington Boulevard all the way to the proposed terminus at Venice. The railway planned to charge the same fares for its proposed bus line as are now charged on its electric interurban trains operated between Los Angeles and Culver City and Venice.

The Free Bus System seeks permission to continue its present schedule of fares, namely 10 cents from terminus to terminus. But the bus service is not rendered complete in going between Venice and Los Angeles, as the passengers are picked up or unloaded at the city limits of Los Angeles or at the end of the Los Angeles Railway's Washington Street line, whereby passengers are obliged to pay a 5-cent fare on the local car line in Los Angeles.

The electric line offers a system of fares which consists of round-trip rates, family, commutation and other special fares, which in some cases give rides for less than the bus men charge.

PLEA FOR CO-ORDINATION

At the hearing J. Ogden Marsh, chief engineer of the Los Angeles Board of Public Utilities, stated that the Board of Public Utilities of Los Angeles was engaged in trying to unify into one system the local street car lines in Los Angeles of the Pacific Electric Railway and Los Angeles Railway, as well as all bus lines for improvement and continuity of service and to make universal transfers possible. For that reason, he said, the board favored the granting of bus line franchises to the street railways.

The Pacific Electric Railway informed the commission that it had eight new 29-passenger buses available for the new service, provided the commission approved of the railway's application.

Inquiry Conducted Into Oakland Wreck

The worst accident in the history of East Bay electric train service occurred during the rush hour the morning of Dec. 4. A single car train of the Sacramento Short Line, westward bound, crashed into a four-car train of the Key System Transit Company on the Key line's fill a short distance from the Oakland mole. The Sacramento car telescoped the lighter rear car of the Key train half its length, killing six passengers and maiming 22 others. Subsequently two of the injured died in hospitals, bringing the death list up to eight.

Immediately after the accident investigations were started by the coroner, the State Railroad Commission and by each of the two railroads. The problem of fixing responsibility proved a knotty one, owing to the peculiar conditions under which that portion of the road on which the crash occurred is operated.

Details of Operation Developed

The fill is the property of the Key System Transit Company, but is used jointly by the Key and Sacramento trains. The switches and safety devices are all under Key System control. Trains running on the fill are subject to the orders of Key officials. These facts were brought out at the hearing in the Key Building in Oakland the day after the wreck by H. A. Mitchell, vice-president and general manager of the Short Line. Mr. Mitchell produced a contract dated Jan. 20, 1911, in support of his testimony. E. E. Thornton, division superintendent of the Key System, however, denied that his company was responsible for what Short Line employees do while operating their own trains on Key tracks. To this Mr. Mitchell replied that no men are put on Short Line trains that operate over Key Line tracks until they have been passed upon by Key System officials. Manager Thornton accused the Short Line motorman of being in a previous crash with a Piedmont Key train at Fortieth Street and Telegraph Avenue. Mr. Thornton said:

> If the motorman of the Sacramento train had been working under Key System regulations there would have been no subsequent accident in which he could have participated, for the reason that he would have been disqualified from further service.

He further explained that all Key System trains are equipped with a "dead man" device.

Mr. Mitchell admitted that his train did not have such a device, but explained that it was equipped with other safety devices.

Testimony at the hearing showed that the signals on the fill were found to be in good working order after the accident. It was also brought out that the brake valves of the Short Line car were inspected before the accident and found to be in perfect working order. The brakes and brake devices, examined after the wreck, were found to be in excellent condition.

These points were brought out at the hearing:

1. That the Key train had come to a complete stop before the crash.
2. That the Short Line train went by at least two danger signals.
3. That it had been raining and the tracks were slippery.
4. That the crash came about 30 or 35 seconds after the Key train had stopped.
5. That the Short Line train was traveling at the rate of about 30 m.p.h. when first sighted by members of the crew of the stalled train.
6. That there was good visibility.
7. That both trains were late.
8. That there are no speed regulations on the fill.

Members of the board of inquiry named by the Key System and Short Line included:

Frank Mott, former Mayor of Oakland; Samuel Irving, former Mayor of Berkeley; J. C. McPherson, superintendent of the East Bay division of the Southern Pacific Company; W. Arnstein, president; L. H. Rodehaugh, traffic manager, and F. A. Miller, superindent of power and equipment of the Sacramento Short Line; W. R. Alberger, vice-president and general manager of the Key System Transit Company; J. P. Potter, superintendent of transportation of the Key Line, and W. P. Jackson, master mechanic of the Key.

Mr. Mitchell declared that the fact that the frame of the Short Line car was higher than the frame of the Key Line car accounted for the telescoping.

Litigation in Spartanburg Officially Ended

The mandate of the Supreme Court of the United States, affirming the judgment of the Supreme Court of South Carolina in the case of the city of Spartanburg against the South Carolina Gas & Electric Company was filed in the office of the Supreme Court of South Carolina recently. This permanently ends one of the biggest cases that has ever been tried in Spartanburg. This was a proceeding in mandamus to compel resumption of street car service.

The case was practically settled by consent. Some weeks ago R. L. Peterman, manager of the Barstow interests in South Carolina, new owners of the South Carolina Gas & Electric Company, appeared before City Council and voluntarily agreed to withdraw their appeal. The city agreed to this, and under this arrangement the appeal was abandoned and ordered dismissed by the court.

The Barstow interests agreed to abandon the appeal of the South Carolina Gas & Electric Company from the South Carolina Supreme Court's decision on the ground that they did not care to be working under the disadvantage of a long-standing litigation.

The new company has petitioned for a 10-cent fare between Morgan Square and the city limits. A 10-cent fare has been in effect for some time on the car lines between East Spartanburg and Clifton. A 7-cent fare was charged within the city limits by the South Gas & Electric Company under the old ownership and prior to the discontinuance of car service in the city. Ten cents was also charged outside the city limits. At present a 10-cent rate is in effect on the buses. The new owners for several months have been at work rehabilitating the old car system.

News Notes

Court Allows One-Man Cars Temporarily.—On the day that the ordinance prohibiting one-man car operation on the lines of the Connecticut Company in New Haven, Conn., was to become effective an injunction was obtained by George D. Watrous, representing the company, from Judge Isaac Wolf of the Superior Court permitting the present status of operation to continue until Jan. 6. The injunction enjoined the chief of police and city officials from attempting to enforce the provisions of the ordinance recently passed by the Board of Aldermen. The action of the board was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 6. The hearing on Jan. 6 will be to determine whether the injunction shall be made permanent.

Considers Utility Courses.—The University of Oklahoma has under consideration the offering of utility courses in its regular curriculum. Such utility studies were recently added to the course of work in the University of Pennsylvania.

Railway Service Wanted.—More than 100 residents of Marlboro, Mass., have filed a petition asking the City Council to exert its influence to retain the service of the Worcester Consolidated Street Railway on the Northboro road section. The railway officials threatened to abandon service between Marlboro and Northboro if business fell off because of bus competition. The City Council decided not to restrict bus lines with reference to taking on and discharging passengers on the route between Marlboro and Westboro. The Marlboro Chamber of Commerce likewise is against any drastic change in the present transportation arrangements. The railway fare is 59 cents one way between Marlboro and Worcester, while Terry Carlstrom, bus proprietor, has announced he would sell 12 tickets for $4 or at the rate of 33⅓ cents a trip.

Advertisements Told Strike Story.—The Illinois Traction System, Chicago, Ill., told the story of the incidents leading up to the recent strike situation and its position in the matter by means of display advertisements in the papers in its territory and a series of letters to employees. By these means the people in its territory were offered every opportunity to know all of the facts concerning the situation. E. E. Soules, manager of the publicity department of the railway company, directed the work of placing the statement with the newspapers.

Life Insurance Increased.—Employees of the Kansas City, Leavenworth & Western Railway, Kansas City, Kan., have increased their group life insurance coverage by more than $63,000, bringing the total in force to about $150,000. Both the original and additional insurance policies were issued by the Metropolitan Life Insurance Company on the co-operative group plan, under which the railroad company and the workers jointly pay the premiums.

New Franchise Increases Service.—Interurban service between Cleveland and Bedford, Ohio, will be increased by the Northern Ohio Light & Traction Company and the fare increased by 5 cents. This follows a referendum vote of approval on a new franchise for the company by the voters of Bedford.

Court Dismisses Old Suit.—A suit involving reversion of the Omaha & Council Bluffs Street Railway's property to the city of Omaha, Neb., and popularly supposed to be still on a District Court docket, subject to an order to reopening, was dismissed at the city's cost by the court on Dec. 11. This suit grew out of the first franchise grant made to the Omaha horse railway in 1867. The grant specified that the property of the company should revert to the city after 50 years. The company was absorbed by the lines that went later into the present system.

Fares Lowered.—The Maine Public Utilities Commission has rendered a decision permitting the Androscoggin & Kennebec Railway, Lewiston, to make changes in its fare zones which will give many patrons a 10-cent reduction on every trip because of the extended fare limits. In view of the fact that the proposed changes in the fare zone limits would result in an extension of the present fare limits and would be of mutual benefit to the petitioner and patrons, the commission said it would approve the petition.

Will Petition for Charter.—Judge J. Moss Ives, receiver of the Danbury & Bethel Street Railway, Danbury, Conn., and others associated with him will petition the Connecticut General Assembly for a charter to operate an electric railway system and power generating plant. The company will be designated as the Danbury & Bethel Power & Transportation Company, and if authorized may take over the company now operating, foreclosure of which has been ordered by the court on the petition of first mortgage bondholders. It is also proposed to take over charters of the Danbury & Bethel Traction Company, and the Bridgeport & Danbury Electric Railway.

Old Equipment in Service. — The Illinois Power & Light Company has placed a bus in service between the center of Des Moines and the power plant of the company located some 6 miles southeast of Des Moines. The bus was one acquired from some of the original bus operators in Decatur, in which city the company has co-ordinated the railway and bus service. The bus is used merely to haul the workmen between the plant and the city. The company has also placed in service between South Omaha, Neb., and Ralston, three buses acquired from the old equipment in Decatur at the time of the purchase. These three buses supplement service to the interurban line between the two towns.

New Proposal Offers Bus. — The Philadelphia Rapid Transit Company, Philadelphia, Pa., has requested permission of the Delaware River Bridge Joint Commission to operate a bus route across the Delaware River Bridge, connecting Philadelphia with a suitable place in Camden. The plan would afford passengers the same fares and transport privileges as obtain now in Philadelphia. The company wrote to the Delaware River Bridge Joint Commission a few months ago asking to extend the transportation system, offering both street car and bus service. Later, at a hearing before the executive committee of the Bridge Commission, details of the proposed service were discussed. Since that meeting the company has been requested by the Reading Railroad to consider a bus route over the bridge to Camden which would give service to the Reading's new Camden terminal.

Christmas Checks for Safe Work.—Christmas letters in the form of checks were received recently by 321 motormen, conductors and operators of the Nashville Railway & Light Company, Nashville, Tenn., as a bonus for their work in the safe operation of street cars for the past three months. The amount paid out by the company this quarter was $3,140, increasing the total bonus payments in the safety campaign for the past 11 months to $7,383. According to John J. Connors, safety director of the company, the safety campaign has been responsible to a great extent for the 60 per cent reduction in street car accidents since 1920.

Wants Fare Increase.—Officials of the Milford & Uxbridge Street Railway, Milford, Mass., recently asked the State Department of Public Utilities for an increase in fares from 10 cents to 13 cents with the right to sell nine tickets for $1. Children's and workmen's fares would not be increased. The officials claimed that no dividends had been paid since 1916 and that this year no taxes could be paid or interest on loans.

Placards Will Tell Story.—Councilman Philip Tindall will ask the City Council of Seattle, Wash., to provide for printing placards to set forth the financial progress of the Seattle Municipal Railway. He states that Seattle's railway has spent approximately $2,000,000 in rehabilitation of the system since the property was taken over by the city on April 1, 1919; this in addition to the paying of all operation and maintenance expenses, paying off bonds and meeting interest payments. He plans to acquaint the people of the city with the true status and accomplishments of the line since it became city property.

Spencer Circulates Car Petitions.—Petitions are now in circulation in Spencer Mass., for presentation to the Worcester Consolidated Street Railway to show that there is sentiment for restoration of the lines to Leicester and Worcester, Mass., discontinued some months ago. It is proposed to open the question to general discussion at the town meeting in March.

Wins Road Ownership.—Cliff Little of Gadsden, Ala., is awarded the property of the Gadsden, Bellvue & Lookout Railroad, in North Alabama, in a case decided by the Circuit Court at Gadsden, Ala. on Dec. 15. The road operates from Gadsden, Ala., for several miles through the mountain section of North Alabama. It was alleged that the owners refused to refund money paid out by him for running the road or give him possession of it. Under the decision of the court the owners may hold the road in the event they immediately refund this money, together with interest and attorney fees. Otherwise the road becomes the property of Mr. Little.

Expert's Report Awaited.—Milo R. Maltbie, New York, has been engaged by the Cincinnati, Ohio, Chamber of Commerce as the expert adviser of that organization's traction committee. Mr. Maltbie has started his work and expects to have a preliminary report ready by Jan. 1 on the traction situation in Cincinnati.

Bonus Checks Distributed. — Bonus checks totaling $106,680 were distributed to 2,330 motormen, conductors and safety car operators on Dec. 15, under the merit and bonus system of the Los Angeles Railway, Los Angeles, Cal. This is the fifth Christmas season in which the bonus has been paid. A new high record is established in the amount paid and in the number of men receiving checks. The Christmas bonus is in the form of payment for special service rendered by trainmen during the year.

To Grant Petition Would Be Discriminatory.—Taking the view that a discriminatory action was being asked, the Board of Public Utility Commissioners of New Jersey denied the request of employees of the Pennsylvania Railroad for a modification of the Public Service Railway fare zones from Jersey City and the Meadow Shops at Kearney and from Newark to the Meadow Shops. The board held it would be unjust to change the zones in favor of these employees without extending the same privilege to all passengers. It said that while the present municipal zoning system might require modification in the future, such modification should not be made under this application.

Wants to Run One-Man Cars.—The Northern States Power Company has petitioned the Wisconsin Railroad Commission for permission to establish one-man car service on its line between Eau Claire and Chippewa Falls. At the hearing no opposition of residents was voiced.

Urge Widening Woodward Avenue.—Sidney D. Waldon, president of the Detroit, Mich., Rapid Transit Commission, recently stated his reasons for recommending the widening of Woodward Avenue, to be available for a four-track route. He believed that measures should be taken at once to adopt a uniform width of 120 ft. on the avenue from the Detroit River to the entrance of Palmer Park. The recommendations were made in a letter sent to the Woodward Avenue Improvement Association, which had asked for information as to the necessity of widening the thoroughfare. The association's letter, which was signed by John M. McKerchey, president, asked the commission to state the reasons it had to offer for recommending the expenditure of the sum required for the widening project. The Detroit *News* of Nov. 16 referred to the transit commissioners' suggestions.

Financial and Corporate

Plans Acquisition of Bus Company

Detroit Street Railways to Serve Sections of the City Now Without Transportation Facilities

The immediate establishment of bus service in certain sections of the city of Detroit and the ultimate taking over of the Detroit Motor Bus Company are in line with the new policy of the Department of Street Railways, according to a general outline of the transportation question by Mayor John W. Smith. Mr. Smith pointed out that the acquisition of the bus company's property must come eventually, and that the fact is realized by city officials and directors of the bus company.

The Department of Street Railways plans to have immediately a fleet of 25 buses to serve sections of the city which as yet have no transportation facilities and the bus service will be augmented as soon as the Council formally approves the purchase of the new double-deck buses recommended by the Street Railway Commission.

Before the city can proceed very far with plans for a complete and unified transportation system including street cars and buses, according to the mayor, legislation is necessary which will establish for the city the rights to its streets. The existing laws give the city the right reasonably to control the use of the public streets but an ordinance must be passed giving the city more complete control of the pavements. The mayor cites that at the present time a score of bus companies are operating into the city of Detroit from neighboring municipalities. The solution of this problem is one of the first to be faced by city authorities, the Mayor considers.

It is believed by Mayor Smith that the decision handed down by the Supreme Court in the case now pending concerning the right of the city to control its streets as far as the jitneys are concerned will pave the way for the passage of an ordinance relative to bus operation in the city.

To the Street Railway Commission will be left the working out of a proper system of bus transportation in the outlying districts. It is claimed that in some of the districts, citizens have to walk a mile or even farther to get to a street car. It is in these sections that the bus will be used to carry passengers to the car lines and transfers will be issued for the trip down town.

Immediate contracts for five buses from each of the three bidders who bid upon the city's request for proposals on 50 buses are urged by the Mayor and the Street Railway Commission but formal approval of this action has not yet been given by the City Council. The commission points out that immediate contracts should be let to insure delivery of the buses by spring. It is not anticipated that the buses will operate into the down town section for the present at least. They will be used only as feeders in connection with the car lines.

The Mayor believes that the eventual acquisition of the Detroit Motorbus Company's property is necessary in order that a maximum of service may be rendered the public. With the present company running equipment on parallel routes with the street car lines the most efficient service cannot be accomplished. It is pointed out that as the bus company is operating under a day-to-day agreement without a franchise, not much change would result from the city's acquisition of the bus company's equipment. Although the buses could be stopped from running on very short notice it is realized that a valuable service is being rendered by the buses and there is no disposition on the part of city officials to take any action that might result in discontinuing the bus service.

Sale of 26-Mile Road Sanctioned

The property of the Interstate Consolidated Street Railway, Attleboro, Mass., is to be sold at public auction by Zenas W. Bliss, the receiver. Judge Crosby of the Supreme Court of Massachusetts has authorized the sale. As receiver Mr. Bliss asked for authority to sell on the ground that the company cannot earn its cost of maintenance; that it is unable to meet its obligations as they mature, and that it would be of no advantage to the creditors, stockholders or the public to continue the receivership. The road operates 26 miles of line from Plainville, in Wrentham, through North Attleboro and Attleboro to the Rhode Island line, and a line from Attleboro to Seekonk to the Rhode Island line. The sale will be held in Attleboro.

$51,138 Below Return

Rochester Lines Show Deficits on Railway and Bus Operations—3,000,000 Fewer Passengers

For the fourth year under the service-at-cost contract the Rochester lines of the New York State Railways failed by $51,138 to get the 6 per cent return on their base value guaranteed by the contract. This fact was disclosed in the recent report of Charles R. Barnes, city railway commissioner, for the year ended July 31. The base value for the year covered by the report is stated at $19,573,606. The detailed results are shown in the accompanying table.

The returns are fixed at $1,162,598 for street car operations and $5,465, for the bus lines or a deficit of $41,890 and $9,249 respectively. The company began the operation of buses on Nov. 1, 1923. The shortage for the four years since the inception of the service-at-cost contract follows: First year, $133,998; second year, $94,001; third year, $47,642, and fourth year, $51,139.

Nearly 3,000,000 fewer passengers were carried for this year than in the preceding one, although 94,448 car-miles were run. This represented the high water mark since the signing of the contract. The unusually open winter, making possible greater use of autos, and adverse business conditions in the early part of the year are held responsible for the decline.

Commissioner Barnes commented upon the fact that the automobile affects the lines adversely in two ways, decreasing revenues by taking away passengers and by adding to the traffic congestion, retarding the movement of cars and increasing operating costs. The retarding of car movement has been acute since the city of Rochester installed a signal light control system on its main street, creating a problem for street cars and vehicles, particularly the former.

RESULTS OF OPERATION AT ROCHESTER FOR YEAR ENDED JULY 31, 1924

	Railway	Co-ordinated Bus Lines*	Combined
Revenue from transportation—			
Passenger revenues	$5,027,845	$41,117	$5,068,962
Miscellaneous transportation revenues	2,533	....	2,533
Total revenue from transportation	$5,034,081	$41,920	$5,078,011
Revenue from other operations			
Station and car privileges	$49,562	....	$49,562
Rent from tracks and facilities	42,297	....	42,297
Rent from buildings and other property	34,577	....	34,577
Total revenue from other railway operators	$126,436	$41,929	$126,436
Total operating revenue	$5,160,518	$41,929	$5,202,447
Railway operating expenses			
Way and structures	$490,806	$1,296	$492,103
Equipment	402,758	4,890	407,648
Power	285,847	4,428	290,275
Conducting transportation	1,782,188	20,823	1,803,812
Traffic	14,375	....	14,375
General and miscellaneous	514,789	7,633	522,422
Renewals and depreciation	190,000	6,272	196,272
Total operating expenses	$3,680,765	$45,344	$3,726,110
Net revenues from railway operations	$1,479,752	$3,415	$1,476,337
Auxiliary operations—revenues	6,357	....	6,357
Auxiliary operations—expenses	5,467	....	5,467
Net revenue from auxiliary operations	$890	....	$690
Net revenue from all operations	$1,480,642	$3,415	$1,477,227
Taxes assignable to operations	370,466	368	370,834
Operating income	$1,110,176	$3,785	$1,106,392
Non-operating income	10,531	....	10,531
	$1,120,708	$3,783	$1,116,924
Return on investment	1,162,598	5,464	$1,168,063
Deficit	$41,890	$9,248	$51,138

* Bus operation started Nov. 1, 1923.

Submits Report on Denver Tramway Operation

E. Stenger, receiver of the Denver Tramway, Denver, Col., recently presented the following report to the United States District Court covering operations from Dec. 24, 1920, when he was appointed receiver, to Oct. 31, 1924:

CONDENSED STATEMENT OF NET INCOME PERIOD DEC. 24, 1920, TO OCT. 31, 1924

	Accumulative Dec. 24, 1920, to Dec. 21, 1923	January to October, 1924	Accumulative Dec. 24, 1920, to Oct. 31, 1924
Total revenue from transportation	$14,136,741	$3,733,107	$17,869,848
Total revenue from operation other than transportation	514,900	162,308	677,208
Total operating revenue	$14,651,641	$3,895,415	$18,547,056
Total operating expenses	9,802,256	2,542,433	12,344,689
Net operating revenue	$4,849,385	$1,352,981	$6,202,366
Total miscellaneous income	36,462	20,910	57,372
Gross income less operating expenses	$4,885,847	$1,373,891	$6,259,738
Total deductions from income	4,237,966	1,178,117	5,416,083
Net income	$647,881	$195,774	$843,655

Georgia Interurban in Danger of Suspension

Preston S. Arkwright, president of the Georgia Railway & Power Company, Atlanta, Ga., recently sent a letter to the Mayor and the Council of Marietta protesting the establishment of bus lines and warning that the interurban railway could not continue to operate under bus competition. The letter stated that granting permission to operate a bus between Atlanta and Marietta over a public highway supported in part by the railway was unfair and such operation was taking away essential revenue. He said that the Atlanta Northern Railway was opened for operation in 1905, and in every place possible along all parts of its route outside of incorporated cities it was built upon a private right-of-way bought and paid for by the railway. In the 19 years of its existence the company has not paid a single dollar in dividends, but has accumulated a floating debt of $145,000. In 1923 it failed by $11,550 to earn bare operating expenses, taxes and renewals. He said that the Atlanta Northern Railway could not face bus competition as the electric lines in Atlanta had been forced to face jitney competition. He said that there was no public convenience served by these buses and that their continuance would seriously hamper, if not completely destroy, the effectiveness of the electric railway.

276,460,074 Passengers Carried by Wisconsin Railways

The public utilities in Wisconsin have shown a steady growth with a total valuation on Dec. 31, 1923, of $376,679,440, according to the biennial report of the Wisconsin Railroad Commission for 1922-1923. This is an increase of 60.13 per cent over the $235,332,138.13 valuation of utility properties on June 30, 1917.

The electric railways showed losses in the number of passengers carried in the last few years. A high mark of 287,905,241 passengers was established in 1920 compared with 222,508,368 in 1917. In 1922 the total number of passengers carried during the year dropped to 262,110,613, while in 1923 the number of passengers carried increased to 276,460,074. Operating revenues increased from $11,323,223.38 in 1917 to $20,032,358 in 1922. Expenses, however, increased even more rapidly and the ratio of expenses to revenues rose from 74.61 per cent in 1917 to 84.6 per cent in 1922, and by the end of 1923 this figure had decreased only 1 per cent, although the revenues for 1923 had increased to $22,397,270.

Discontinuance of Train Service Allowed in Niagara Section

Upon the assurance of the New York Central Railroad that it will sell commutation and special trip tickets good between Suspension Bridge and Lewiston at its ticket office at Suspension Bridge and that all tickets reading to or from Lewiston via New York Central will be honored on the Niagara Gorge Railroad and Niagara Gray Bus Line, the Public Service Commission on Dec. 12 permitted the New York Central to discontinue its train service between Suspension Bridge and Lewiston.

At a hearing on Nov. 7 on the commission's order to the Central to show cause why it should not continue service, it was brought out by the railroad that an arrangement had been made whereby the Niagara Gorge Railroad will operate cars between Niagara Falls and Lewiston in connection with New York Central trains. The Niagara Gorge Railroad also operates the Niagara Gray Bus Line, operating between Niagara Falls and Lewiston and beyond, giving practically a two-hour service each way. The commission reserves the right to direct the resumption of train service.

Divisible Receipts Greater in Chicago

The Chicago Surface Lines announced a substantial gain in its 45 per cent of divisible receipts for November over the same month a year ago, though a slight falling off from October. The city gets 55 per cent of the net receipts. The Surface Lines share was $132,981 for November, 1924, against $86,685 for November, 1923, and $169,523 for October, 1924. The company's efforts to reduce operating expenses are shown in the comparison of $3,727,303 November expenses and $3,877,750 in October. Trainmen received $1,683,001 wages as against $1,785,503.

The number of passengers carried in November declined to 120,540,271, against 127,729,691 in October, but the average fare rose from 3.82 cents to 3.83. A compared income account for the two months shows:

	November	October
Gross earnings	$4,710 210	$4,963,509
Expenses	3,727,303	3,877,750
Residue receipts	982,986	1,085,759
Joint account expense	20,000	20,000
5 per cent interest on purchase price	667,391	689,040
Divisible receipts	295,515	376,718
City's share	163,533	207,195
Company's share	132,981	169,523

Conspectus of Indexes for December, 1924

Compiled for Publication in this Paper by Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Dec. 1924 7.17	Nov. 1924 7.17	Dec. 1923 6.89	May 1921 7.24	May 1923 6.88
Street Railway Materials* 1913 = 100	Dec. 1924 148.7	Nov. 1924 148.6	Dec. 1923 155.5	Sept. 1920 247.5	Oct. 1924 148.5
Street Railway Wages* 1913 = 100	Dec. 1924 220.8	Nov. 1924 220.7	Dec. 1923 216.4	Sept. 1920 232	Mar. 1923 206.8
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Nov. 30 1924 4.03	Oct. 31 1924 3.53	Nov. 30 1923 4.37	July 31 1920 11.12	July 31 1924 3.19
U.S. Bank Clearings Outside N. Y. City (Billions)	Nov. 1924 16.62	Oct. 1924 18.02	Nov. 1923 15.92	Mar. 1920 18.54	Feb. 1922 10.65
Business Failures	Nov. 1924	Oct. 1924	Nov. 1923	Jan. 1924	Sept. 1924
Number	1,460	1,573	1,653	2,231	1,277
Liabilities (millions)	29.01	45.96	63.92	122.95	27.71

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Dec. 1924 203.6	Nov. 1924 205.7	Dec. 1923 217.3	June 1920 273.8	Mar. 1922 162.0
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Nov. 1924 152.7	Oct. 1924 151.9	Nov. 1923 152.1	May 1920 247	Jan. 1922 138
Bradstreet's Wholesale Commodities 1913 = 9.21	Dec. 1 1924 13.53	Nov. 1 1924 13.35	Dec. 1 1923 13.44	Feb. 1 1920 20.87	June 1 1921 10.62
Dun's Wholesale Commodities 1913 = 120.9	Dec. 1 1924 193.0	Nov. 1 1924 193.7	Dec. 1 1923 190.9	May 1 1920 263.3	July 1 1921 159.8
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Nov. 1924 150	Oct. 1924 149	Nov. 1923 151	June 1920 219	Mar. 1922 139
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Nov. 1924 165.2	Oct. 1924 165.0	Nov. 1923 165.3	July 1920 204.5	Aug. 1922 154.5

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wage of motormen, conductors and operators on 100 of the largest street and interurban railways in the United States, weighted according to the number of such men employed.

Raleigh Company Not Reorganized

It was erroneously stated in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 20, 1924, that the Carolina Power & Light Company, Raleigh, N. C., had been acquired by J. G. White Company and reorganized. The company acquired by J. G. White Company is the Carolina Light & Power Company, Aiken, S. C. The Carolina Power & Light Company operates the railway system in Raleigh, N. C., and also does a general lighting, power and gas business. The Carolina Light & Power Company is a power and lighting property. It does no railway business.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week $45,000 Shawnee-Tecumseh Traction Company, Shawnee, Okla., first mortgage 5 per cent 10-20 year gold bonds, due 1926; June, 1922, coupons on; 20 per cent.

Short Line Given Up.—Fitchburg & Leominster Street Railway has abandoned its 5-mile line between Fitchburg and Lunenburg, Mass. The action of the road was due to lack of patronage, which made operation a loss. Bus line owners are investigating the possibilities of operating between Fitchburg and Lunenburg.

Income Lower.—For the 5 months of the fiscal year ended November, 1924, the net corporated income of the Brooklyn City Railroad, Brooklyn, N.Y., was $595,493, against $792,341 for the corresponding 5 months in the last year. The passenger revenue for the 5 months ended with Nov. 30, 1924, totaled $4,708,989, while for a similar period in 1923 this item stood at $4,880,417. Expenses and taxes for the period this year were $4,090,439, which differed slightly from that of last year, when the figure was $4,048,268.

Balance Lower—Bus Service Extended.—For the eleven months ended Nov. 30, 1924, the gross income of the Republic Railway & Light Company, New York, N. Y., amounted to $9,557,946, against $9,027,895 for a similar period last year. The balance for depreciation, dividends and surplus amounted to $578,232 for the period of January through November of the current year and $635,363 for a similar period of 1923. The company, through its subsidiaries, operates 23 buses in interurban service and 57 buses in city service. Recently an important subsidiary, the Pennsylvania-Ohio Power & Light Company, started bus service between New Castle and Sharon. In the Nov. 29 issue of the ELECTRIC RAILWAY JOURNAL this company was inadvertently referred to as the Pennsylvania Power & Light Company.

Approve Liquidation Plan. — The stockholders of the Railways Company General approved a plan for the proposed liquidation of the company on Dec. 10. The property of the company is held by two corporations. The Railways Company General, which is a New Jersey corporation, has for some years held securities of several electric railways and accounts receivable, among which is the entire capital stock of the Victory Park Land & Improvement Company, Inc. The latter company is a New York corporation and was organized to hold the real estate owned by the Railways Company General. The assets of the Railways Company General will be transferred to the Victory company for an arbitrary consideration. Each stockholder of the Railways Company General can surrender his stock and take his pro rata share of the Victory company stock. As the capitalization now exists, this will give to each shareholder of Railways Company General two shares of Victory Company for one share of Railways Company General that he now holds.

Revenue Up.—For the eleven months months ended Nov. 30, 1924, the Philadelphia Rapid Transit Company, Philadelphia, Pa., had a net income of $1,895,868, against a net income in 1923 of $1,890,437. The passengers carried totaled 829,812,333 in the period from January to November, 1924, and 836,817,620 for the similar period in 1923. The passenger revenue from January to November this year amounted to $40,669,902 and for the 11 months of 1923 the amount was $40,265,921. Passenger statistics for November, 1924, the second full month of operation on the new fare, show that 74,087,646 passengers were carried, bringing a revenue of $4,010,418 against a revenue in November, 1923, of $3,771,562. The number of 8-cent fare passengers during November this year was 2,833,384. The 7½-cent token passengers totaled 48,581,229. The 5-cent fare zone line passengers numbered 1,100,404. Transfer passengers totaled 18,835,463.

Abandoned Property to Be Sold.—All the property of the Nevada County Traction Company, which formerly operated between Nevada City and Grass Valley, Cal., will be sold Jan. 17, 1925, by Frank Steel, commissioner named by the Superior Court. The sale is to satisfy a judgment of $67,000 obtained by the Mercantile Trust Company, San Francisco. Almost a year ago the company petitioned the California Railroad Commission for permission to abandon railway service. The property of the company was covered by a mortgage which was ordered foreclosed and sold by the Superior Court.

Ordered to Sell Power Equipment.—The receivers for the Dayton, Covington & Piqua Traction Company were directed to sell three boilers in the company power plant at West Milton, Ohio, for not less than $4,500 in an order filed in U. S. District Court recently by Judge Smith Hickenlooper. The receivers in their application pointed out to the court that a saving of $10,000 had been recorded annually by purchasing their power from foreign sources.

Commission Approves Issue. — The Public Utilities Commission of the District of Columbia has authorized the Washington Railway & Electric Company to sell $1,850,000 of general and refunding mortgage 6 per cent, ten-year gold bonds, secured by mortgage of Nov. 1, 1923. The issue is for the purpose of retiring a similar amount of Metropolitan Railway first mortgage 5 per cent bonds, due Feb. 1, 1925.

Appeals on Tax Decision. — Judge Thomas Bailey of the County Court recently decided that the Lewistown & Reedsville Electric Railway, Lewistown, Pa., must pay $4,000 annually for ten years for use of the Juniata River bridge, between Lewistown and Lewistown Junction. Following this announcement the company decided it would discontinue service across the bridge on Dec. 31. Through the efforts of the Chamber of Commerce, the county, the railway representatives and business firm representatives met in the community hall to consider the company's action in suspending action over the bridge. Day & Zimmermann, Inc., manager of the railway, were represented by J. A. Dewhurst and Chester Wilson. The company made a report of its business. During the twelve months period ended Oct. 31, 2,230,000 revenue passengers were handled at an average fare of 6.58 cents. Of the more than 2,000,000 people who were carried during the past year, 434,000 rode on cars over the river bridge. The company has taken an appeal from the rental decision. It states that an agreement could come about by passing the tax to the users of the bridge, discontinuing the existing railway service as a losing venture and substituting buses.

Boston Road Does Well.—The Boston Elevated Railway, Boston, Mass., showed a profit for operations in November. Edward Dana, general manager, said that the road had "turned the corner." Receipts from fares on Dec. 20 were $126,844, the greatest in the history of the road. Wage increases granted recently were said to have been more than offset by reductions in the working force and economies in purchase and operations.

Will Cease Operations.—The Nassau County Railway, operating between the Long Island Railroad station at Sea Cliff and Sea Cliff village, notified the Public Service Commission on Dec. 22 that it will cease operation on Jan. 8. Arrangements are under way between the company and the Sea Cliff authorities for a bus service.

Trolley Line Gives Up.—The Warren-Bristol line of the United Electric Railways, Providence, suspended service on Nov. 23 and simultaneously a bus line was started. Three buses will be maintained during normal service and a fourth added during the rush hour.

Earnings Lower.—The gross earnings of the railway department of the Cumberland County Power & Light Company, Portland, Me., for eleven months of this year are $117,191 less than for a similar period last year. The November gross earnings of the railway department were $110,408 compared with $121,449 during the similar month of 1923. The decline in gross earnings is due, it is said, to the use of the automobile.

Employees All Stockholders.—C. H. Harvey, president and general manager of the Knoxville Power & Light Company, Knoxville, Tenn., recently announced that every employee was a company stockholder. Stock of the company paying a 7 per cent dividend was opened to public subscription on Sept. 1.

Leaves Directorates.—Colonel Sheldon Potter has submitted his resignation as city director of the Philadelphia Rapid Transit Company, Philadelphia, Pa. The two other representatives of the city on the board are Mayor Kendrick and Ernest Trigg.

Personal Items

Wisconsin Officials Take on New Duties

S. B. Way, vice-president Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been named president of the Peninsular Power Company, which was recently acquired by the North American Company. A. K. Ellis, general manager of the Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., was named vice-president in charge of operations in addition to his duties with the Appleton properties.

For practically 25 years Mr. Way has been connected with the public utility business and during all that time he has been associated with the interests of the North American Company. Seven years ago he became vice-president and general manager of the Milwaukee property. At one time he had been actively engaged in the management of the Wisconsin Gas & Electric Company, the Watertown Gas & Electric Company, Burlington Electric Light & Power Company and other important utilities in Wisconsin.

A. K. Ellis, who has been named vice-president, was for many years secretary-treasurer and general superintendent of the Wisconsin Traction, Light, Heat & Power Company. He was made general manager in the summer of 1923. The properties recently acquired by the North American Company serve a number of communities in Wisconsin and northern Michigan, including Crystal Falls, Iron Mountain and Iron River.

H. V. Bozell Joins Bonbright & Company

Harold V. Bozell, for the past two and a half years co-editor of *Electrical World* with W. H. Onken, Jr., has resigned, effective Jan. 1, 1925, to join Bonbright & Company, Inc., New York, investment bankers dealing almost exclusively in bonds and preferred stocks of electric light and power companies. During his five years with the McGraw-Hill Company Mr. Bozell has been co-editor of the ELECTRIC RAILWAY JOURNAL, editor of *Bus Transportation* and co-editor of the *Electrical World.*

Mr. Bozell's work with Bonbright & Company will be largely advisory, covering utility operations and technical matters, and his appointment represents an expansion of Bonbright & Company in the direction of maintaining more intimate contact with the light and power industry.

After his graduation from the University of Kansas, his native state, in 1908, Mr. Bozell spent nine years at the University of Oklahoma, where, as a professor, consulting engineer and secretary of the Oklahoma Utilities Association, he was very active in promoting technical education and public interests generally in the state. His good work there resulted in his becoming assistant professor at Yale University in 1917 and continuing in that position until he joined the McGraw-Hill staff. At Yale he developed graduate courses in public utility management and finance.

Mr. Bozell has been very active in association affairs. He takes with him to his new work the best wishes of his many friends, including those of his associates in the McGraw-Hill Company.

C. Henry Dahl Promoted at Winnipeg

C. Henry Dahl has been appointed assistant general manager of the Winnipeg Electric Company, Winnipeg, Man. For the past twelve months Mr. Dahl has occupied the position as assistant manager, and prior to that time was statistician for the company. In his new position Mr. Dahl will have charge of the operating of the railway, electric and gas utilities, as well as the electric and railway business of the two subsidiary companies — the Suburban Rapid Transit Company and the Winnipeg, Selkirk & Lake Winnipeg Railway.

C. H. Dahl

Mr. Dahl is a graduate of the University of Wisconsin, where he specialized in railway transportation, public utilities, statistics, money, banking and other political economy courses. From 1917 to 1919 he worked for the Wisconsin Railroad Commission as case investigator in public utility cases. He joined the Winnipeg Electric Company as statistician in November, 1919, and in less than four years was made assistant to the vice-president. Later in 1923 he assumed the duties of assistant manager of the operating department.

Mr. Dahl's appointment follows the retirement of John Whitsell as operating manager of the company.

E. V. Caton, formerly electrical engineer, has been appointed manager of the light and power department.

All Mr. Dahl's Time to Brooklyn Company's Problems

Gerhard M. Dahl, chairman of the board of the Brooklyn - Manhattan Transit Corporation, will hereafter devote his entire time to the affairs of that company. When Mr. Dahl became chairman of the corporation more than a year ago, he expected to devote only a part of his time to its affairs. The transit problems of Greater New York, however, during the past 18 months have become so important and absorbing that he has decided to devote all his time after Jan. 1 to the corporation in the hopes that he may be of service to the community in the further development of adequate rapid transit. He is retiring from the firm of Hayden, Stone & Company. His retirement from the firm, while a loss to it and a financial sacrifice by Mr. Dahl, will, of course, make it possible for him to carry out his plans—a work that Mr. Dahl's business associates believe will be of great value to the community. As they see it, both from the standpoint of civic benefit and business progress, the transit problems must be solved.

For more than two years now Mr. Dahl has devoted practically all of his time to this question and he has built up confidence in his ability and in his policies. On the occasion of his election as chairman of the executive committee Mr. Dahl said that he assumed the city officials would endeavor to co-operate with the officers of the company to the end that transit conditions might be improved. As for the public, his attitude has been to use all of the present resources of the company to improve the service and to satisfy the public as nearly as it is humanly possible to do so.

Charles Hayden has been elected to the board of directors and the executive committee of the railway.

John Whitsell Retires

John Whitsell, operating manager of the Winnipeg Electric Company, Winnipeg, Man., since 1921, has retired from the railway field and gone to California with his family. His career did not begin with his assumption of duties as manager of the Winnipeg property, for it was in 1891 that he entered upon his utility work. In that year he joined the forces in the car service department of the Sioux City Traction Company, Sioux City, Iowa, now known as the Sioux City Service Company. Six years later Mr. Whitsell served on the Suburban Railroad, Chicago, as a shopman, later advancing to master mechanic and superintendent. When the County Traction Company, Chicago, combined with the Suburban Railroad to make the Chicago & West Towns Railway he was made general superintendent. At the time he went to Winnipeg he was general superintendent of the Chicago & Interurban Traction Company.

Charles H. Allen of Stone & Webster, Boston, has been appointed to a new position, comptroller Chicago Surface Lines, created by the board of operation. He will have entire charge of the financial affairs of the company.

J. P. Hudson has been appointed auditor of the Niagara, St. Catharines & Toronto Railway, effective Dec. 1, 1924. His headquarters will be at St. Catharines, Ont.

F. R. Harrington is secretary and treasurer of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., and W. J. Raidt is auditor. These duties were formerly performed by J. R. Abercrombie. D. C. McClure has succeeded R. W. Curran as general superintendent and purchasing agent.

E. W. Allen is the new engineering assistant for Francis C. Pratt, recently appointed vice-president in charge of manufacturing of the General Electric Company, Schenectady, N. Y. Mr. Allen was appointed manager of the engineering department of the company in April, 1924. He entered the employ of the company in January, 1901, in the test department in Schenectady. He was appointed engineer of the Chicago district in September, 1911, and was made assistant district manager a few years later in addition to his duties as district engineer.

Joseph A. Clair, for many years with the New York Railways, New York City, but more recently with the Yellow Cab Company, has been appointed claim agent of the Fifth Avenue Coach Company, New York. Mr. Clair entered railway work with the Eighth Avenue Railway, New York, in 1898 as a conductor. He pushed forward through the position of starter, inspector, assistant superintendent and general inspector for the superintendent of transportation of the New York Railways organization. In 1910 he joined the legal department of the New York Railways as transfer expert. Later he was made chief investigator, in which capacity he continued until February, 1923, when he took charge of the credit department of the Yellow Cab Company sales agency.

John O. Williams, depot master at the Halsey Street depot of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., has been appointed acting division superintendent of that depot. Mr. Williams' appointment follows the transfer of Division Superintendent R. A. Masters to the Fresh Pond depot, to take the place left vacant by the death recently of Division Superintendent Frederick J. Frey. Mr. Williams has been in the service of the Brooklyn company for more than thirty years.

H. F. T. Erben has been appointed assistant vice-president on the staff of Francis C. Pratt, vice-president in charge of manufacturing and chairman of the manufacturing committee of the General Electric Company, Schenectady, N. Y. Mr. Erben will continue as vice-chairman of the manufacturing committee. He has been identified with the General Electric Company since its early days. During 1914 he was made engineer of the Schenectady works and in March, 1916, was appointed assistant manager. Following Mr. Emmons' retirement as works manager in 1920, Mr. Erben assumed full charge of the works as manager, a position which he held until Jan. 1, 1923, when C. E. Eveleth was made works manager.

Obituary

Walter E. Harrington

Walter E. Harrington, for many years active in electric railway operation and recently consulting engineer in New York, died Dec. 12 at the age of 58. He was graduated from the University of Pennsylvania in 1887 and from 1896 to 1904 was vice-president and general manager of the Camden & Suburban Railway. After the lease of this railway to the Public Service Corporation of New Jersey Mr. Harrington was connected with the operating department of J. G. White & Company, New York, and later was president and general manager of the Eastern Pennsylvania Railways, Pottsville, Pa. In 1904-05 Mr. Harrington was a member of the executive committee of the American Street Railway Association. He also served on several association committees.

Frank Dabney, manager of the Puget Sound Power & Light Securities Company, of the Stone & Webster organization, and a notable figure in Seattle's business and community life, died in Seattle on Dec. 12, following a short illness contracted immediately upon his return from an extended Eastern business trip. Mr. Dabney went to Seattle in 1900 with the Stone & Webster organization. Years ago, when the Stone & Webster interests owned and operated the railway lines in Seattle, Mr. Dabney was named assistant treasurer. At that time the company was known as the Seattle Electric Company. This position, as well as that of manager of the Puget Sound Power & Light Securities Company, he held up to the day of his death. He was also assistant treasurer of the Diamond Ice Company and the Renton Coal Company, subsidiary companies of the Puget Sound Power & Light Company. Mr. Dabney was born in 1853 at Fayal, Azore Islands, where his father was American vice-consul. After obtaining his early education at Fayal and Boston, including a course at the Massachusetts Institute of Technology, Mr. Dabney entered the foreign shipping business. Later, for a time, he was identified with coal mining, timber and railroad interests in Ohio and elsewhere.

Thomas Benton Clawson, one of the organizers and the first president of the Warren Street Railway and the Warren-Jamestown Street Railway, Warren, Pa., died at his home in Warren Dec. 11. He was 79 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Official Washington Sees Good Business Ahead

Public psychology is now inclining strongly toward an expansion of business. There is economic confidence and optimism everywhere. We may expect an active year in all lines of business during 1925. These are thoughts expressed by a high official in Washington.

Some think that we are at the beginning of an inflation movement. Official Washington is watching this very carefully for it was commented that this country cannot go through another cycle of inflation and deflation without wrecking some of the public organizations, and the Federal Reserve system would probably be the first. Thus no real inflation is likely to be allowed to go beyond the early stages.

There is also the further suggestion that we will not have any inflation because that does not come until after there has been total employment for a considerable period. We are not yet up to full capacity in our production and there is still a surplus of labor. The New York Stock Exchange was observed to be distinctly not an indicator fundamentally of business conditions. The recent sustained upward trend of the market was attributed, in the first instance, to the election, but beyond that to the fact that wealthy people cannot afford to sell their stocks at the present large profits on account of the necessity to show these profits in their income tax statement this year. This has caused a shortage of supply of stocks, which has tended to keep the market up.

In view of the great interest which has been shown by business and the public generally in the special studies made by the Department of Commerce in Washington, it may be said that the average of intelligence with respect to business matters generally is showing a distinct advancement. The Secretary of Commerce recently said, in commenting upon this, that "If we can develop in our people a high sense of

Metal, Coal and Material Prices

Metals—New York	Dec. 23, 1924
Copper, electrolytic, cents per lb	14.85
Copper wire base, cents per lb	16.875
Lead, cents per lb	9.60
Zinc, cents per lb	8.02
Tin, Straits, cents per lb	58.02
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.125
Somerset mine run, Boston, net tons	2.15
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.775
Central, Ill., screenings, Chicago, net tons	1.75
Kansas screenings, Kansas City, net tons	2.30
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.75
Weatherproof wire base, N.Y., cents per lb.	18.25
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal	$1.16
White lead in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.157
Turpentine (bbl. lots), N. Y., per gal	0.84

economic understanding, we would rid ourselves of a large part of the problems that daily confront us." Such general understanding of economics will certainly tend toward governmental as well as economic stability.

Two New Interlocking Plants

The Interborough Rapid Transit Company has placed an order with the Union Switch & Signal Company for the materials required to install an electro-pneumatic interlocking plant at 149th Street, New York City. The machine will be of the Model 14 type, having 24 working and 3 spare levers, equipped with lever lights on all switch levers. Electro-pneumatic high and dwarf signals will be used to direct traffic in the interlocked area, the switches being operated by a total of 16 switch and lock movements equipped with style "C" cut-off switch valves. These materials will be installed by the Interborough company's regular signal construction forces.

Another important installation will be made by the Union Switch & Signal Company on the Boston Elevated Railway, Boston, which has ordered materials for the installation of an electro-pneumatic interlocking plant at Tower "F," Dudley Street. All electric energy employed at this plant will be alternating current. The layout embraces 20 color light signals and 14 switches to be controlled from the interlocking machine, which will have 15 working levers. A track model having 47 lights is being provided to indicate to the towerman the occupancy by trains of the tracks through the plant and in the territory south to Eggleston Square station and north to Dover Street Station.

Laconia Car Company Has Lower Profit

For the year ended Sept. 30, 1924, the net income of the Laconia Car Company, Boston, Mass., after interest charges was $4,753, against $237,254 in the preceding year ended Sept. 30. The total income amounted to $5,710 for the fiscal year ended Sept. 30, this year, compared with $313,615 for a similar period of 1923. Current assets at Sept. 30, 1924, amounted to $839,822 and current liabillities were $34,871, leaving a net working capital of $804,951. This item last year was $678,596.

Rolling Stock

New York Central Railroad, New York, N. Y., has ordered seven electric switching engines and two electric freight locomotives from the General Electric Company.

Atlantic Coast Railway, Asbury Park, N. J., through the Atlantic Coast Transportation Company, a subsidiary, has purchased 17 new buses to be used along the New Jersey coast cities.

Lewisburg & Ronceverte Electric Railway, Lewisburg, W. Va., according to R. M. Bell, general manager, is planning for the purchase of a gasoline motor car which will be used for freight service.

New York State Railways, Syracuse, N. Y., expects to buy four more buses for relief purposes. A number of motor trucks will also be purchased for the establishment of a freight service between Syracuse and cities within a radius of 100 miles.

Track and Line

Pennsylvania Railroad, New York, N. Y., has been ordered by the Board of Public Utility Commissioners of New Jersey to provide a switch connection between its tracks and the proposed carhouse and shops of the Trenton & Mercer County Traction Corporation, Trenton, N. J. The railroad refused to lay the switch, claiming that it had leased ground there to a lumber company.

Southern Public Utilities Company, Charlotte, N. C., is rebuilding ¾ mile of track on Belmont Avenue incident to the paving of that street.

Municipal Railway of San Francisco, San Francisco, Cal., has been authorized by the Board of Public Works to launch the $500,000 Judah Street extension. The board has authorized immediate improvement of 10 blocks on Judah Street between Thirty-first and Forty-first Avenues in preparation for laying tracks from the ocean along Judah Street to Cole and Carl Streets. This extension will connect with Market Street by way of the Eureka Valley-Sunset Mission tunnel.

Power Houses, Shops and Buildings

Columbus Railway, Power & Light Company, Columbus, Ohio, is having plans drawn for a three-story repair and service building to cost $300,000, with machinery and equipment. It will be devoted to the repair of rolling stock, company automobiles, service cars and trucks.

New York, N. Y. — The Board of Transportation recently awarded to the Lustbader Construction Company, Inc., the contract for the construction of the foundations, retaining walls and embankment for the Corona Storage Yards on the Flushing subway at Hewitt Avenue and Riverside Avenue, Corona. The contract was for $235,934, which was the lowest bid received. The yards are designed to accommodate 200 cars of either the Interborough or B.-M. T. type. When completed the yards will have capacity for 700 cars, in addition to space for inspection sheds. The yards cover an area of twenty acres and under the terms of the contract will have to be ready for occupancy within a year.

Trade Notes

Stockbridge Machine Company, Worcester, Mass., has appointed the following direct sales representatives in their respective territories: D. J. Normoyle and Starr Equipment Company, in the Liberty Building, Philadelphia, Pa.; A. B. Starr in the Anott Building, Pittsburgh, Pa.; D. E. Morand Machinery Company, at 8784 Quincy Avenue, Detroit, Mich.

Norma-Hoffmann Bearings Corporation, New York, N. Y., has moved its factory and general offices to its new plant at Stamford, Conn. The Long Island City office has been discontinued and all shipments will now be made from the Stamford plant.

O. M. Bostwick has resigned as New York representative of the publicity department of the General Electric Company and will probably resume his activities in the technical publicity field in New York City.

New Advertising Literature

Roller-Smith Company, New York, N Y., has issued Bulletin No. 530 illustrating and describing its new double-pole "interlocked trip" breakers and its new "shock-proof" circuit breaker. Data are included pertaining to different types of circuit breakers for different applications.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 48732, "Electric Equipment for Cranes." This is an attractive 35-page leaflet, well illustrated with photographs, diagrams, tables and charts. It discusses the subject thoroughly, with particular reference to crane motors, control and brakes. Information is given on operating characteristics, and types of standard motors are listed in the bulletin.

Crouse Hinds Company, Syracuse, N. Y., has issued folder No. 15 and bulletin No. 2058 describing "Wedgtite" pipe hangers. How pipes are clamped to or suspended from structural shapes is described.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a new publication called "The Cleveland Railways—The Story of Its Operation and Maintenance." This book was prepared with the cooperation of officials of the railway and describes the entire system. The introductory chapter is headed "The Tayler Plan—Its Evolution and Provisions" and briefly relates the early traction history in Cleveland. Chapter I, "Track and Overhead Systems," describes briefly the practice and policies of the Cleveland system. "The Power System" is the title of Chapter II. This describes in detail the automatic substation practice on this city system, which enjoys the distinction of having used the first large capacity two-unit substations for metropolitan areas. The various types of cars in use at the present time are described in Chapter III, which also contains several paragraphs about the service. The Harvard Shops, which have always caused much comment because of their completeness, are described by departments in Chapter IV. Chapter V is devoted to the operating stations. The entire book is profusely illustrated. Copies of the book, known as Special Publication 1703, may be obtained free of charge from any Westinghouse district office or from the publicity department at East Pittsburgh.

McGraw-Hill Company, Inc. December 27, 1924 Twenty Cents Per Copy

ELECTRIC RAILWAY JOURNAL

Two hundred fifty "Mitten Management" gasoline-electric Yellow Coaches have been ordered by the Philadelphia Rapid Transit Co. to supplement their street car service * * * This is the largest single motor coach order in the history of this new mode of transportation * * * During the past year six hundred Yellow Coaches have been ordered to supplement and extend traction service

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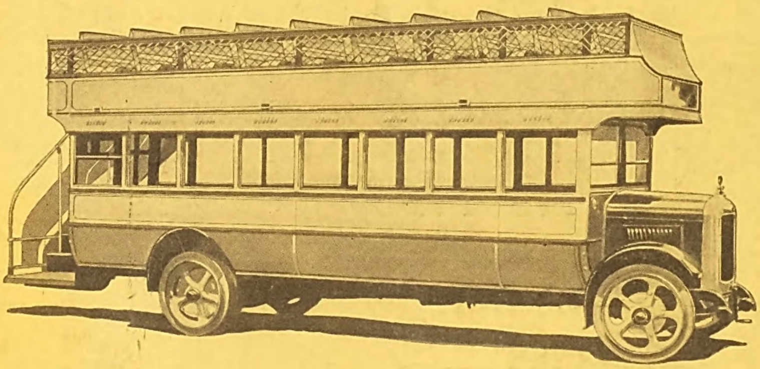
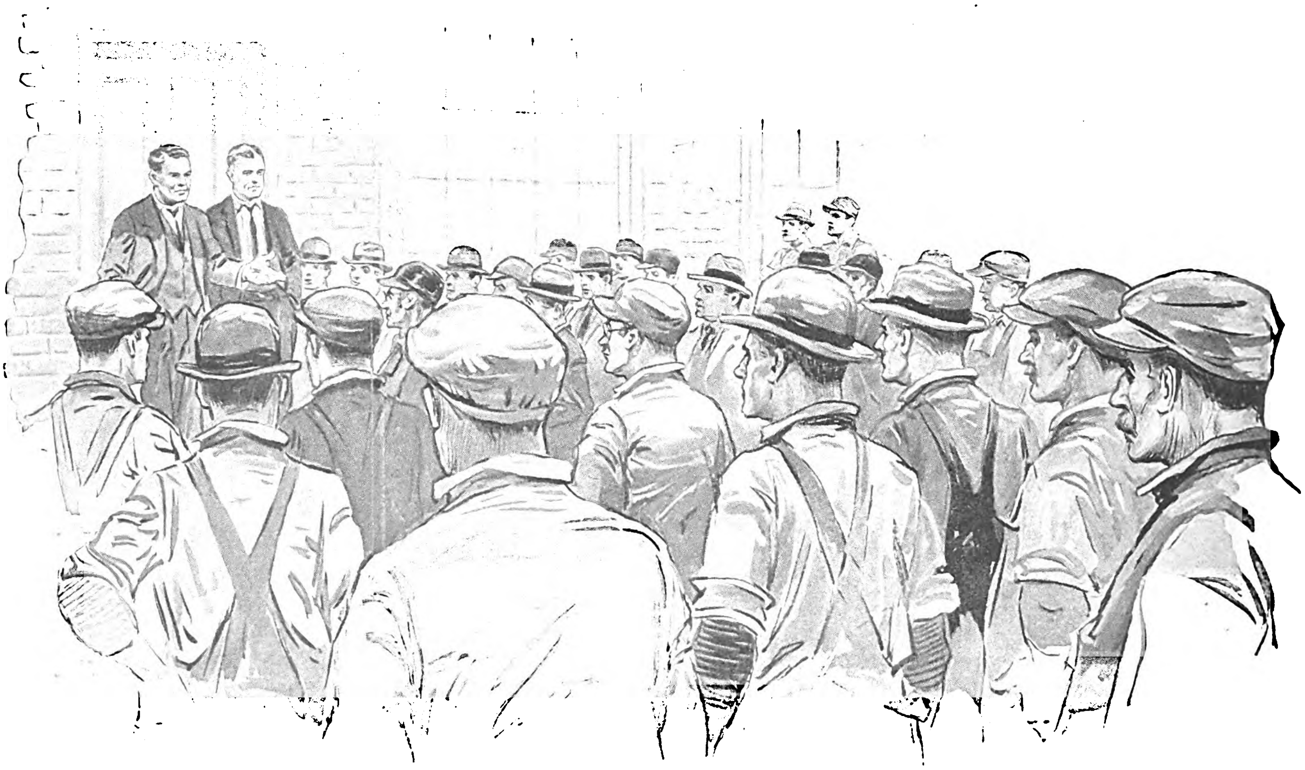


YELLOW COACH MANUFACTURING CO.
Austin & Dickens Aves., Chicago, Ill.



Better Public Relations, Better Service and Better Income—Our 1925 Resolution

"Boys!", said Big Bill, the Master Mechanic, "Doughboy Dan, our Transportation Engineer and myself have just left the General Manager's office. He paid all of us a fine compliment for the splendid progress we have made during the year on better Maintenance and Service, and has approved our plans for the coming year, but in addition to that, he wants us to get aboard of the Company's program for Better Public Relations and Increased Revenue. He said that the homes of every one of our men should be a *broadcasting station*, sending out constructive, helpful information about the Company and what we are accomplishing among their neighbors and people with whom they come in contact, and that our Staff Leaders should develop the ability to give talks in their neighborhood before various Civic Associations and Clubs. Doughboy Dan has been assigned the duty of developing this activity in our department. Dan, tell them what your plans are."

Dan stated: "The first thing I suggest is that we read and digest the Westinghouse Co-operative public advertisements that have been put out the last few years, such as '*Jammed*,' '*Street Cars Build Homes*,' '*You Need Street Cars*,' '*The Wheels of Progress Are Under Your Street Cars*,' and the like. These ads are highly educational and informative. Another thing to grapple with is Freight Haulage on our Interurban lines. Westinghouse specialists have been doing a remarkable amount of study and co-operative service on this. Each of us should get a copy of Westinghouse Special Publication No. 1634 on Freight Haulage. I am also going to get our Educational Directors busy on a special course of training on public speaking and the economics of our transportation business."

WESTINGHOUSE 1925 PROGRAM

For Better Maintenance—Better Service—
Better Public Relations,
and Increased Earnings for the Industry

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
Sales Offices in All Principal American Cities

Westinghouse

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ELECTRIC RAILWAY JOURNAL

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Work of the Baltimore Mileage Bureau 1077
New system installed obtains mileage by lines, days, individual cars, etc. Automatic tabulating machines make calculation for any desired classification quick and accurate.

Inspection Schedule Reduces Accidents 1079
Specified dates each month used for consideration of certain operating points has reduced the number of accidents in El Paso remarkably in a two-year period.

The Readers' Forum 1080

Association News and Discussion 1082

Features of Second Convention of Central European Street Railways 1082
At the September meeting of the International Street and Interurban Railway Association many features of equipment and track design, maintenance methods, fares and employment problems are discussed.

American Association News 1083

Maintenance of Equipment 1084

News of the Industry 1087

Financial and Corporate 1093

Personal Mention 1096

Manufactures and the Markets 1097

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64th Volume Indexed

WITH the completion of Volume 64 of ELECTRIC RAILWAY JOURNAL this week, covering the last six months of 1924, the index for this volume is bound in as an integral part of this issue. This has been a feature of JOURNAL service for many years. It is well understood by the older subscribers of the paper, who keep the indexes available so as to facilitate reference to the volumes.

For those who bind the JOURNAL in permanent form the index section also provides the title page. It should be placed in the front of the volume. But in any event the index should be kept handy, for its references will be found of value to every subscriber whenever information is needed regarding events or practices chronicled during the past six months.

Reference is made easy by classification of articles by subjects as well as by cities and companies. The principal subjects are classified in a list of key words printed ahead of the alphabetical index. Then, too, articles are cross-indexed so that there are several ways by means of which they may be located quickly.

Number of Copies Printed, 6,250

Advertising Index—Alphabetical, 40; Classified, 36, 38; Searchlight Section, 35

Happy New Year!

May you have smooth track to happiness, may you weld the good-will of your public permanently to your organization, may your daily grind prove profitable—may you thrive in 'twenty-five.

Railway Trackwork Co.

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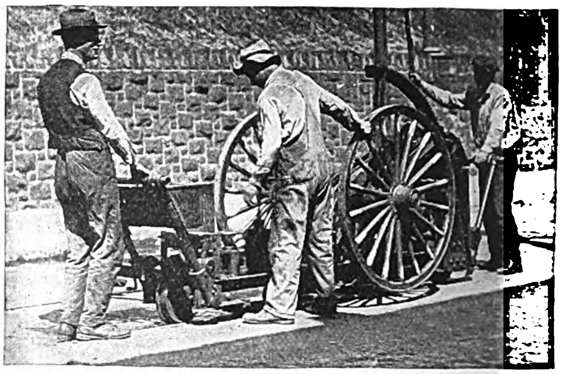
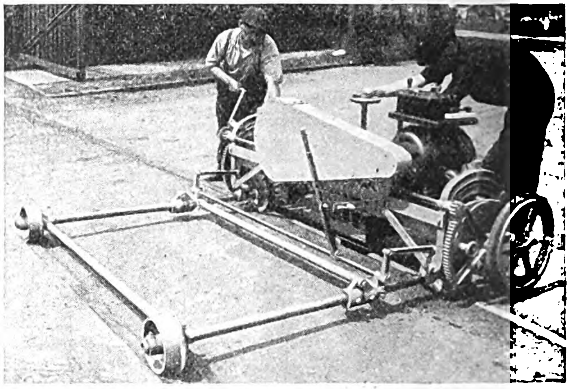


"Reciprocating" Track Grinder



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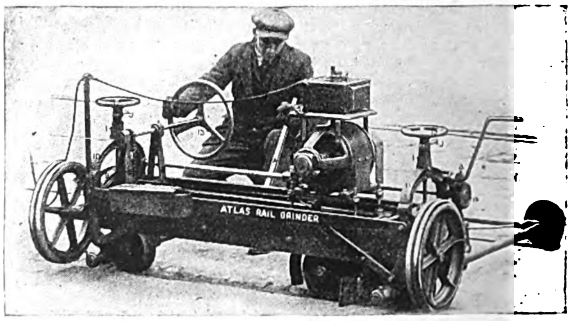
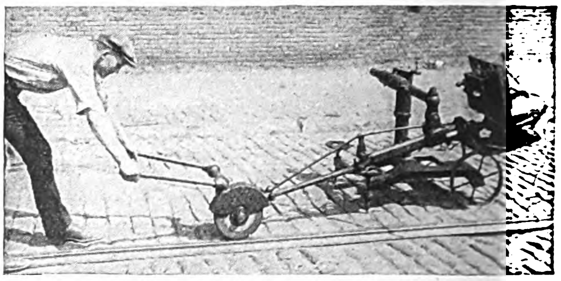
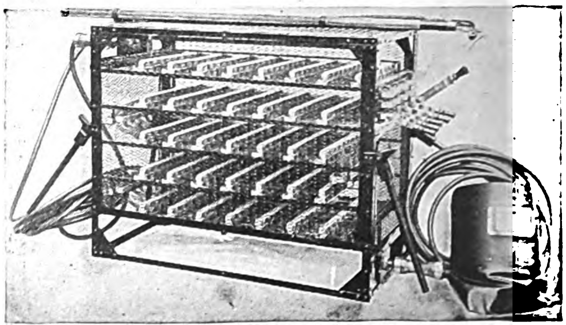


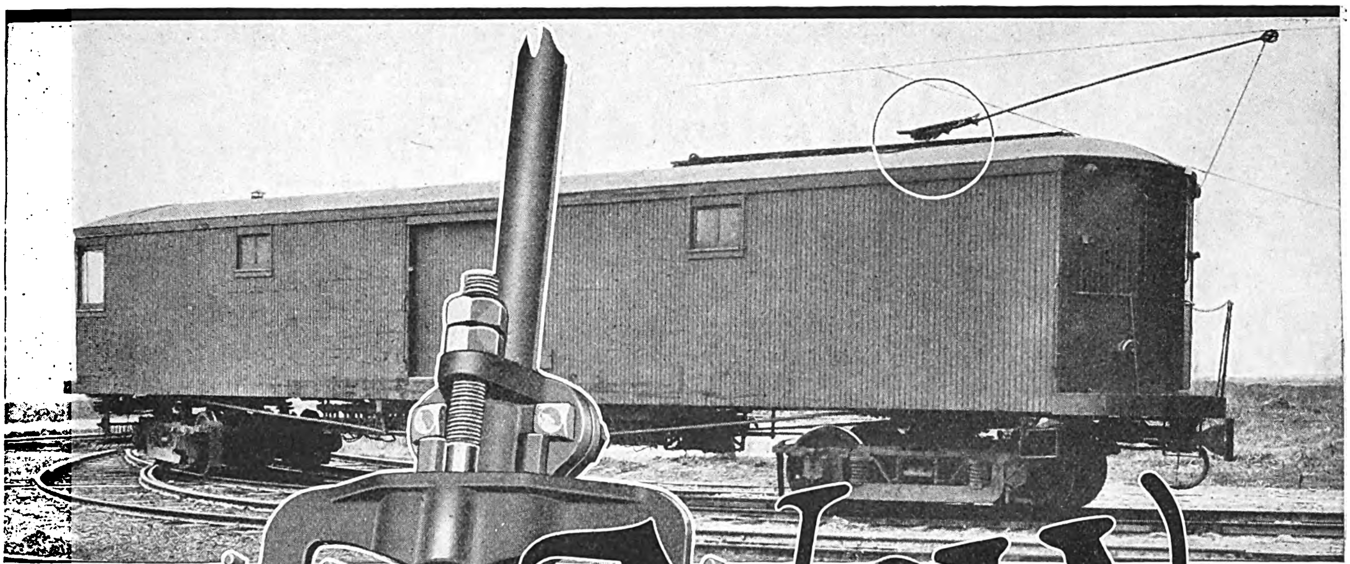
"Atlas" Rail Grinder

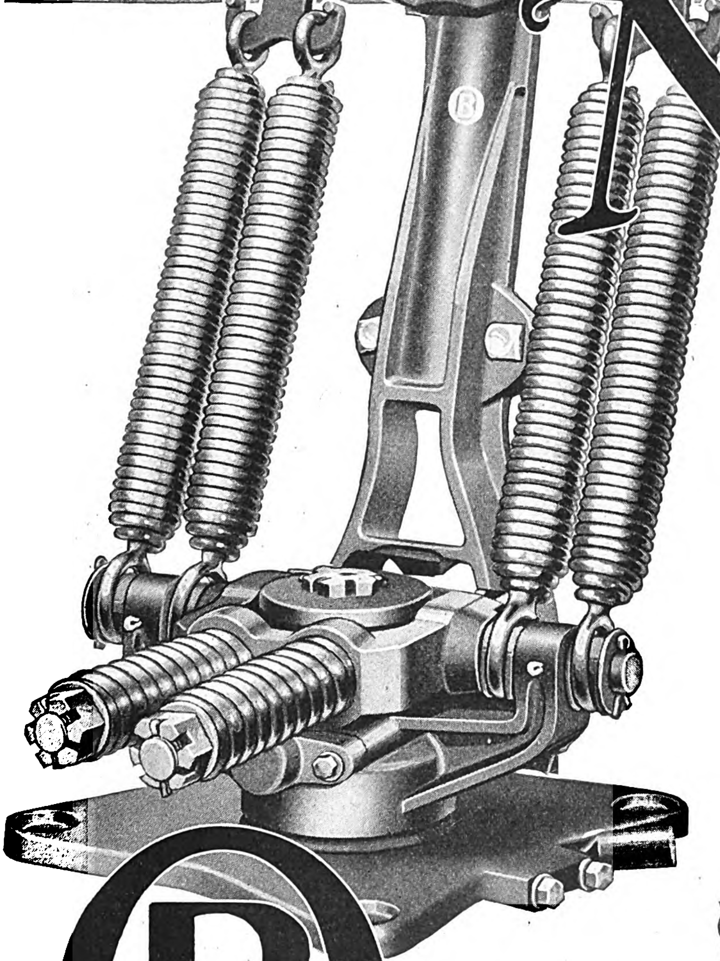


"Hercules" Swing Frame Rail Grinder



"Ajax" Electric Arc Welder





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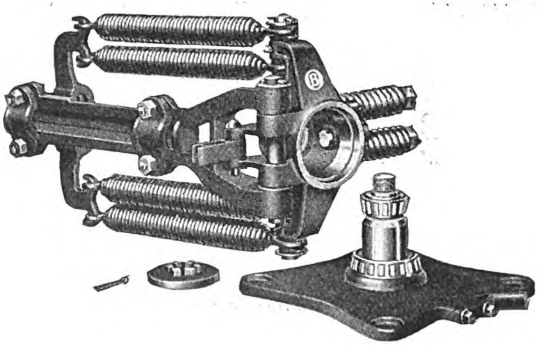
An O-B Base with Timken Roller Bearings

An O-B Trolley Base with standard Timken Roller Bearings is now ready· Bearing housing carries contact brush that shunts current around the bearings. Let us send you complete details.

The Ohio Brass Company
Mansfield, Ohio, U. S. A.



OB CAR EQUIPMENT

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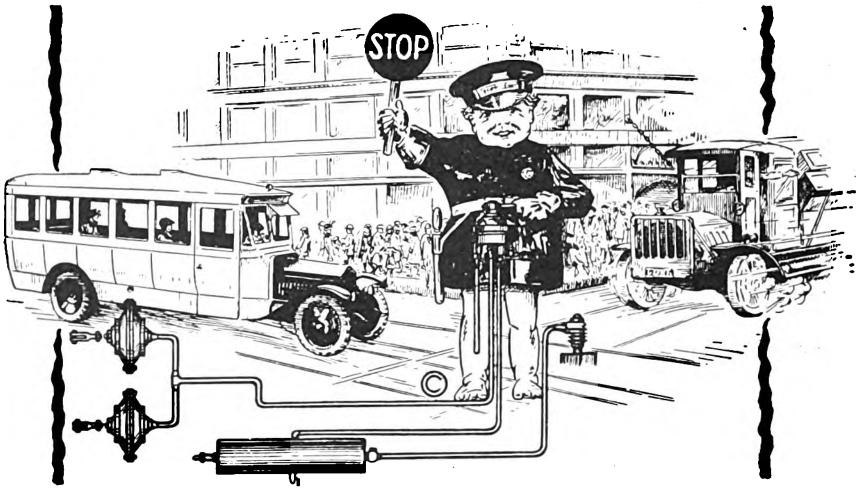
AUTOMOTIVE AIR BRAKES



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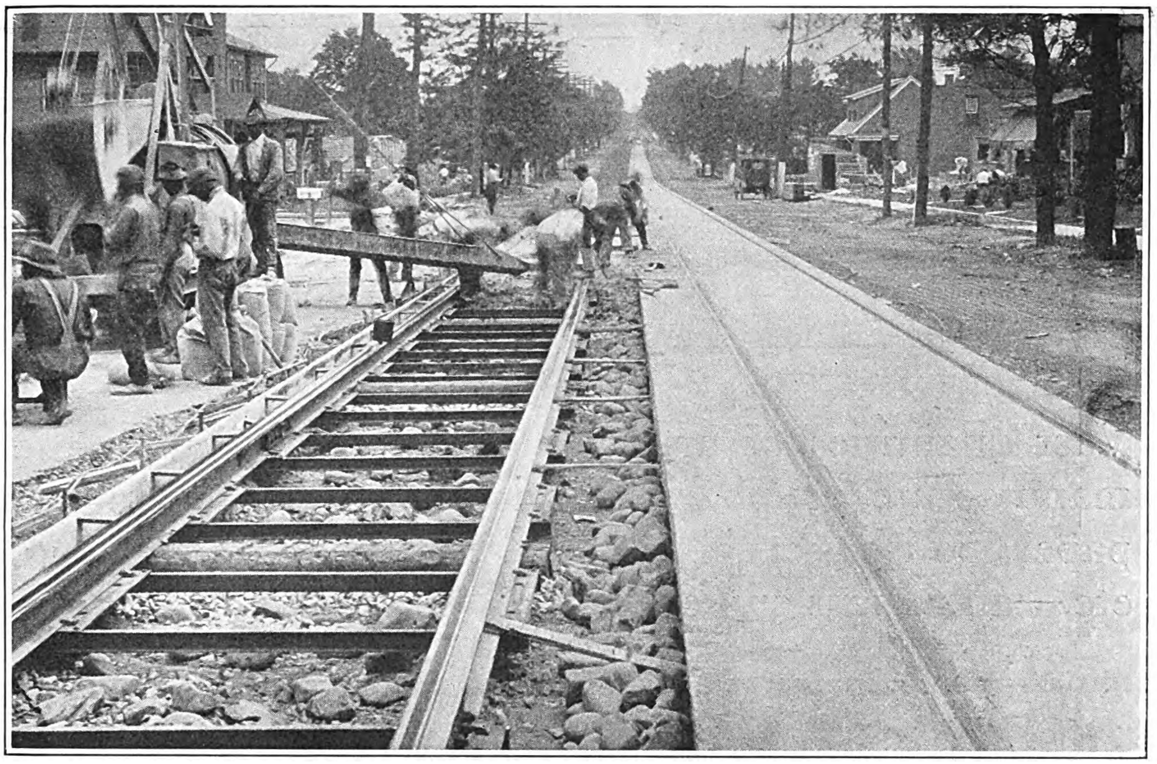
You also should install Westinghouse Automotive Air Brakes on the buses you operate, and thus safeguard the riding public, who have learned to depend upon the safety and time-saving assured by the Air Brake.

Westinghouse Traction Brake Company
AUTOMOTIVE DIVISION
General Office and Works: Wilmerding, Pa.

Automotive Air Brakes Sell Transportation



THE FIFTEENTH YEAR

37% More Twin Ties sold than in 1923.

80% Sold to Companies with upwards of 13 years experience with Steel Tie Construction.

20% Sold to new customers.

There is a definite relation between this record year for sales of Steel Twin Ties and Track Costs for initial installation and maintenance on over 147 properties in the United States and Canada.

While the complete presentation of this data in our book, "Steel Tie Track Construction" is persuasive, it is not dangerous.

Expose yourself to it by directing us to mail it to your office or home.

THE INTERNATIONAL STEEL TIE COMPANY
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track • • Permanent Foundation

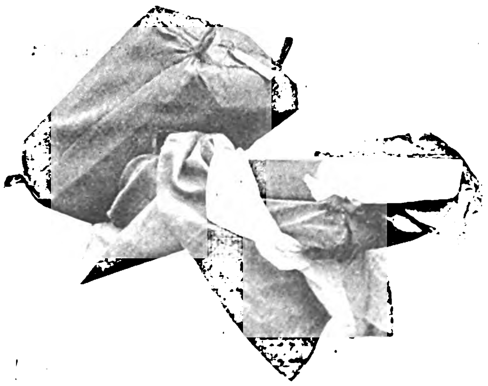
We
Work
With
Waxes

One of the "streets" in the Mitchell-Rand plant, Jersey City, N. J. Transporting Synthetic Ceresin Wax to the loading platform.

Vast quantities of artificial ceresin are used in the manufacture of pharmaceutical creams, perfumery, paper, polishes, rubber mixtures, paints, wax figures, etc.—an almost endless list.

MITCHELL-RAND
MAKES MANY MIXTURES

Animal, Vegetable and Mineral Waxes—gathered from China, Japan, India, Galicia, Saxony, Mexico, Brazil and the Americas—are employed in the manufacture of our insulating and commercial compounds.



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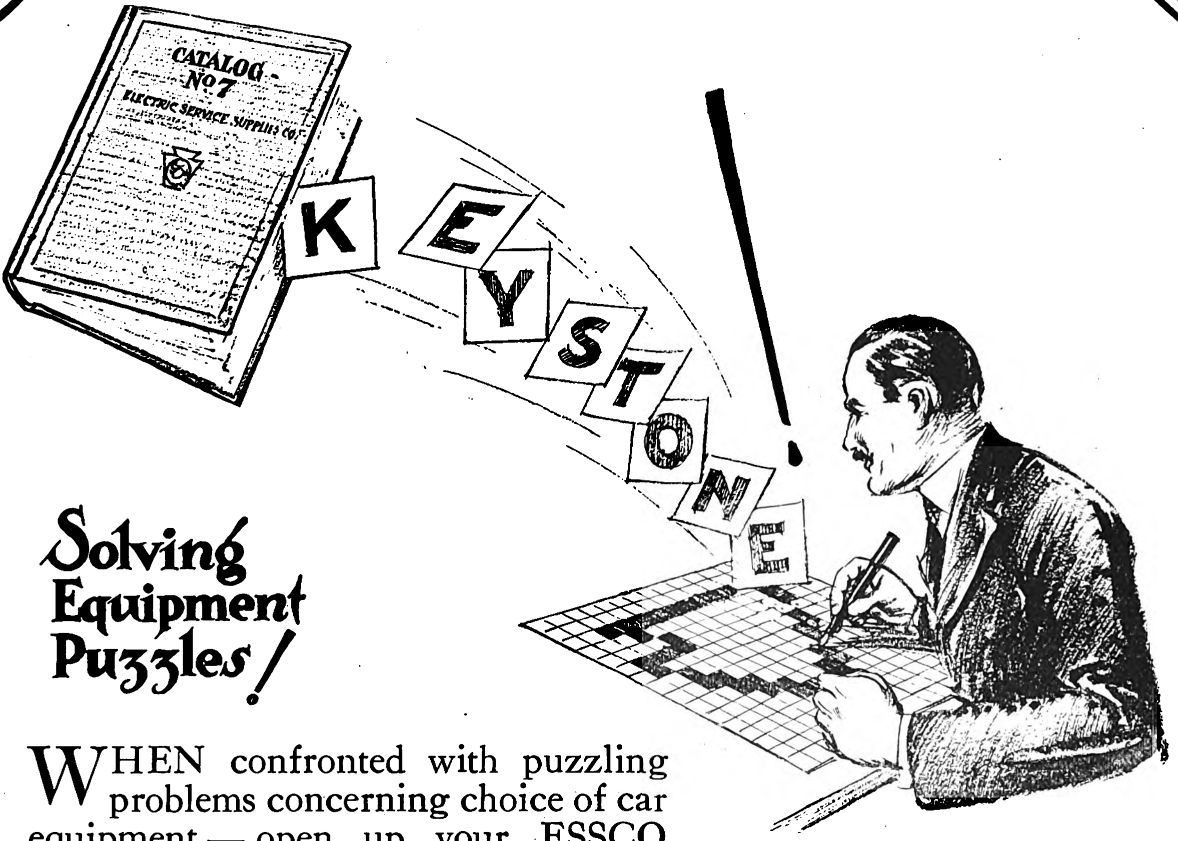

Solving Equipment Puzzles!

WHEN confronted with puzzling problems concerning choice of car equipment — open up your ESSCO CATALOG No. 7. The answer will be found quickly.

In the *Keystone* Line of Car Equipment, you will find the most up-to-date, efficient, and satisfactory materials and devices. Specify them for your new cars. Order them to carry out your modernization program with the older cars.

Some items from

ESSCO CATALOG NO. 7

the Car Equipment Book

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Shelby Trolley Poles
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UNA RAIL BONDS

Now! Applied by "Gas"

The Long-life, Highly Conductive Copper to Steel Welded UNA Bond is now applied by either the Electric Arc or Gas Flame methods.

The UNA Weld.

No matter which method is used the resulting copper to steel weld is identical. The same bonds and molds are used, the only difference in either method being the source of heat. In one case it's the heat of the carbon arc, in the second case it's the heat of the arc drawn by the metal electrode and in the third case it's the heat of the gas flame (oxy-acetylene).

The UNA Mold.

The UNA Mold positions and holds the bond head against the rail. *It retains the molten metal until the weld forms. The mold not only simplifies the bonding for the welder but also speeds up the process.*

UNA—The Universal Bond.

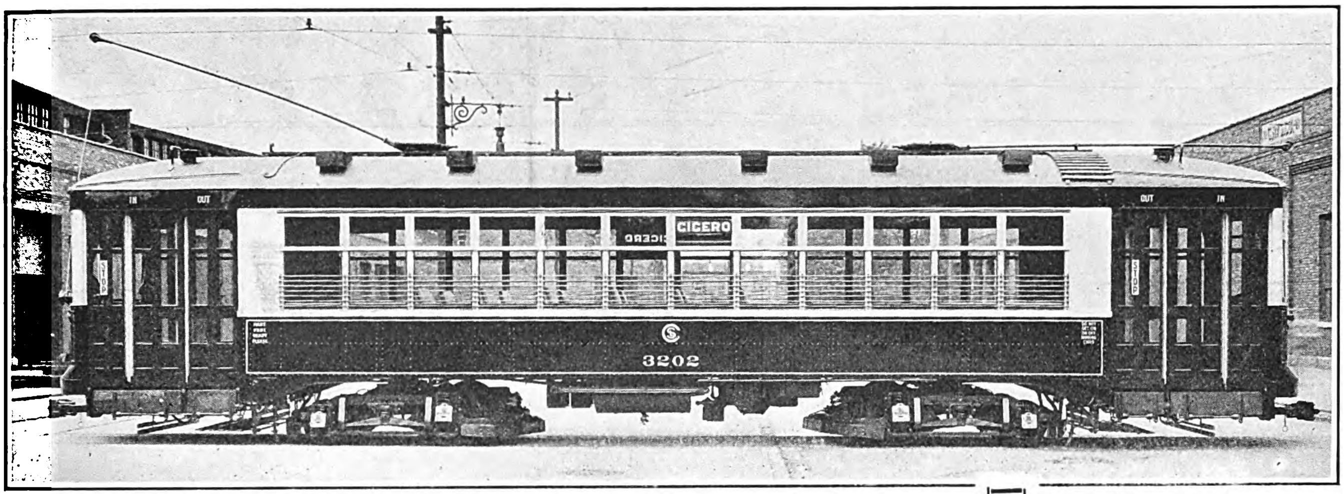
With one stock of standard UNA Bonds and Molds either of the three methods of Bonding may be used. If electric power is available either of the electric arc methods may be the most suitable. For pickup bonding or if power is not available, the gas flame method will meet your bonding needs.

As the same bonds and molds are used, UNA Bonding offers a *Universal Bonding Method* that economically meets every bonding condition.

Send for details

RAIL WELDING & BONDING COMPANY, Cleveland, Ohio

Agents in England: Scholey Construction Company, 137 Victoria Street, Westminster, London



The Exit Doors Are Automatic

On Chicago's Latest Type Multiple Unit Cars!

Of course
NATIONAL
PNEUMATIC
DOOR ENGINES
are used

Here's the story!

OVER two years ago, Chicago installed in addition to "Safety Car Devices Equipment," *automatic* doors on 45 double truck one man cars. Today they are putting them on 100 new cars, designed for single and multiple unit operation in congested districts. This is a tribute not alone to the success of the Automatic Door, but also to another successful adaptation of National Pneumatic Equipment.

And furthermore, National Pneumatic Door Equipment is standard in Chicago, as it is in nearly all the leading American cities.

National Pneumatic Co., Inc.
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***Executive Office:* 50 Church Street, New York**
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Manufactured in Canada by
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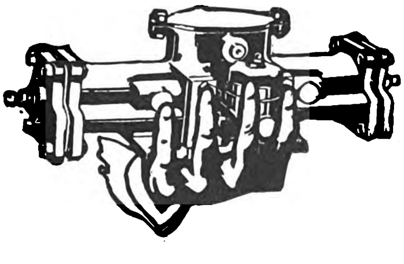
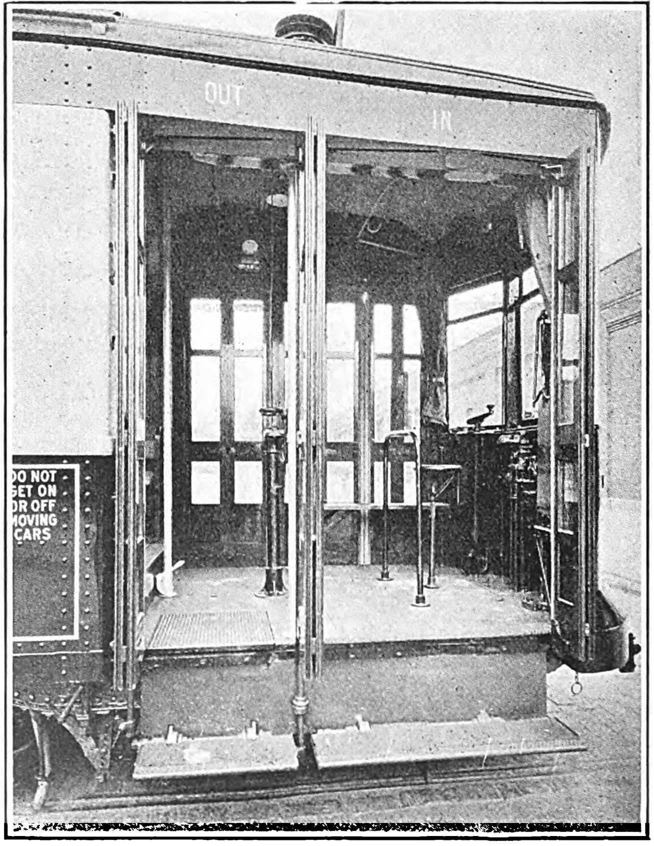
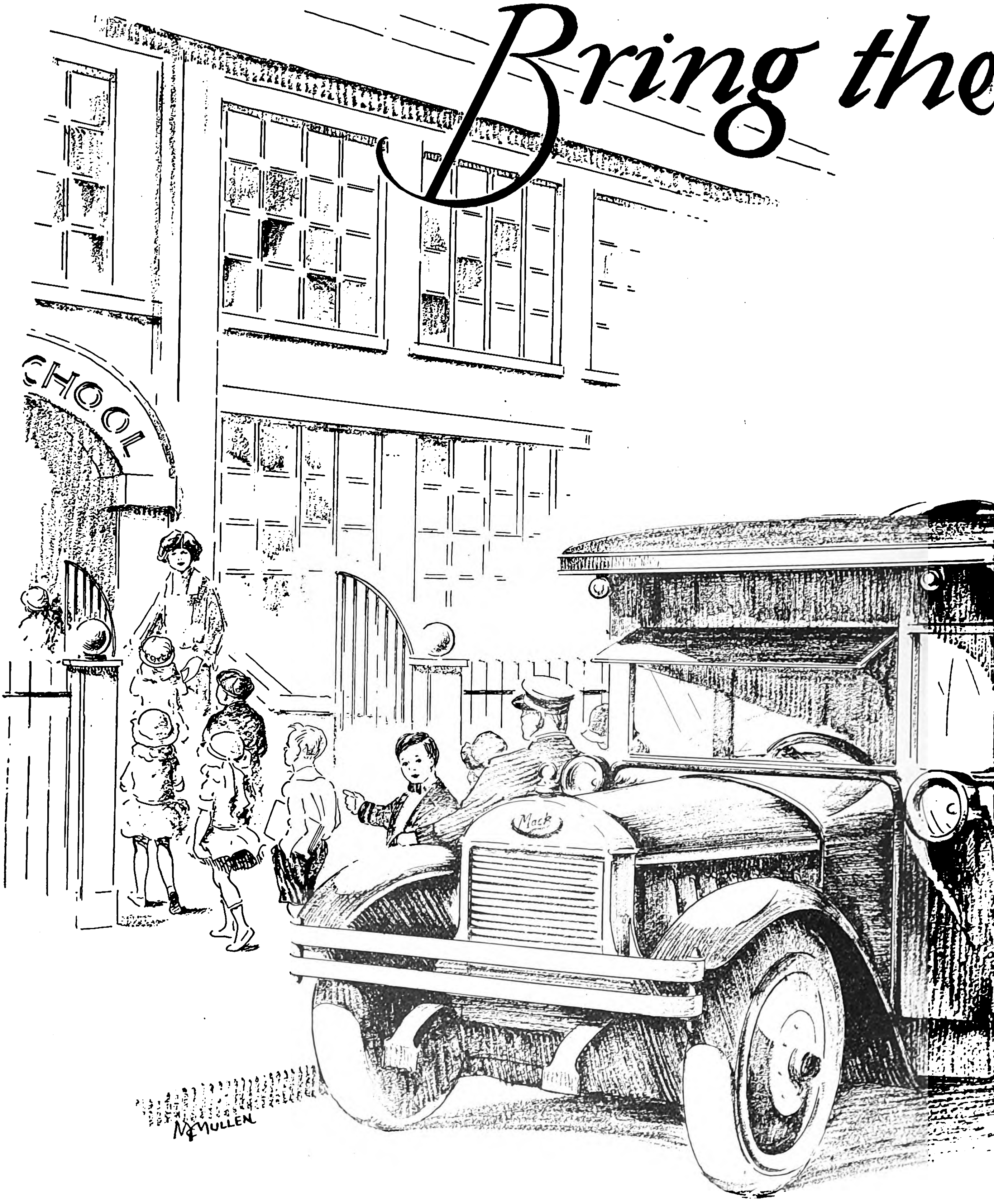





Bring the
CHOOL
Mack
McMULLEN

children to school in Mack Buses!

Ask any of the mothers in your community how much thought they have given to the problem of getting the children off to school. They'll tell a story of worry and anxiety.

For in most cases small children can not be allowed to travel alone in crowded cars. Either mother must go along, or the kiddies must walk,— and nine times out of ten the kiddies walk.

How welcome would be a school bus service,— with trusty, safe, dependable Mack Buses? And a driver who would take good care of the little ones from door to door.

Mothers relieved of all anxiety would bless the railway company,— goodwill well worth having. Thousands of children riding, where previously they had walked would mean a substantial increase in fare-box receipts.

All through a comparatively small investment in equipment, which because of its flexibility, could always be used to utmost advantage.

Progressive electric railways are turning more and more to Mack Buses for auxiliary service of this kind. They find in Mack Bus design and exclusive mechanical features, that solid dependability so vital whether the service be taking the kiddies to school, feeding an outlying district, or helping ease congested car lines in busy sections.

From bumper to tail light, the Mack is all bus; — built for utmost efficiency and economy in bus operation.

For example there is the sturdy long-life Mack engine.

The specially designed low bus chassis.

Wide tread assuring safety and permitting a short turning radius.

The Mack dual reduction drive axle, especially designed to give maximum road and underbody clearance.

The Mack transmission with ground gears.

Dual system of brakes on rear wheels and drive shafts.

The Mack Shock Insulator. (All spring ends are embedded in rubber shock insulator cushions, assuring ease of riding and less wear.)

The kiddies are doubly safe in a Mack Bus.

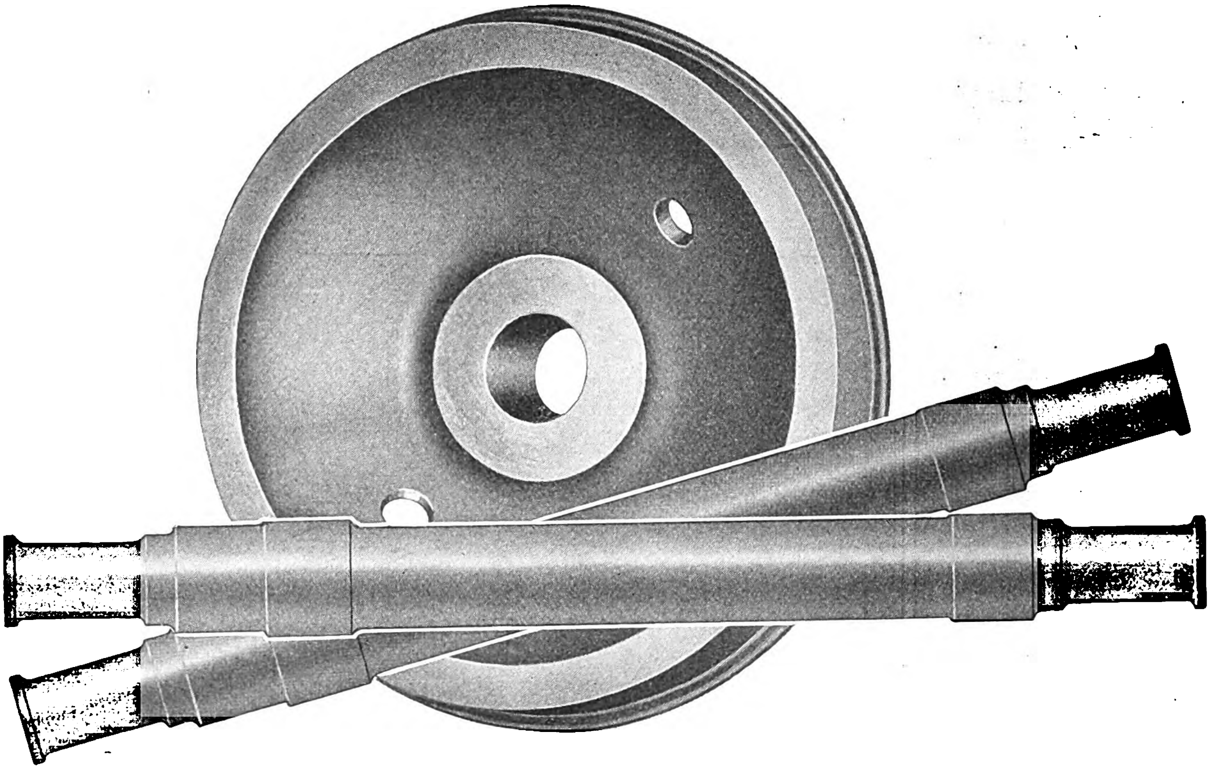
The Mack Bus

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 BROADWAY NEW YORK CITY
Eighty-three direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY" and "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION."

GREENSBORO ★ DURHAM
WHITE STAR LINE
Mack

Sedan Type Bus

Performance counts!



Cambria Rolled Steel Car Wheels and Forged Axles

CAMBRIA ROLLED STEEL CAR WHEELS for Electric Service are made at the Johnstown Plant of Bethlehem Steel Company by a combination rolling and forging process. This process thoroughly works the steel and gives an exceptional refinement in structure which does not readily develop flat spots. For this reason Cambria Rolled Steel Car Wheels will give you the longest service at lowest cost.

CAMBRIA FORGED AXLES for Street, Interurban, Subway and Elevated cars, and Armature Shafts for Electric Service are made in the Axle Plant to meet any reasonable specification. They can be furnished treated or untreated; solid or hollow bored; smooth forged only; rough turned all over; rough turned on journals and wheel seats; or finished turned on journals and wheel seats.

We will also mount wheels on the axles if so desired

Specify Cambria Rolled Steel Car Wheels and Forged Axles on your next order.

Large stocks of wheels and axles in standard sizes assure prompt shipment.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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Sole Exporter of Our Commercial Products

BETHLEHEM

CONSOLIDATED
CAR-HEATING
COMPANY

Listen in on Station CCH

This is station CCH, the Consolidated Car Heating Company, broadcasting its usual weekly program to the electric railway industry, direct from its factory, at Albany. This station is operating on a wave length of satisfaction.

Underwriters approval—

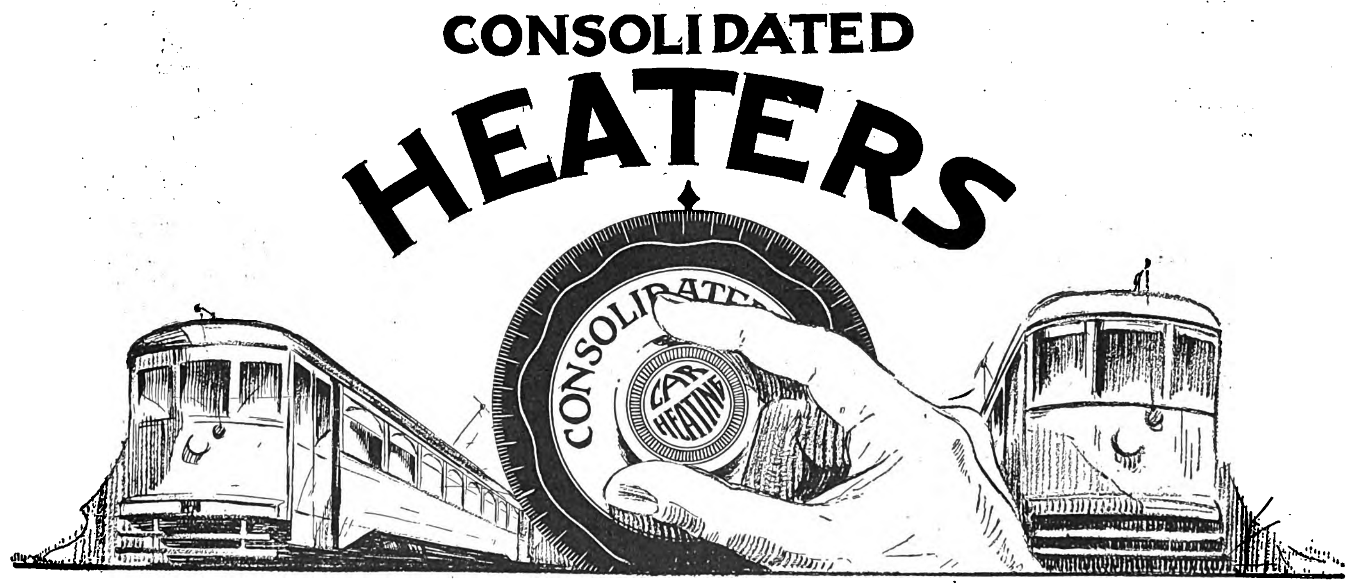
ON CONSOLIDATED ELECTRIC CAR HEATERS

IT MEANS SOMETHING to you to know that 26 different types of Consolidated Electric Car Heaters have been inspected and approved by the Underwriters Laboratories Maintained by the National Board of Fire Underwriters.

Critical inspection of Consolidated Electric Car Heaters reveals many safety features which inspire confidence. No red-hot wires. Asbestos safety cord through coils binds coils securely to porcelain insulator. Every coil used is accurately measured for electrical resistance. Cases are tamper and fool-proof.

Station CCH now signing off until this time next week when the broadcasting program will be resumed.

Good day!



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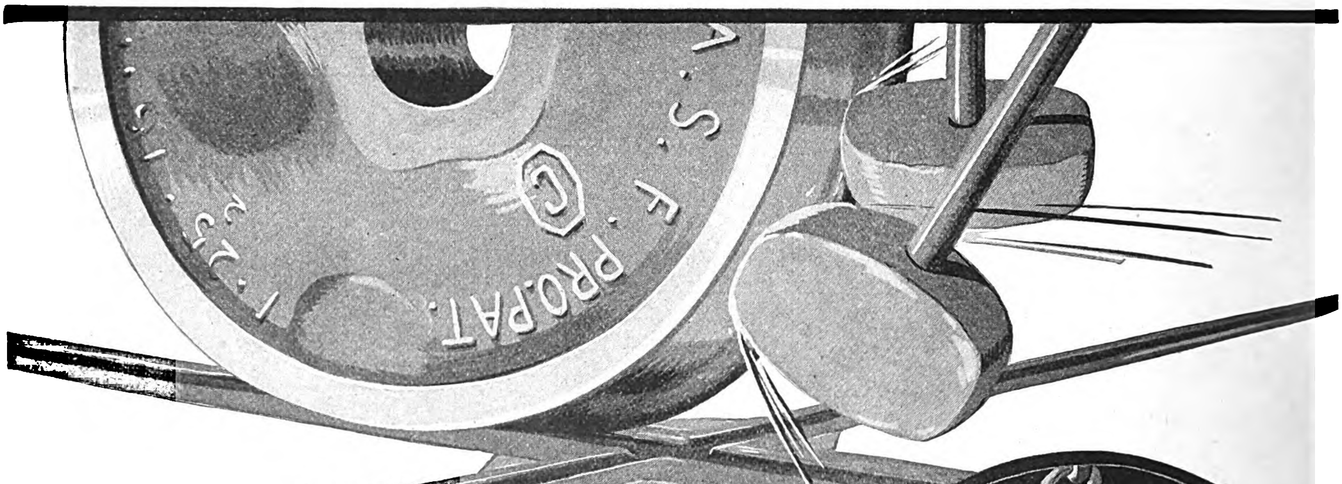
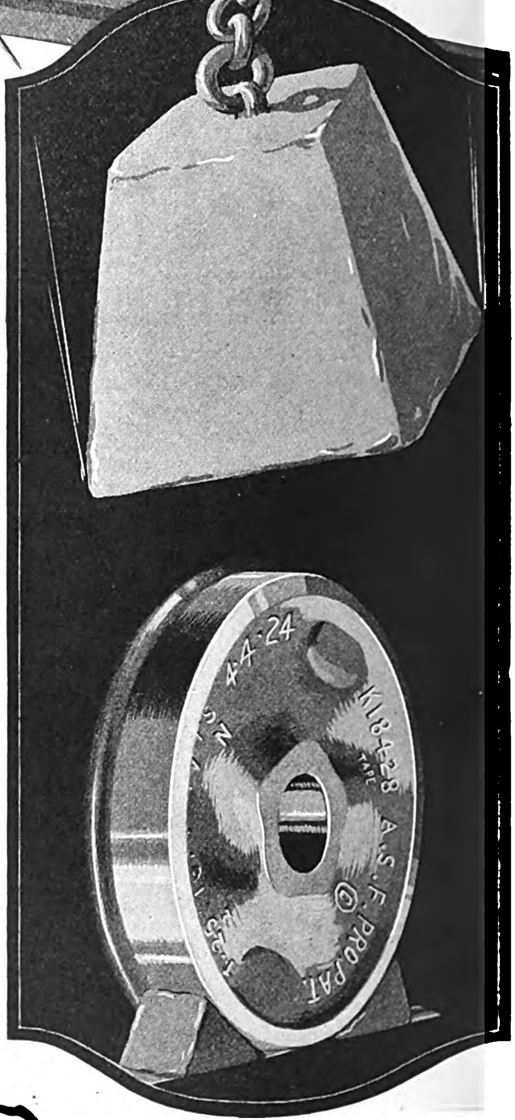
ALBANY, N. Y.

New York **Chicago**





Skull Crackers

Smash! Crash! Bang!

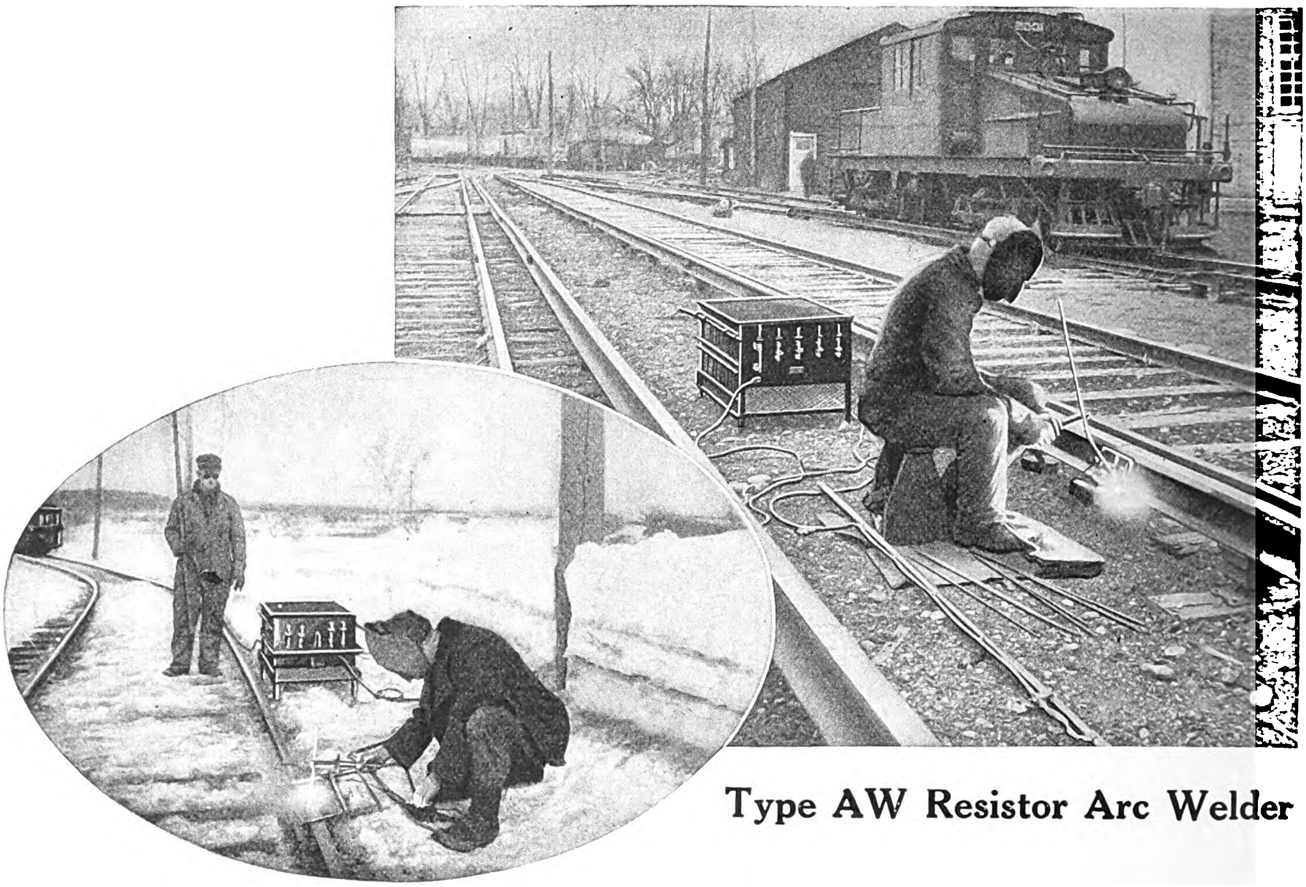
THE hammer blows of the maker's tests are repeated a thousand times a day as car wheels pound over track crossings, over frogs, switches and low joints.

"Skull cracker" is the suggestive name by which this testing equipment is known. Tests on Davis "One-Wear" Steel Wheels made with this instrument of torture show that they are able to withstand the impact and shocks of service, without chipping or cracking, better than any wheel made.

Records of Davis "One-Wear" Steel Wheels in operation on scores of roads back this up in actual service.

American Steel Foundries
NEW YORK CHICAGO ST. LOUIS

DAVIS
"ONE-WEAR"
STEEL WHEELS



Type AW Resistor Arc Welder

Type AW Arc Welder

- —weighs 140 lbs.
- —does good work in quick time at minimum cost
- —withstands wear of weather
- —specially designed for welding rail bonds, fish plates, etc.
- —operates on 400/650 volts, and welding current can be varied by 15 ampere steps to 60 to 200 amperes.

"It recommended itself on account of its lightness"

—writes a user of the AW Arc Welder. "It is the lightest machine for doing this type of work that we know of, and for the use to which we put it this lightness is a distinct advantage on account of the number of set-ups per day over a considerable stretch of track.

"It has been in service about a year and has performed its work very satisfactorily. We use it on maintenance work where the bonds to be applied are more or less scattered—and with two men put on 60 to 70 bonds per day."

Just hook the Type AW Arc Welder to a trolley wire and you get service that satisfies.

Light weight—easily handled

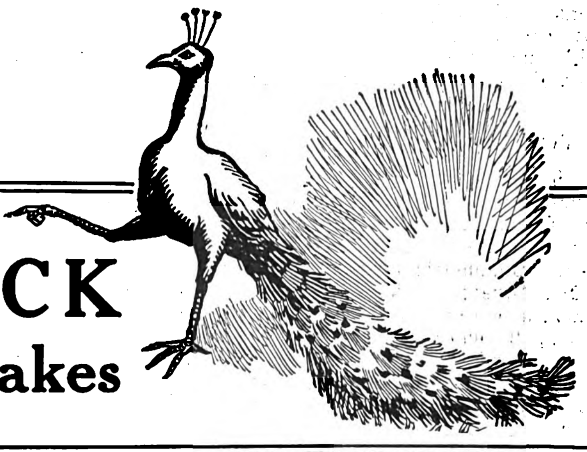
Ask the G-E sales office nearest you for complete information on your electric welding requirements.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

GENERAL ELECTRIC

PEACOCK

Staffless Brakes



Reasons why Peacock is preferred—

Maximum Braking Power
Ample Chain Winding Capacity
Least Platform Space
Simple Operation
Unfailing Reliability
Low Maintenance Costs

You'll find them all Important

Nearly quarter of a century building and installing hand brakes has established beyond question, the safety and reliability, the long satisfactory life and low maintenance costs of Peacock Brakes.

Due to their correct construction of properly selected materials, Peacock Brakes involve practically no expense for repairs and replacements.

The rapidity with which a Peacock Staffless Brake will bring a speeding car to a dead stop inspires confidence on the part of the motorman because he knows after a few trials that he can depend on the Peacock in emergencies.

Our engineers have specialized on the design of hand brakes and they have considered the problem from all angles. Peacock Brakes are specified by experts in rolling stock who do not depend on some one else's say so.

Peacock Brakes are designed with the "*safety* first" idea.

Write us for details.

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Engineers
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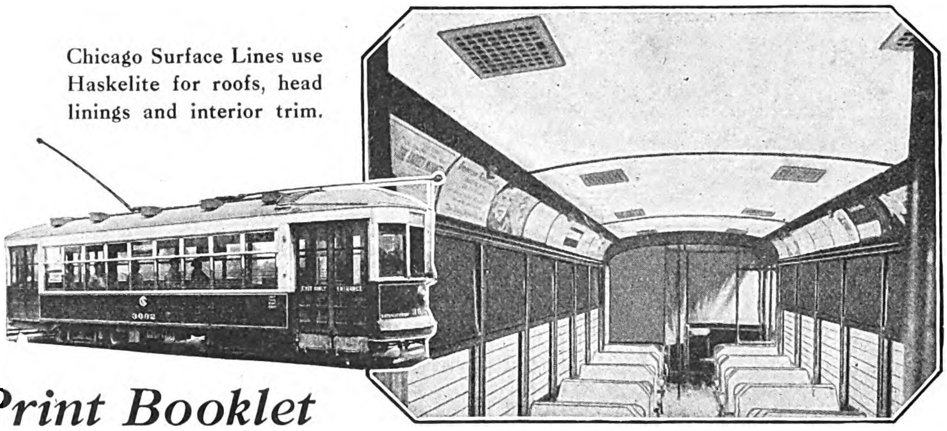

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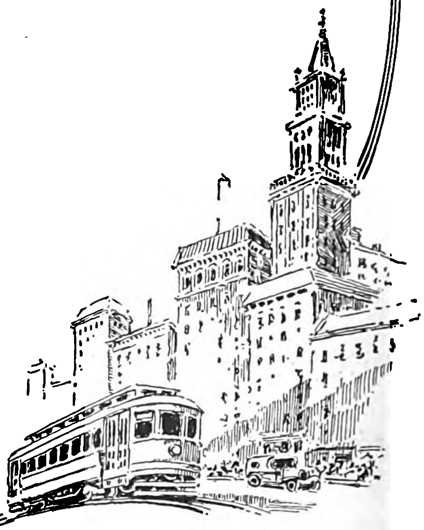

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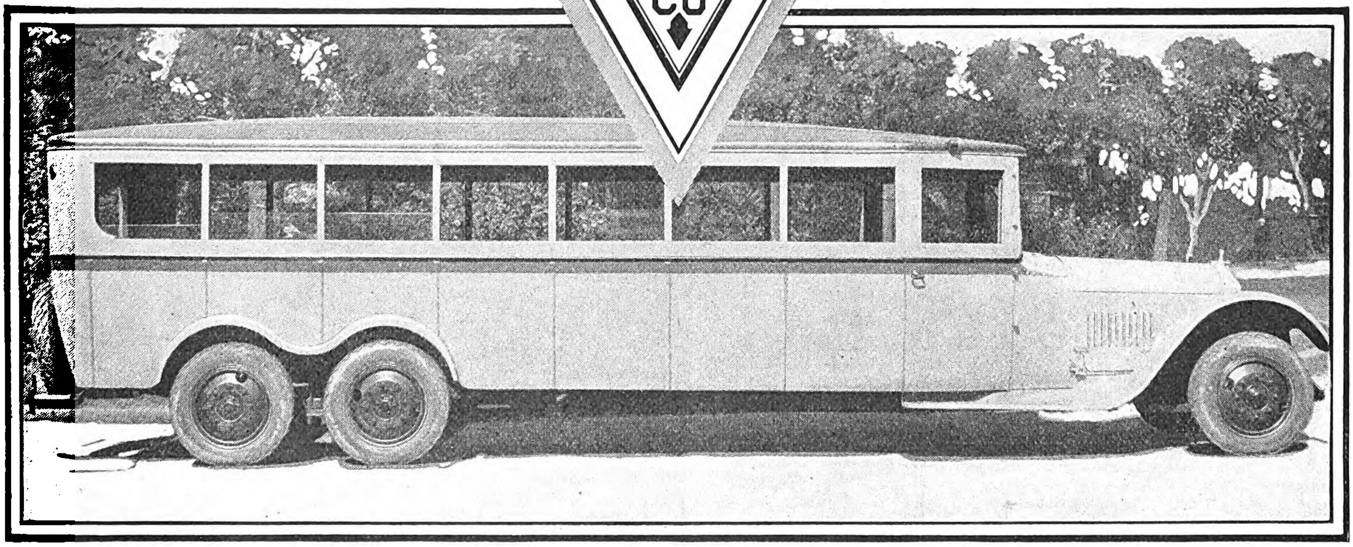

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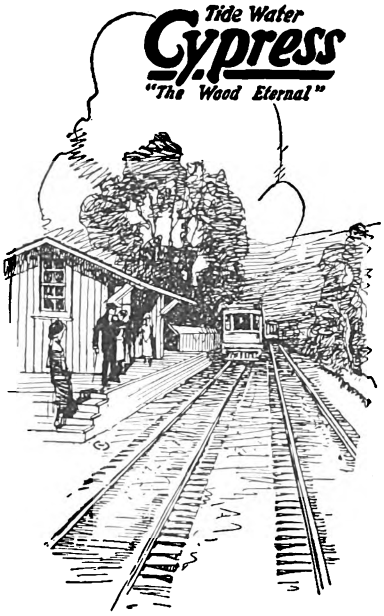

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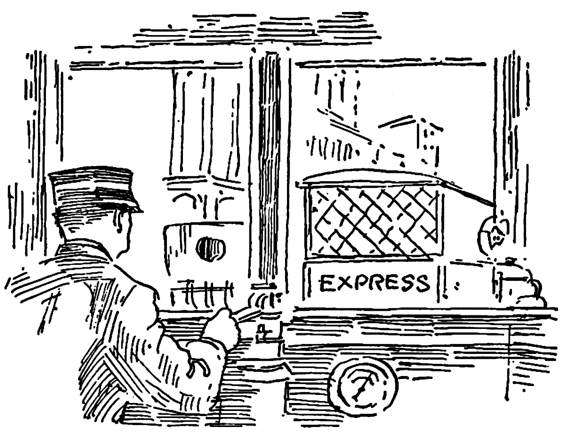

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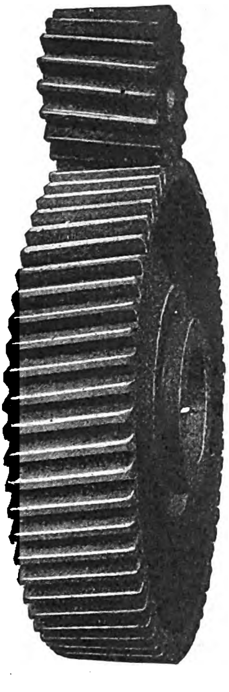

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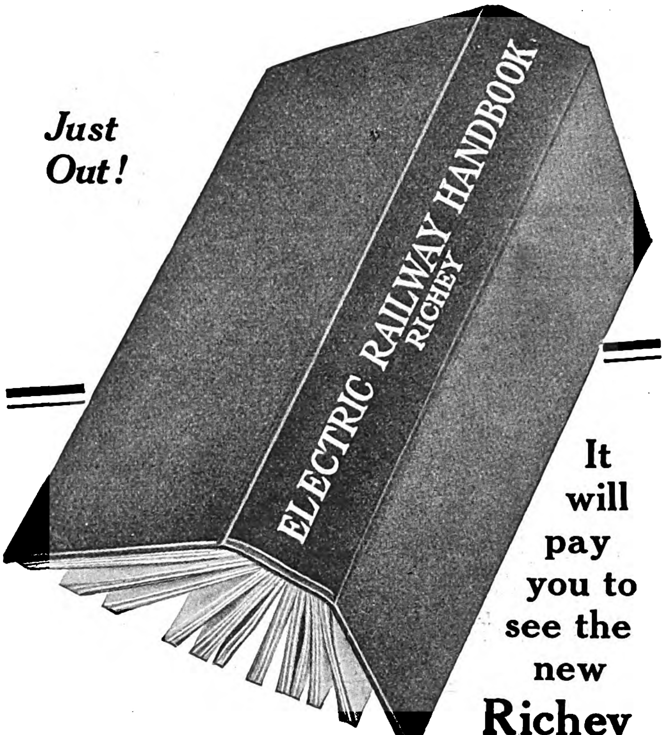

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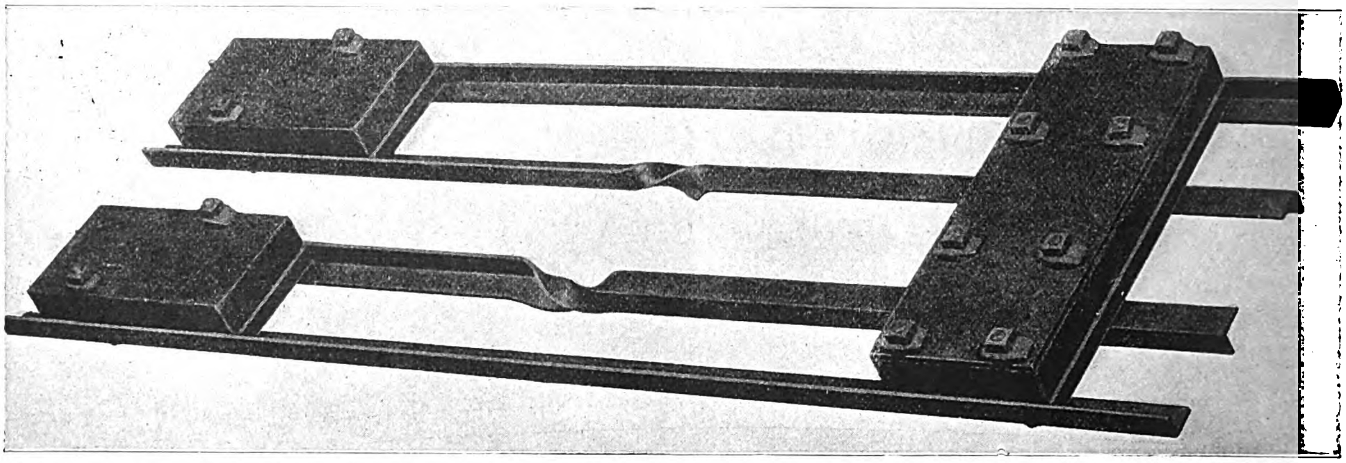

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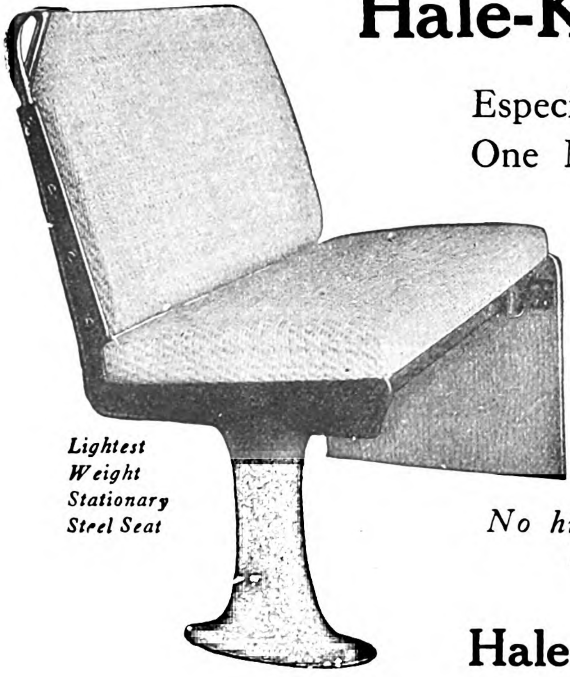

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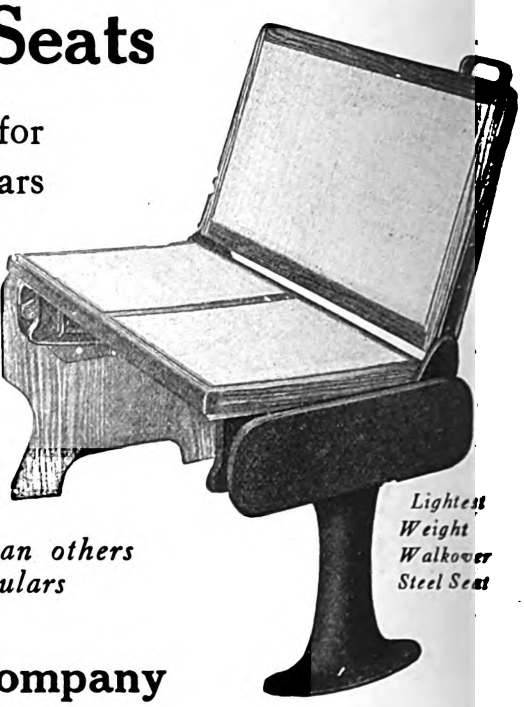

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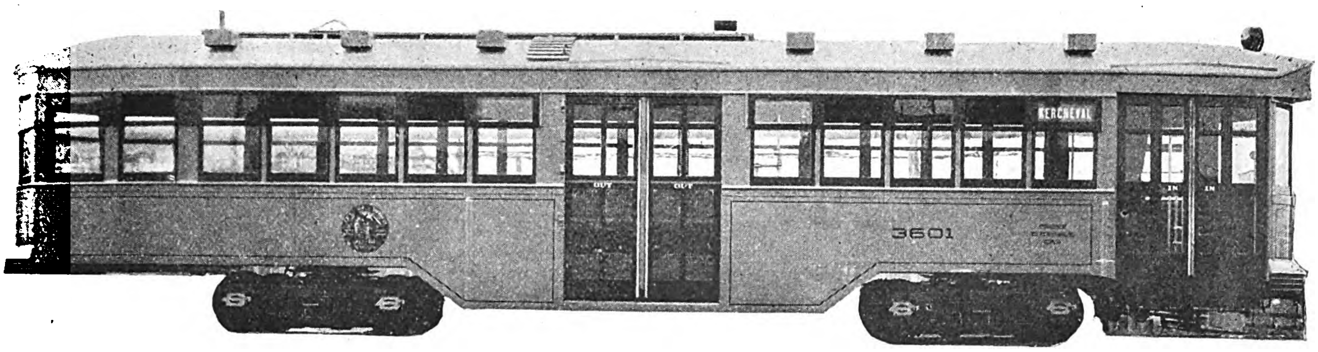

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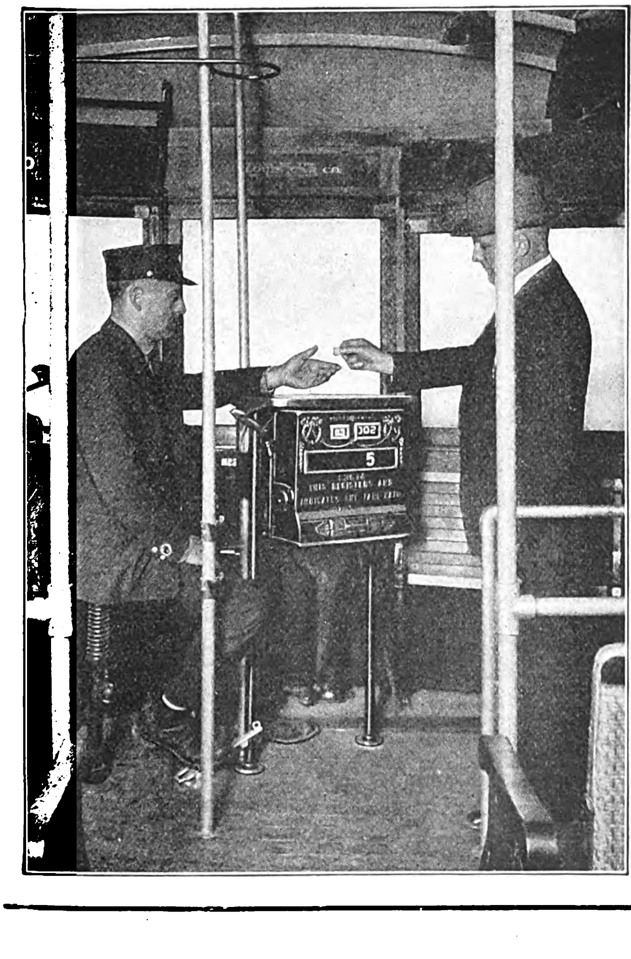

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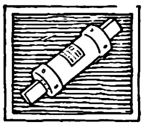
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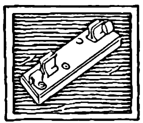
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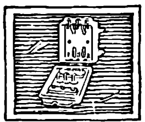
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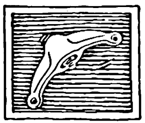
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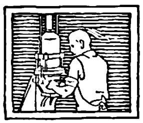
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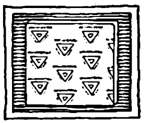
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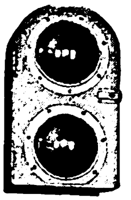

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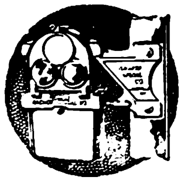

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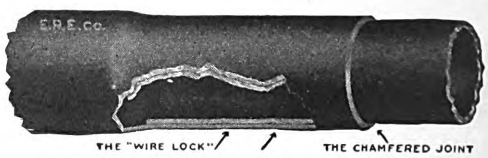

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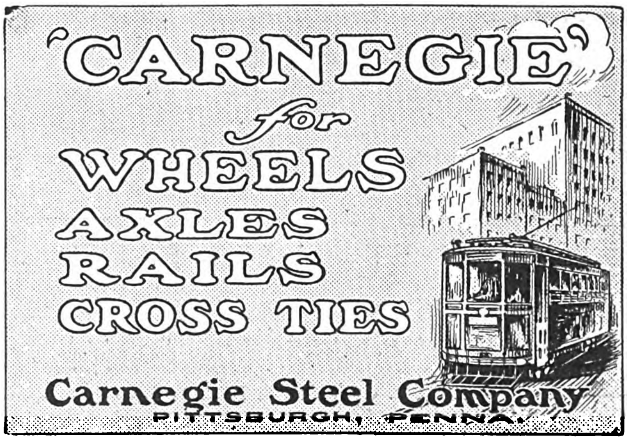

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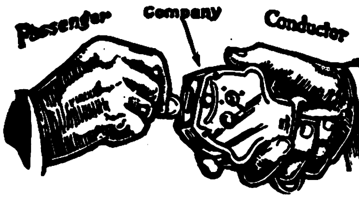
Samples and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

PS HEATERS
Car Heating and Ventilation
are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.
The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.

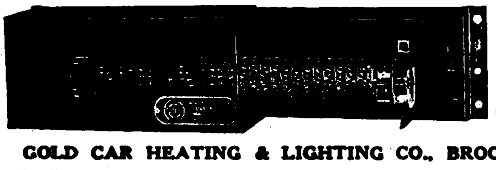
PROVIDENCE FENDERS
H-B LIFE GUARDS
The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents

Heywood-Wakefield
CAR SEATS
of pressed Steel for all Classes of Passenger Service. Rattan for covering seats and for snow sweepers.
HEYWOOD-WAKEFIELD CO.
Factory at Wakefield, Mass.
Offices at New York, Chicago, San Francisco

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition



Direct Automatic Registration By the Passengers
Rooke Automatic Register Co.
Providence, R. I.

THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED

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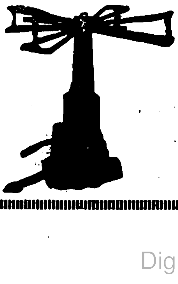
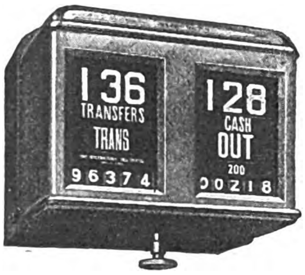
GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.


Gets Every Fare
PEREY TURNSTILES or PASSIMETERS
Use them in your Prepayment Areas and Street Cars
Perey Manufacturing Co., Inc.
101 Park Avenue, New York City



Type R-11
Double Register

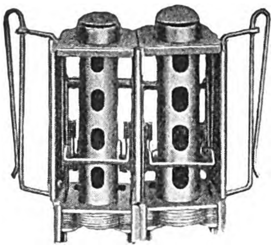
International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

Exclusive selling agents for HEEREN ENAMEL BADGES.

The International Register Co.
15 South Throop Street, Chicago, Illinois

JOHNSON Universal Changer



Adjustable

The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

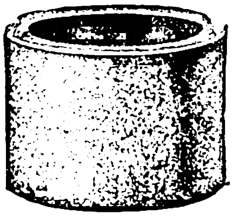
Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels to suit his personal requirements, and to facilitate the addition of extra barrels.

JOHNSON FARE BOX COMPANY
Ravenswood, Chicago. Ill.

"Longwear" Pins and Bushings

Hard—Accurate—Uniform



Renewal Materials for Peckham and other Trucks

Castings—Forgings
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E. G. Long Company
50 Church Street, New York, N. Y.

TULC
A
LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC
on your equipment

The Universal Lubricating Co.
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Tulc, Inc., Eastern Representative,
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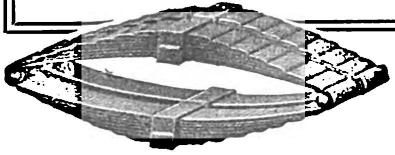
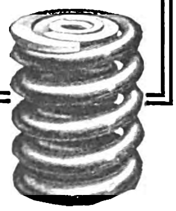
Play for safety—
plus resiliency—
plus long life
By specifying

FORT PITT SPRINGS

FORT PITT SPRING & MFG. CO.
Pittsburgh, Pa.





The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

THE KALAMAZOO
No 8

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

Let Us Tell You of Our Especially Designed Fare Box for the

ONE MAN CAR

THE CLEVELAND FARE BOX COMPANY
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ontario

For better Axles Specify

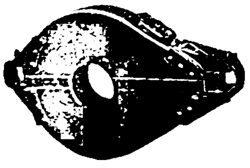
"VALSCO"
HEAT TREATED CAR AXLES
LACLEDE STEEL CO.
Arcade Bldg. St. Louis, Mo.

100 New Users in the Last Nine Months

KASS SAFETY TREADS

HIGH
in efficiency and lasting qualities
LOW
in weight, initial and upkeep costs

Morton Manufacturing Co., Chicago



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One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service—Durability and Economy. *Write Us.*

Chillingworth Mfg. Co.
Jersey City, N. J.

Griffin Wheel Company
410 North Michigan Ave.
Chicago, Ill.

GRIFFIN
F. C. S.
WHEELS

For Street and Interurban Railways

FOUNDRIES:

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Denver

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Kansas City
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St. Paul
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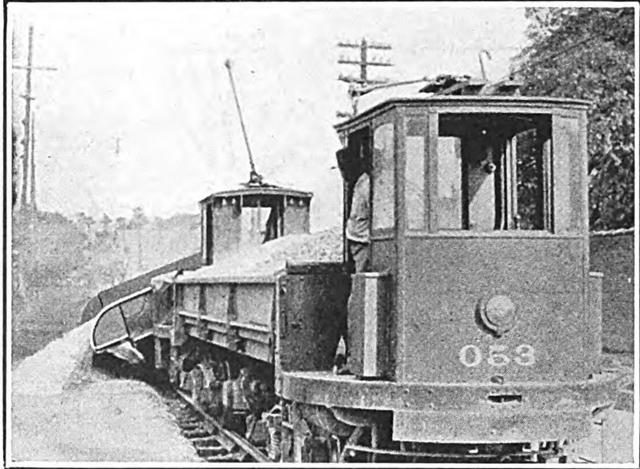
Tacoma



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DIFFERENTIAL CARS
Standard on Fifty Railways for

Track Maintenance
Ash Disposal
Placing Ballast
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Track Construction
Hauling Crossties
Disposal of Waste
Snow Disposal

Concrete Materials to the Job
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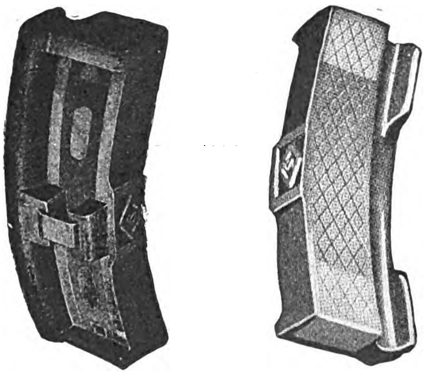
For Economy
THE CLARK CONCRETE BREAKER
THE DIFFERENTIAL BOTTOM DUMP CAR
THE DIFFERENTIAL COMBINATION
CAR-WHEEL TRUCK and TRACTOR

THE DIFFERENTIAL STEEL CAR CO.
Findlay, Ohio, U. S. A.

BRAKE SHOES
AERA Standards
Brake Heads



Diamond "S" Steel Back and Lug Shoes best for all equipment.

Manufactured and sold under U. S. Patent and Registered Trade Mark.

American Brake Shoe and Foundry Co.
30 Church Street, New York
332 So. Michigan Ave., Chicago

You're having brush trouble

CORRECT IT
USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

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345 Madison Avenue, New York
Pittsburgh Office: 634 Wabash Bldg.
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Safety cars
make
safer dividends
when equipped with
"Tool Steel" gears & pinions

Tool Steel Quality

**The Tool Steel
Gear and Pinion Co.**
CINCINNATI, O.

BUY BRUSHES
MADE IN THE U. S. A.

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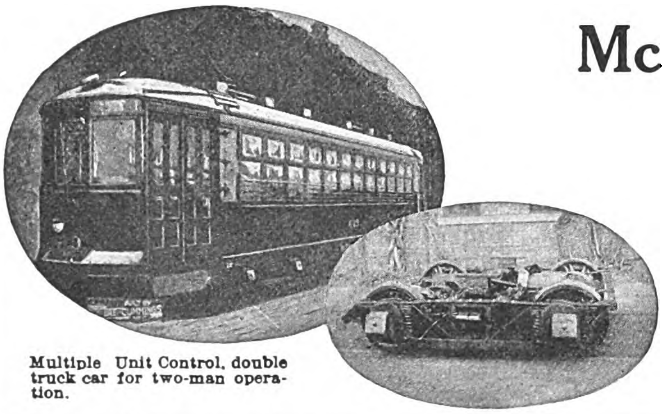
**CARBON—GRAPHITE—METAL
MOTOR AND GENERATOR
BRUSHES**

Meet every requirement

Grade recommendations, based upon your individual requirements and operating conditions, made by experienced Brush Engineers, guarantee long life and perfect service.

Write for Catalog B-3.

**THE UNITED STATES GRAPHITE
COMPANY**
SAGINAW, MICHIGAN, U. S. A.



Multiple Unit Control, double truck car for two-man operation.

McGUIRE-CUMMINGS
Manufacturing Company

**General Offices
111 W. Monroe St., Chicago, Ill.**

**Street Cars, Trucks
Snow Sweepers**

Traction Experts Sing the Praise
of **THORNTON**
Trolley Wheels

THORNTON
TROLLEY WHEEL CO.
INC.
ASHLAND KY. U.S.A.

"Best I have ever seen for high speed cars," says the master-mechanic of the Cincinnati Traction Co. "Almost impossible to wear out," says an official of the Ohio Valley Electric Railway Co. and so it goes. They are built to outlast, outclass and outrun all other trolleys—and they are doing it.. An investigation will prove it.

Thornton Trolley Wheel Co.
Incorporated
Ashland, Kentucky

**MORE-JONES
"TIGER" BRONZE
AXLE & ARMATURE
BEARINGS**

Strong-tough-durable
anti-frictional
economical

MORE-JONES BRASS & METAL CO
ST. LOUIS MISSOURI

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USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

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Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E.F J.

POSITIONS WANTED

AUDITOR, broad and thorough experience in financing and accounting; all branches railway, electric and gas utilities, open for engagement. Possess initiative and capable of assuming full control of all accounting matters. PW-758, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

EXECUTIVE, nine years manager of local street railway system in industrial town seeks larger opportunity. Thirteen years' prior experience in engineering, transportation and executive departments of large trunk line railroad. Has given special study to analyzing transportation problems and operating costs. PW-761, Electric Railway Journal, Real Estate Trust Bldg., Philadelphia, Pa.

EXECUTIVE—Twelve years' experience in engineering and operation, city and interurban; first-class record and references. PW-757, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

GENERAL superintendent of one of the largest electric railway systems, interurban and city, desires a change. Has come up through the ranks. Knows both electric railway and bus business. Capable of handling combination property. Highest references furnished confidentially. Open to any stable proposition. Wide experience with men in all departments of the business. If interested please give me an interview. Address PW-764, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

MR. MANAGER, are you in the field for a superintendent of equipment or master mechanic. If so you should realize that practical experience is an important factor in successful handling of this department. 15 years in the railway field, installation, maintenance and operation. PW-763, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

POSITION wanted by young man, thorough accountant, ten years' public utility experience middle west, six years as auditor, secretary and treasurer and assistant to manager; familiar with railway, bus, gas and electric departments. Now employed, but desire change. PW-766, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

TRAFFIC and transportation superintendent—Experienced interurban and city railway and bus operation, desire to connect with organization inaugurating bus service. PW-759, Electric Railway Journal, Leader-News Bldg., Cleveland, Ohio.

WANTED: Position with street railway company by master mechanic, 18 years' experience. Best of references. PW-765, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

**In Small Lots
As Well As Large**

THERE is a class of rail buyers, occasionally in need of only small tonnages, who are paying a premium on their purchases elsewhere because they believe that we do not seek their patronage.

We maintain a large organization to give efficient service on small orders. Our tremendous volume gives us unequaled buying power and saves our clients money regardless of the tonnage required.

Immense stocks at strategic distributing points provide complete assortments near you. This adds a saving in freight to our already unbeatable prices.

Next time you need rails, let us know your requirements.

We guarantee the same prompt, efficient service to all.

HYMAN-MICHAELS COMPANY

"The House of Dependable Service"

122 South Michigan Avenue, Chicago

**Dealers in New and Relaying Rails,
Locomotives and Railway Equipment**

District Offices: **New York, Woolworth Bldg.;
St. Louis, Railway Exchange Bldg.; Pittsburgh, First Nat'l Bank Bldg.;
San Francisco, 234 Steuart St.**
Yards: **St. Louis, East Chicago, Ind., McKee's Rocks, Pa., San Francisco.**
Cable Address: **"Hymanmikel"**
World's Largest Distributors of Rails

FOR SALE

Two Single Truck Snow Sweepers

Complete
Ready for operation
Splendid condition

Transit Equipment Co.

Cars — Motors
501 Fifth Avenue, New York

RAILS
New
Relaying
1 TON OR 1000
©LBFC

**FROGS
SWITCHES
SPLICE BARS
BOLTS
NUTS
TIE PLATES
RAIL
BRACES**

All Rails and Track Materials shipped subject to inspection and approval at destination.

L.B. Foster Co.
PITTSBURGH·PA
NEW YORK

WANTED

Order for Oak, Car Stock, Cross Ties, Switch Ties, Timber. Have four mills in operation. A good stand of timber, grades guaranteed. Prices right. Let's get acquainted.

**ENARO LUMBER MFG. CO.
411 Aouw Bldg., Little Rock, Ark.**

WE WANT TO BUY

30—West. 306-C.V.-4

MOTORS

Have you any to offer?

**ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.**

UNUSUAL 70 LB.

RAILS

ASCE Section—Low Price

ZELNICKER IN ST. LOUIS

Steel Piling—Cars—Track Material, Etc.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers & Aftercoolers
Ingersoll Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bomis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Laclede Steel Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Axles, Car Wheels
Bethlehem Steel Co.

Axles, Front & Rear, Motor Truck & Passenger Car
Timken-Detroit Axle Co.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co., The

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., J. G., The
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Suplies Co.
St. Louis Car Co.

Bearings, Roller
Norma-Hoffman Bearings Corp.

Boilers
Babcock & Wilcox Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Rail Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Rail Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Boxes, Switch
Johns-Pratt Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
Horne & Ebling Corp.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes Graphite
U. S. Graphite Co.

Brushes Wire Pneumatic
Ingersoll-Rand Co.

Buses, Motor
Brill Co., The J. G.
International Motor Co.
St. Louis Car Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
St. Louis Car Co.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Cars, Dump
Brill Co., J. G., The
Differential Steel Car Co.
St. Louis Car Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Gas, Rail
Brill Co., J. G., The
St. Louis Car Co.

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.
Horne & Ebling Corp.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceilings, Plywood, Panels
Haskelite Mfg. Co.

Chains, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.

Circuit-Breakers
Anderson, A. & J. M. Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Elec. Service Supplies Co.

Coils Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll Rand Co.
Westinghouse Tr. Br. Co.

Concrete Reinforcing Bars
Laclede Steel Co.

Condensor Papers
Irvington Varnish & Ins. Co

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll Rand Co.
Westinghouse E. & M. Co.

Connectors, Solderless
Frankel Connector Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co., The
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.

Crossing, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.

Crossings
Ramapo Ajax Corp.

Crossings, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Elec. Service Supplies Co.
Morton Mfg. Co.
St. Louis Car Co.

Dealer's Machinery
Elec. Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
St. Louis Car Co.

Doors & Door Fixtures
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ingersoll Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Ohio Brass Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Roebling's Sons & Co., J. A.

Electric Grinders
Railway Track-work Co.
Western Electric Co.

Electrodes, Carbon
Railway Track-work Co.
Rail Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Rail Welding & Bonding Co.

Engines Gas, Oil or Steam
Ingersoll Rand Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Bureau of Commercial Economics, Inc.
Byllesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Ong, Joe R.
Railway Audit & Inspection Co.
Richey, Albert S.
Robinson & Co., Dwight P.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engineering
Equipment Engineering Co.

Engines, Gas, Oil or Steam
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Fare Boxes
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Ohmer Fare Register Co.

Fare Registers
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Acme Wire Co.
Amer. Steel & Wire Co.

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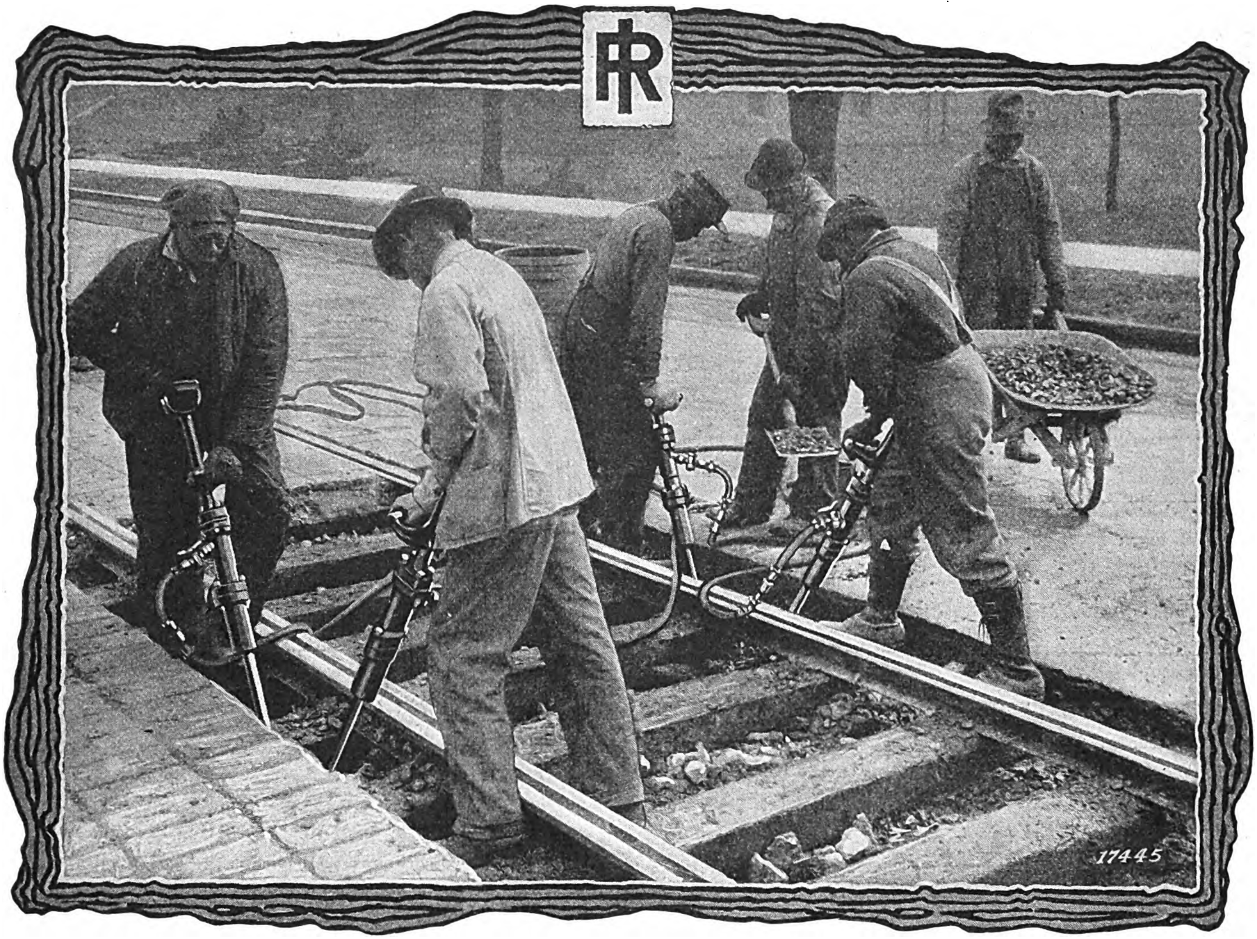

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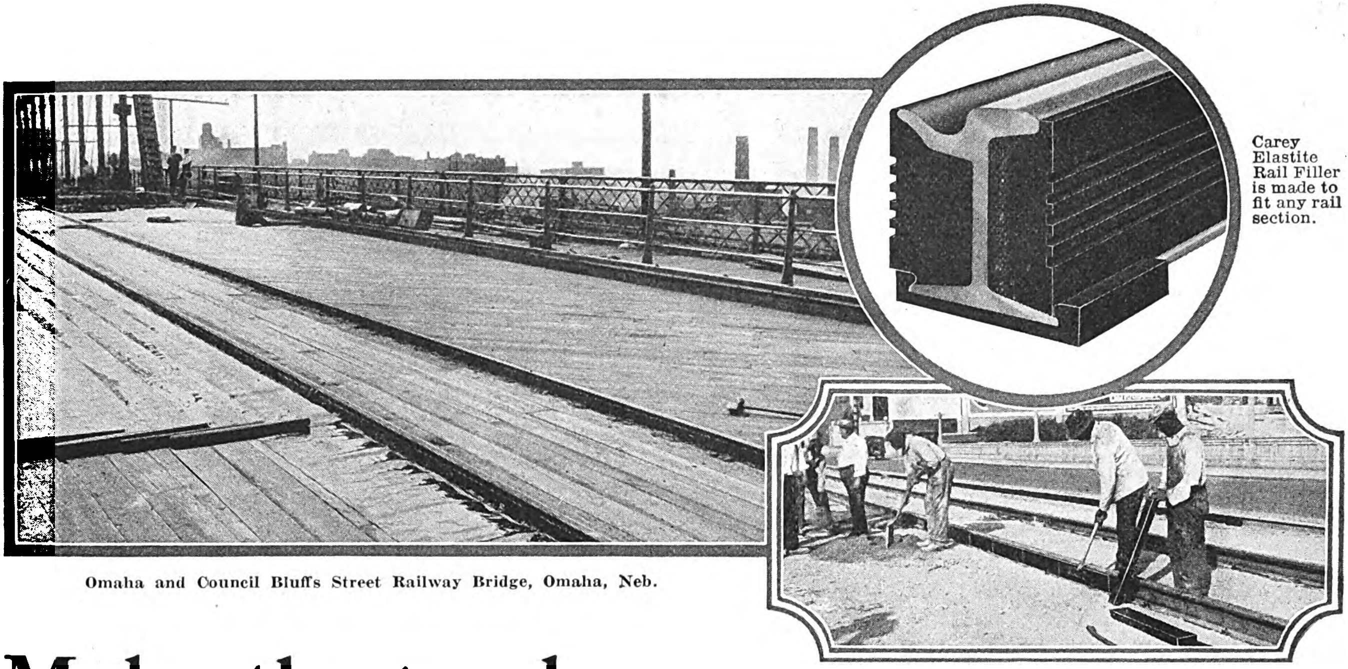

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RAIL FILLER

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West'gh'se Traction Brake Co. 6
White Eng. Corp., The J. G. 20
Wish Service, The P. Edw. 21
Wood Co., Chas. N. 28

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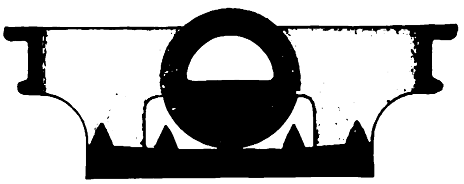

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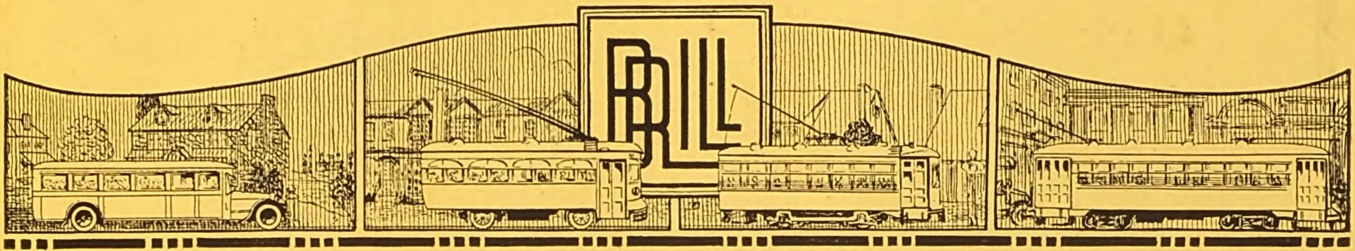

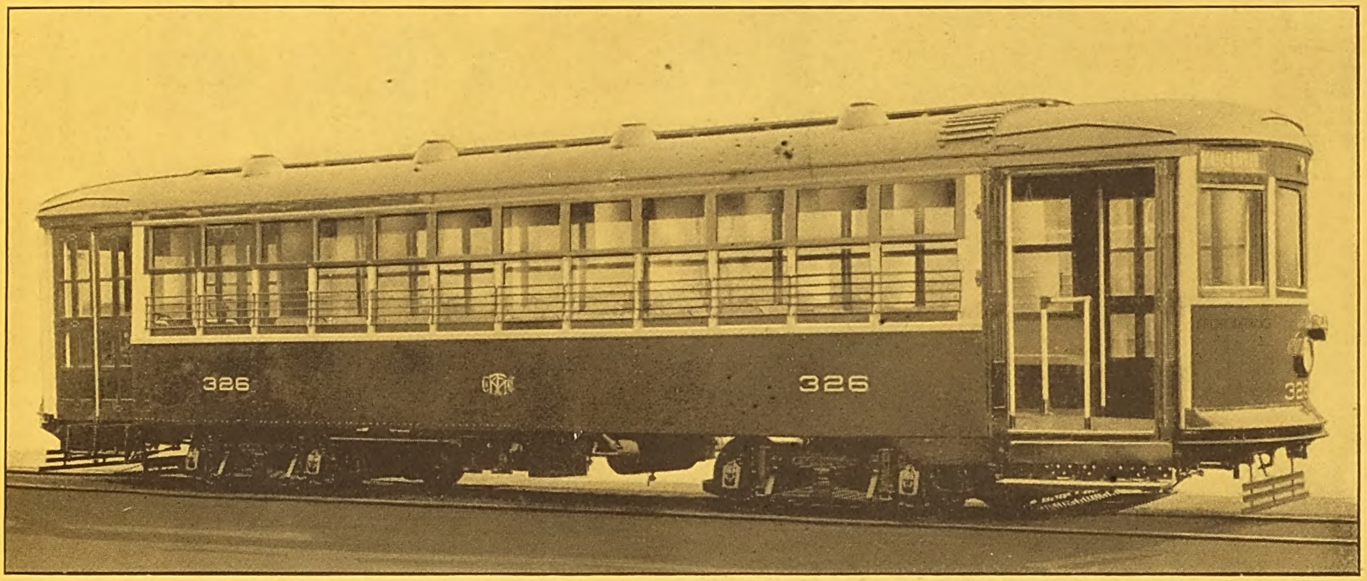

Trenton & Mercer Co. Trac. Corp.

New City and Suburban Cars

Twenty light-weight, one-man two-man cars of this type were recently built in our Philadelphia Plant for Trenton, N. J. Ten cars include quadruple 25 Hp. motor equipment for city service, and ten are equipped with quadruple 35 Hp. motors for suburban service. Otherwise, the cars are practically identical, being mounted on Brill 77-E low-level trucks equipped with Brill Twin Swing Links, measure 44 ft. long over platforms, and seat 48 passengers.

The city cars weigh 34,476 lb. and the suburban cars 36,746 lb.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
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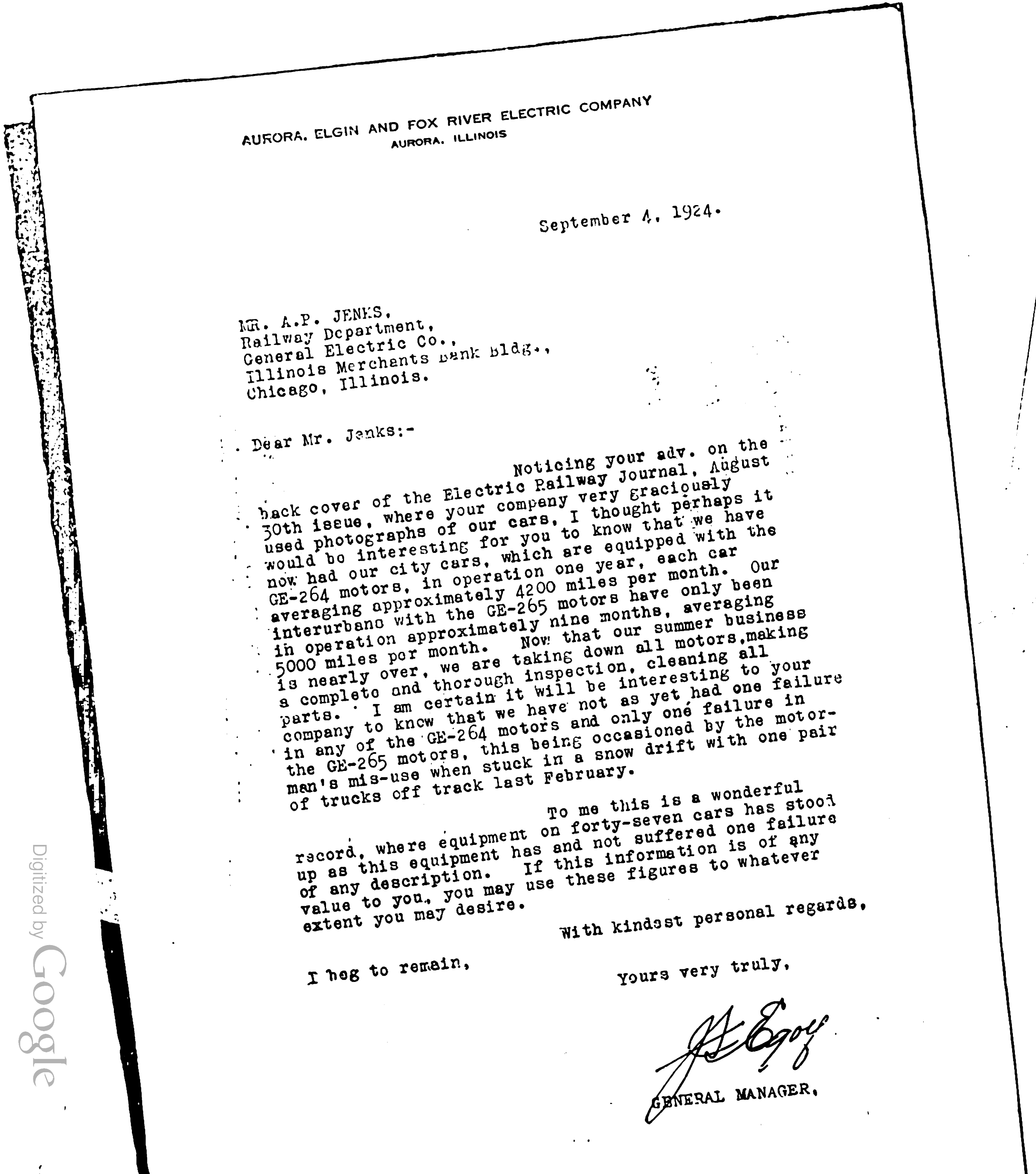


AURORA, ELGIN AND FOX RIVER ELECTRIC COMPANY
AURORA, ILLINOIS

September 4, 1924.

MR. A.P. JENKS,
Railway Department,
General Electric Co.,
Illinois Merchants Bank Bldg.,
Chicago, Illinois.

Dear Mr. Jenks:-

Noticing your adv. on the back cover of the Electric Railway Journal, August 30th issue, where your company very graciously used photographs of our cars, I thought perhaps it would be interesting for you to know that we have now had our city cars, which are equipped with the GE-264 motors, in operation one year, each car averaging approximately 4200 miles per month. Our interurbans with the GE-265 motors have only been in operation approximately nine months, averaging 5000 miles per month. Now that our summer business is nearly over, we are taking down all motors, making a complete and thorough inspection, cleaning all parts. I am certain it will be interesting to your company to know that we have not as yet had one failure in any of the GE-264 motors and only one failure in the GE-265 motors, this being occasioned by the motorman's mis-use when stuck in a snow drift with one pair of trucks off track last February.

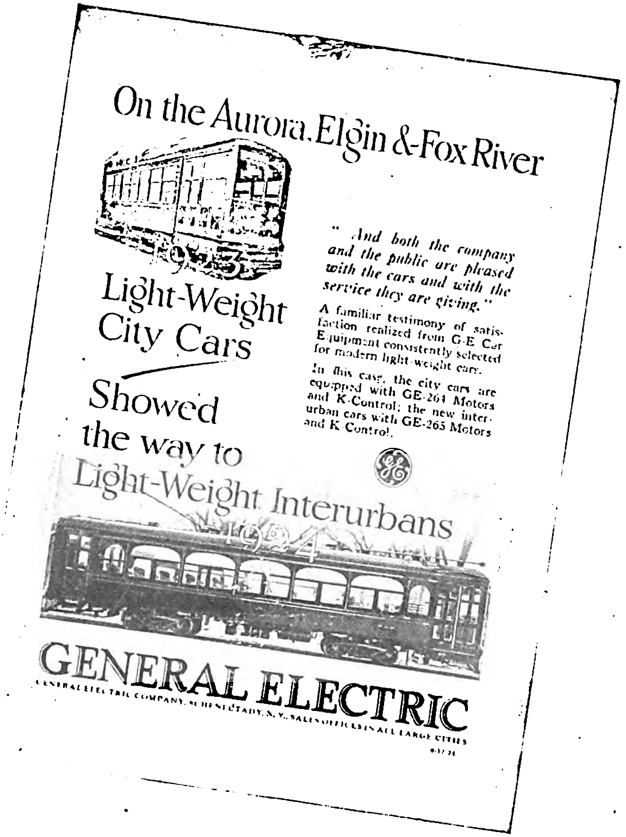
To me this is a wonderful record, where equipment on forty-seven cars has stood up as this equipment has and not suffered one failure of any description. If this information is of any value to you, you may use these figures to whatever extent you may desire.

With kindest personal regards,

I beg to remain,

Yours very truly,

GENERAL MANAGER.



On the Aurora, Elgin & Fox River

Light-Weight City Cars

Showed the way to Light-Weight Interurbans

"And both the company and the public are pleased with the cars and with the service they are giving."

A familiar testimony of satisfaction realized from G-E Car Equipment consistently selected for modern light-weight cars.

In this case, the city cars are equipped with GE-264 Motors and K-Control; the new interurban cars with GE-265 Motors and K-Control.

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G-E modern equipment on this middle-west road is living up to the high standard it has set on many other progressive properties.

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